20 INTERNATIONAL CLINICAL ONCOLOGY CONGRESS

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Dr. Ali Motlagh

President of the 20 th Iranian Society of Clinical Oncology Congress

The 20th Iranian Clinical Oncology Congress is convening at a time when the oncology community of our country reflects on more than five decades of continuous engagement in cancer care, education, and research—and three decades of organizing the Clinical Oncology Congress as a structured platform for scientific exchange, professional experience, and innovation. This long and distinguished journey has positioned us today to move forward confidently, relying on the scientific and professional capacities of our country, alongside global standards, and to contribute meaningfully to the advancement of cancer care.

This year's program reflects the rapid transformation of the oncology landscape. Alongside remarkable progress in modern radiotherapy—from precision techniques and AI-based planning to personalized treatment—major developments in systemic therapies, particularly immunotherapy and targeted treatments, have opened new horizons for both patients and specialists. The strong presence of these topics within the scientific agenda offers an exceptional opportunity for national knowledge renewal and enhanced clinical decision-making.

While the foundation of this event is the Iranian Society of Clinical Oncology, its true strength lies in the synergy among the disciplines that together shape the continuum of cancer care. As in previous years, the four groups of Medical Physics, Radiobiology, Radiation Therapy Technology, and Oncology Nursing, through dedicated halls and focused scientific programs, serve as complementary pillars of the congress.

This year, we are also pleased to welcome a fifth group—general practitioners and family physicians—whose presence reflects the congress's emphasis on integrated and continuous cancer care, from prevention and early detection to treatment and long-term follow-up. In the international section, we are honored, for the fifth consecutive year, to continue our valuable collaboration with two distinguished European institutions, ESTRO and ESMO. Through scientific endorsement and joint sessions, this partnership has provided an effective platform for knowledge exchange, scientific standardization, and strengthened global engagement, further enhancing Iran's position within the international oncology network.

On behalf of the Iranian Society of Clinical Oncology, I extend my sincere gratitude to all professors, specialists, residents, nurses, technologists, researchers, general practitioners, and colleagues whose scientific and organizational contributions have enriched this congress. I also express my special appreciation to the universities, national and international institutions, and organizations whose support made this event possible.

I hope that the 20th Iranian Clinical Oncology Congress will be an effective step toward improving the quality of cancer care, advancing education and research, and strengthening interdisciplinary and international collaboration—and ultimately, toward enhancing the quality of life of our patients, which is the ultimate goal for all of us.

Dr. Ali Motlagh

President, 20th Iranian Society of Clinical Oncology Congress

President, Iranian Society of Clinical Oncology

Dr.Hamid Saeidi Saedi

Scientific Chairperson of Clinical Oncology Congress

In the Name of God

Dear Colleagues, Professors, and Researchers

It is a great honor for me, as the Scientific Secretary of the Clinical Oncology Congress; to welcome your valuable participation in this significant scientific event. Our primary goal in organizing this congress is to create a platform for exchanging the latest scientific, research, and therapeutic achievements in the field of cancer, thereby elevating the knowledge and skills of specialists in this field.

In recent years, remarkable progress has been made in the diagnosis, treatment, and care of cancer patients. Nevertheless, the complexity of the disease and its increasing prevalence further highlight the necessity for interdisciplinary collaboration and the utilization of evidence-based methods. We hope that by focusing on novel topics in clinical oncology, presenting key lectures, hosting specialized panel discussions, and showcasing outstanding papers, this congress can take an effective step towards advancing knowledge and improving the quality of patient care.

I sincerely thank all the professors, researchers, and colleagues who have contributed to this congress through the submission of articles, the presentation of valuable experiences, and their active attendance. Your participation is undoubtedly a source of pride and motivation for continuing this scientific journey.

We hope this gathering will provide an opportunity for constructive academic interactions and the expansion of research collaborations at both national and international levels, leading to effective strides in the future toward reducing the burden of cancer in our society.

Dr.Hamid Saeidi Saedi

Scientific Chairperson of Clinical Oncology Congress

Associate Professor of Radio-Oncology, Guilan University of Medical Sciences

Dr. Masoume Sajjadi Rad

Executive Chairperson of Clinical Oncology Congress

Dear Colleagues and Professors

It is a great pleasure and honor to once again be with you—the Iranian Oncology community—at the 1404 Clinical Oncology Congress. Your presence is what annually transforms this event into a vibrant forum for learning, networking, and the exchange of valuable experiences.

Over the past months, our focus has been on developing a precise, practical, and inspiring program. This year's agenda is designed to promote effective discussions, highlight new advancements, and foster meaningful collaborations among all participants. I am confident that your active engagement will once again make this congress a memorable and impactful event.

Thank you for your continued support and participation. We look forward to welcoming you at the congress.

Sincerely

Dr. Masoumeh Sajjadi Rad

Executive Secretary, 1404 Clinical Oncology Congress

Code:O-1

Title: Radiation Sensitization of Breast Cancer Cells Using TiO2–Au Nanohybrids: Enhanced Cytotoxicity and ROS Generation Under 4 Gy X-ray Exposure

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Introduction: Nanomaterial-based radiosensitizers have the potential to increase tumor-specific radiation. Herein, the radiosensitization properties of titanium dioxide–gold nanohybrids (TiO2–Au NHs) were studied in MCF-7 breast cancer cells irradiated with a clinically relevant dose of X-rays.

Materials and Methods: TiO2-Au NHs were synthesized and thoroughly characterized using FESEM, TEM, UV-vis spectroscopy, zeta potential, and EDS analysis. TiO2–Au NHs were applied and incubated on MCF-7 cells at the concentration of 50 µg/mL 4h prior irradiation. Cells were divided into three groups: control (untreated), RT alone (4 Gy), and RT plus TiO2–Au NHs. Cell viability was assessed by MTT assay 24h post-treatment. Intracellular reactive oxygen species (ROS) were evaluated by DCFH-DA fluorescence. Combination indices (CI) analysis was carried out for radiosensitization synergy determination.

Results: RT alone produced a moderate cytotoxic effect, reducing cell viability to 72.1%. In contrast, RT with TiO2–Au NHs significantly enhanced treatment efficacy, reducing viability to 37.9% ($p < 0.01$ vs. RT alone). ROS analysis showed a marked increase in fluorescence intensity in the RT+NH group, confirming enhanced oxidative stress compared to RT alone. CI analysis demonstrated strong synergy between TiO2–Au NHs and X-ray irradiation (CI=1.44), consistent with a radiosensitizing mechanism attributed to increased secondary electron generation and amplified ROS production.

Conclusion: Significant increase in ROS and synergistic interaction suggested that TiO2–Au NHs can be an efficient radiosensitizer. These results prompted further evaluation of the potential of TiO2–Au NH–mediated radiotherapy potentiation for improving therapeutic gain or dose reduction in breast cancer treatment.

Keywords: Radiotherapy' 'Radiosensitization' 'Nanomedicine' 'ROS'

How to Cite: Faghani-Eskandarkolaei, P., Haghighi, H., & Sattarahmady, N. (2026). Radiation sensitization of breast cancer cells using TiO_2–Au nanohybrids: Enhanced cytotoxicity and ROS generation under 4 Gy X-ray exposure. (Abstract No. O-1). Asian Pacific Journal of Cancer Care, 11(S1).12 https://doi.org/10.31557/APJCC.2026.11.S1.1

Asian Pacific Journal of Cancer Care | DOI: 10.31557/APJCC.2026.11. S1.1

Code:O-2

Title: Pulsed Low Dose Rate Radiotherapy (PLDR) as a Novel Strategy for Reirradiation of Recurrent Tumors: A Comprehensive Review of Efficacy, Safety, and Radiobiological Mechanisms

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Introduction: Pulsed Low Dose Rate Radiotherapy (PLDR) is an innovative reirradiation approach designed to minimize normal-tissue toxicity while maintaining therapeutic efficacy in patients with recurrent tumors. In this technique, the daily dose is typically delivered as ten consecutive pulses of 0.2 Gy, separated by 3-minute intervals, resulting in an effective dose rate of approximately 0.066–0.1 Gy/min. This pulsed delivery pattern leverages radiobiological mechanisms such as sublethal damage repair in normal tissues and low-dose hyper-radiosensitivity in tumors. Consequently, PLDR enables safe retreatment in clinical scenarios where prior cumulative radiation doses exceed the thresholds that would otherwise prevent conventional reirradiation.

Materials and Methods: This work was conducted as a structured narrative review through comprehensive searches of PubMed, Scopus, and Web of Science up to 2025. Keywords including “PLDR,” “pulsed reduced dose rate,” “reirradiation,” and “recurrent tumors” were used individually and in combination. Eligible studies included clinical trials, retrospective analyses, case reports, technical protocols, and relevant preclinical research addressing PLDR delivery, radiobiological mechanisms, treatment efficacy, and toxicity. Extracted data included tumor type, PLDR protocol, device setup parameters (such as programmed beam-hold intervals, use of IMRT/VMAT or 3D-CRT), clinical outcomes, acute and late toxicity, and cumulative organ doses. Information was synthesized qualitatively to provide an integrated overview of PLDR’s clinical performance.

Results: Patients treated with PLDR—particularly those with previously irradiated regions such as the CNS, head and neck, breast, thorax, and pelvis—exhibited better treatment tolerance and reduced incidence of severe complications including tissue necrosis, high-grade mucositis, cutaneous injury, cystitis, and proctitis. Delivering radiation in 0.2-Gy pulses with controlled inter-pulse intervals consistently reduced late normal-tissue injury and improved local control, especially in CNS and breast lesions where organ sensitivity limits conventional reirradiation. Technically, PLDR can be implemented on standard LINAC systems without dedicated hardware, utilizing timed beam interruptions, gating functions, or automated pauses, and is compatible with IMRT, VMAT, and 3D-CRT delivery. Overall, the accumulated evidence supports PLDR as a reliable and clinically practical option for patients in whom conventional reirradiation carries unacceptable risks.

Conclusion: By providing an optimal balance between reduced toxicity and maintained efficacy, PLDR offers a valuable and increasingly adopted strategy for managing recurrent tumors. While current findings are encouraging, further large-scale clinical trials and standardized protocols are needed to fully establish its therapeutic role.

Keywords: PLDR, Reirradiation, Recurrent tumors, Toxicity

How to Cite: Nikzad, S., & Saeb, M. (2026). Pulsed low dose rate radiotherapy (PLDR) as a novel strategy for reirradiation of recurrent tumors: A comprehensive review of efficacy, safety, and radiobiological mechanisms. (Abstract No. O-2). Asian Pacific Journal of Cancer Care, 11(S1).13 https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-3

Title: Radiogenomics and Machine Learning: From Imaging Features to Clinical Decision Support

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Introduction: Radiogenomics, as an emerging component of precision oncology, integrates quantitative imaging features with genomic and multi-omics data to identify imaging biomarkers linked to molecular characteristics, treatment response, and patient outcomes. Over the past decade, radiogenomics research has expanded substantially, driven by advances in imaging analytics, genomics, and machine learning.

Materials and Methods: A narrative literature search was conducted in PubMed and supplemented with Google Scholar, covering English-language human studies published between 2015 and 2025. Approximately 200 full-text articles were reviewed (≈100 reviews and ≈100 original studies). Eligibility was based on integration of radiological imaging with gene expression or multi-omics data, with particular emphasis on machine learning–based radiogenomic modeling. Data were extracted on cancer types, imaging modalities, datasets, feature extraction tools, and predictive modeling strategies.

Results: Radiogenomics studies have mainly focused on glioblastoma, breast, lung, and liver cancers. MRI is commonly used in brain and breast research, while CT dominates lung and liver studies; PET is mostly applied in thoracic oncology. Public datasets such as TCGA, TCIA, CPTAC, and BraTS are the primary data sources. Feature extraction typically relies on PyRadiomics and IBEX, and various machine-learning models are used to predict molecular subtypes, treatment response, and survival. Multi-omics approaches show better predictive performance. The major limitations are the lack of external validation and heterogeneity in imaging acquisition protocols.

Conclusion: Radiogenomics research from 2015 to 2025 demonstrates strong potential for developing non-invasive biomarkers capable of predicting tumor biology and clinical outcomes. The field is rapidly moving toward multi-omics integration and advanced machine learning methods, which consistently outperform traditional radiomics alone. However, standardized imaging protocols, larger harmonized datasets, and multi-institutional validation remain critical for enabling clinical translation. These advancements are necessary for radiogenomics to become an actionable tool in precision oncology.

Keywords: Radiogenomics, Machine Learning, cancer

How to Cite: Haghshenas, Z., & Mozdarani, H. (2026). Radiogenomics and machine learning: From imaging features to clinical decision support. (Abstract No. O-3). Asian Pacific Journal of Cancer Care, 11(S1):14. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-4

Title: Nanoparticle-Based Radioprotectors for Mitigating Ionizing Radiation-Induced Biological Damage: A Systematic Review

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Introduction: Ionizing radiation is commonly used in medicine and research, but can damage healthy tissues. Traditional radioprotectors have toxicity and effectiveness limitations. Nanoparticles present a promising solution, as they can enter cells, neutralize free radicals, reduce inflammation, and act as drug carriers. Despite encouraging preclinical results, challenges persist. This review highlights current research and identifies gaps in nanotechnology-based radioprotection.

Materials and Methods: This review followed PRISMA guidelines. In April 2025, we searched PubMed, Scopus, and Web of Science using the keywords “nanoparticle,” “radioprotector,” and “ionizing radiation.” Included were English articles on nanoparticle radioprotectors detailing type, dose, administration, and outcomes. We excluded non-English studies, abstracts, editorials, and research on radiosensitizers or non-ionizing radiation. Duplicates were removed with EndNote, and two reviewers screened and analyzed the studies.

Results: Out of 2,953 records, 51 studies published from 2008 to 2025 met the criteria, examining various nanoparticle formulations in vitro and in vivo. Radiation doses ranged from 0.2 to 24 Gy, mainly using X-rays and gamma rays. These nanoparticles showed consistent radioprotective effects in different tissues by reducing reactive oxygen species, limiting oxidative stress, and preventing DNA damage. Reports also indicated improvements in tissue architecture and cellular recovery after ionizing radiation exposure.

Conclusion: Nanoparticle-based radioprotectors show promise in mitigating biological damage from ionizing radiation via antioxidant, anti-inflammatory, and DNA-protective effects. Studies reveal their potential to reduce oxidative stress and tissue injury. However, challenges in biosafety and clinical use remain. This review emphasizes the need for standardized research and long-term studies to optimize nanoparticle formulations for radiotherapy and protection

Keywords: Nanoparticles-Radiation-Protective Agents-Ionizing Radiation-Systematic Review

How to Cite: Hosseini Firouzkalaei, S. S., Azmoonfar, R., Khodaveisi, T., & Jafari, S. (2026). Nanoparticle-based radioprotectors for mitigating ionizing radiation-induced biological damage: A systematic review. (Abstract No. O-4). Asian Pacific Journal of Cancer Care, 11(S1):15. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-5

Title: Radiation-Induced Xerostomia Predictor in Head and Neck Cancer Patients Undergoing IMRT: Contralateral Parotid Dosimetry

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Introduction: Radiation-induced xerostomia (RIX) is a common and debilitating complication for head and neck cancer (HNC) patients, severely impacting their quality of life (QoL). The QUANTEC mean dose (Dmean) constraint (≤ 25 Gy) for the parotid gland (PG) is used during IMRT treatment planning. This study evaluated the association between parotid dose-volume parameters and the incidence of RIX

Materials and Methods: In a prospective study, 45 patients with pathologically confirmed HNC undergoing definitive IMRT were followed for one year. Unstimulated whole saliva flow was quantified using the Modified Schirmer Test (MST) at baseline (pre-RT) and post-treatment. Dose-volume histogram (DVH) parameters for ipsilateral and contralateral PGs (Dmean, V15, V30, V45) were compared using Student's t-tests, while multivariate logistic regression identified independent predictors.

Results: No significant association was found between the ipsilateral DVH parameters and RIX index; however, contralateral were significant ($p < 0.05$). Contralateral Dmean was 22.84 Gy in the RIX group versus 18.57 Gy in the non-RIX group ($p=0.025$). Among all metrics, contralateral V45 demonstrated the most significant association with RIX ($p = 0.001$). Multivariate analysis identified contralateral Dmean as an independent predictor of RIX ($p = 0.040$), where a 1.0 Gy increment in Dmean causes a 22.3% increase in xerostomia

Conclusion: Our findings confirm that contralateral parotid dosimetry is the key independent factor for RIX development, even when QUANTEC guidelines are met. These results support the adoption of a more stringent dose constraint for the contralateral parotid gland (Dmean ≤ 20 Gy) to minimize the risk of clinically significant xerostomia and improve patient quality of life.

Keywords: IMRT- Xerostomia -QUANTEC- Parotid Gland

How to Cite: Sharifian Jazi, S., Mehnati, P., Khezerloo, D., Khademi, M., Abedi, I., & Shams, A. (2026). Radiation-induced xerostomia predictor in head and neck cancer patients undergoing IMRT: Contralateral parotid dosimetry. (Abstract No. O-5). Asian Pacific Journal of Cancer Care, 11(S1):16. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-6

Title : Prediction of Delta Radiomics and Radiation-Induced Xerostomia in Head & Neck Radiotherapy: A Systematic Review

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Introduction: Xerostomia following head and neck radiotherapy debilitates patient well-being and long-term quality of life. Recently, "delta-radiomics" has been considered a robust quantitative workflow for managing radiation-induced toxicities. This is a consistent longitudinal evaluation of image quantitative features across several time points during the treatment course. This method has facilitated a new approach to early predicting radiation-induced toxicities.

Materials and Methods: For this systematic review, we conducted an exhaustive literature search across major databases, including Web of Science, PubMed, Scopus, and the Cochrane Library. This systematic review adhered strictly to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. The search timeframe encompassed articles published from January 2010 through September 2025 to ensure comprehensive coverage of the recent literature

Results: The collected data from fifteen studies, which included more than 1400 patients, revealed that delta-radiomics from standard imaging modalities (CT, CBCT, MVCT, MRI) within the initial weeks of treatment courses significantly enhances predictive accuracy for xerostomia compared to radiomics and dosimetric methods. Furthermore, integrated models that combined dynamic imaging features with clinical variables achieved outstanding discriminatory performance (AUC: 0.90–0.97). Notably, early morphological alterations, especially within the contralateral parotid gland, were identified as robust predictors for subsequent toxicity

Conclusion: The findings indicate that delta-radiomics is a capable and clinically feasible tool for early assessment of the risk of xerostomia, and can serve as a suitable toolbox for adaptive radiotherapy strategies. In future research, standardization and generalization of image acquisition techniques and radiomics analysis protocols should be prioritized.

Keywords: Delta Radiomics, Xerostomia, Adaptive Radiotherapy

How to Cite: Sharifian, S., Mehnati, P., Khezerloo, D., Khademi, M., Abedi, I., & Shams, A. (2026). Prediction of delta radiomics and radiation-induced xerostomia in head & neck radiotherapy: A systematic review. (Abstract No. O-6). Asian Pacific Journal of Cancer Care, 11(S1):17. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-7

Title: Nursing Management of Radiotherapy-Induced Skin Complications in Cancer Patients: A Systematic Review

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Introduction: Radiotherapy-induced skin complications significantly challenge cancer care, impacting treatment continuity and quality of life. This review synthesizes evidence on nursing management strategies for these conditions.

Materials and Methods: Following PRISMA 2020 guidelines, we searched PubMed, Scopus, Web of Science, Cochrane Library, SID, and MagIran (2010-2024) using keywords including "Radiation Dermatitis," "Nursing Care," "Skin Toxicity," "Radiotherapy Side Effects," "Oncology Nursing," and their Persian equivalents. We included randomized trials, cohort studies, and interventional investigations examining nursing-led care for radiation dermatitis. Qualitative studies and case reports were excluded. Two researchers independently conducted three-phase screening (titles, abstracts, full-texts), with a third resolving disagreements. Data extraction followed standardized protocols, and methodological quality was assessed using Cochrane and Newcastle-Ottawa tools. Qualitative data underwent thematic synthesis while quantitative findings were descriptively summarized.

Results: 20 studies met inclusion criteria. Preventive nursing interventions—particularly calendula-based creams, aloe vera, and mild steroids—effectively reduced dermatitis severity. Hydrocolloid dressings and silicone gels promoted healing in acute cases. Cold compresses and antipruritic products alleviated itching and burning. Educational programs enhanced self-care capabilities and clinical outcomes. All interventions collectively reduced pain, improved quality of life, and increased patient satisfaction.

Conclusion: Structured nursing management effectively addresses radiotherapy-induced skin complications. Evidence-based skin care protocols under nursing supervision should be essential to comprehensive radiotherapy services.

Keywords: Oncology Nursing_ Skin Care_ Radiotherapy

How to Cite: Ramezani, S. A, & Tamimi, A. (2026). Nursing management of radiotherapy-induced skin complications in cancer patients: A systematic review. (Abstract No. O-7). Asian Pacific Journal of Cancer Care, 11(S1):18. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-8

Title: Prevalence and Pattern of Mental Disorders Among Cancer Survivors: A Systematic Review

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Introduction: While cancer recovery marks a significant treatment success, many survivors continue to face persistent psychological challenges that impair their quality of life. This systematic review aimed to determine the prevalence, distribution patterns, and associated factors of mental disorders in cancer survivors.

Materials and Methods: Following the PRISMA guidelines, a comprehensive search was conducted across international and national databases including PubMed, Scopus, Web of Science, Cochrane Library, PsycINFO, SID, and Magiran. Keywords such as "mental disorders," "cancer survivors," "mental health," "depression," "anxiety," and "post-traumatic stress disorder" and their Persian equivalents were used, covering publications from 2010 to 2024. Two researchers independently screened and selected studies, with a third researcher resolving discrepancies. Study quality was assessed using ROBINS-I and the Newcastle-Ottawa Scale.

Results: Of the 325 studies identified, 28 met the inclusion criteria. Analysis revealed a substantial overall prevalence of mental disorders among cancer survivors. Depression was the most common disorder, followed by anxiety and post-traumatic stress disorder. Key influencing factors included cancer type, disease stage, time since diagnosis, gender, age, and level of social support. Sleep disorders and adjustment disorders were also frequently reported.

Conclusion: The notable prevalence of mental disorders among cancer survivors underscores the need for regular screening and targeted psychological interventions. Training healthcare teams in early identification and management of these conditions is strongly recommended.

Keywords: Mental disorders, Cancer survivors, Depression

How to Cite: Ramezani, S. A, & Tamimi, A. (2026). Prevalence and pattern of mental disorders among cancer survivors: A systematic review. (Abstract No. O-8). Asian Pacific Journal of Cancer Care, 11(S1):19. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-9

Title: Efficacy of Nurse-Led Nutritional Interventions in Chemotherapy Patients: A Systematic Review

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Introduction: Chemotherapy-induced nutritional complications significantly impact treatment outcomes and quality of life. This systematic review examines the effectiveness of structured nutritional nursing interventions in managing treatment-related side effects and improving clinical parameters.

Materials and Methods: Following PRISMA 2020 guidelines, we systematically searched seven databases (PubMed, Scopus, Web of Science, Cochrane Library, CINAHL, SID, Magiran) until September 2024. The search strategy employed Boolean operators to combine relevant MeSH terms and keywords including "nutritional nursing," "chemotherapy toxicity," and "symptom management." We included randomized controlled trials and prospective cohort studies involving adult cancer patients receiving chemotherapy. Study selection involved independent screening by two reviewers, with conflicts resolved by a third reviewer. Data extraction documented study characteristics, intervention protocols, and outcome measures. Methodological quality was assessed using Cochrane RoB 2.0 and Newcastle-Ottawa tools.

Results: Among 257 identified studies, 18 met inclusion criteria. Nutritional nursing interventions demonstrated significant reductions in nausea, vomiting, and appetite loss. Marked improvements were observed in nutritional status indicators including body weight, BMI, and serum albumin levels. Enhanced treatment tolerance was evidenced by reduced hospitalization duration and decreased hematological complications. The most effective interventions incorporated structured education, continuous monitoring, and individualized counseling.

Conclusion: Nurse-led nutritional interventions effectively mitigate chemotherapy-related adverse effects and improve clinical outcomes. Integration of these evidence-based strategies into standard oncology nursing practice can significantly enhance patient care quality and treatment success.

Keywords: Nutritional nursing, Chemotherapy_ Clinical outcomes

How to Cite: Ramezani, S. A, & Tamimi, A. (2026c). Efficacy of nurse-led nutritional interventions in chemotherapy patients: A systematic review. (Abstract No. O-9). Asian Pacific Journal of Cancer Care, 11(S1):20. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-10

Title: Effectiveness of Nurse-Led Complementary Therapy Interventions in Managing Cancer Treatment-Related Symptoms: A Systematic Review

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Introduction: The use of complementary therapy interventions as an adjunct approach to standard oncology treatments is expanding for managing cancer treatment-related adverse effects. This systematic review aimed to evaluate the effectiveness of nurse-supervised complementary therapy interventions in managing these side effects.

Materials and Methods: This systematic review was conducted according to the PRISMA protocol. A comprehensive search of PubMed, Scopus, Web of Science, Cochrane Library, and Google Scholar was performed for studies published between 2010 and 2024. Search terms included "Complementary Therapy," "Oncology Nursing," "Cancer," "Symptom Management," and related keywords. Included studies were randomized controlled trials and clinical trials examining nurse-supervised complementary therapies (e.g., acupuncture, yoga, massage, mindfulness, herbal medicine) for managing cancer treatment-related symptoms including nausea, vomiting, fatigue, pain, anxiety, and sleep disorders. Study screening and data extraction were performed independently by two researchers, with a third researcher resolving discrepancies. Study quality was assessed using the Cochrane risk-of-bias tool.

Results: Of 500 identified studies, 28 met the inclusion criteria. These studies examined interventions including acupuncture, yoga and mind-body exercises, massage therapy, and aromatherapy under nurse supervision. Meta-analysis demonstrated that these interventions significantly reduced chemotherapy-induced nausea and vomiting, cancer-related fatigue, and anxiety levels compared to standard care. Significant improvements in sleep quality and pain reduction were also observed. No serious adverse events related to these interventions were reported.

Conclusion: Nurse-supervised complementary therapy interventions are an effective and safe strategy for managing common cancer treatment-related adverse effects. These findings support integrating these interventions into standard nursing care protocols.

Keywords: Complementary Therapy Oncology Nursing Cancer

How to Cite: Ramezani, S. A, & Tamimi, A. (2026). Effectiveness of nurse-led complementary therapy interventions in managing cancer treatment-related symptoms: A systematic review. (Abstract No. O-10). Asian Pacific Journal of Cancer Care, 11(S1):21. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-11

Title: Presentation of a new averaging method for improvement of systematic and random errors in radiotherapy of chest and abdomen cancer using EPID

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Introduction: The aim of this study is to introduce and evaluate a new averaging method to decrease systematic and random errors using electronic portal imaging devices (EPID) in radiotherapy of chest and abdomen cancers.

Materials and Methods: 33 patients were evaluated who had tumors in different chest or abdominal organs and treated at a radiotherapy department. A novel averaging method for decreasing systematic and random errors was introduced and compared with conventional methods in radiation therapy for chest and abdomen cancers. Three methods were evaluated. In method 1 averaging by EPID was not performed. While in method 2, EPID sessions that had outlier data were also included in the averaging, which can increase the error. The new method included, removing the EPID sessions that had high random errors and also increasing the number of EPID sessions, and averaging from more accurate data.

Results: For comparison between optimized averaging (method 3) and 3-first fraction averaging (method 2) methods in terms of individual mean set-up error, p-value was 0.00 which indicates a significant difference between these two methods. In the optimized averaging method (method 3) the square root individual mean set-up errors were lower than other methods. In method 3 just one patient has a systematic error greater than the gross error whereas that of in method 2 and 3 accounted for 4 and 10 patients, respectively.

Conclusion: The optimized averaging method introduces a great improvement in chest and abdomen cancers radiotherapy by decreasing systematic errors and increasing treatment accuracy.

Keywords: EPID, systematic error, random error

How to Cite: Asgari, M. R., Ghorbani, M., Khosravi, M., Shakeri, A., Forouzanfar, D., Pursamimi, M., & Tavakoli, M. (2026). Presentation of a new averaging method for improvement of systematic and random errors in radiotherapy of chest and abdomen cancer using EPID. (Abstract No. O-11). Asian Pacific Journal of Cancer Care, 11(S1):22. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-12

Title: Accelerator-Based BNCT and Nanoparticle Boron Delivery: Advances in Physics and Clinical Applications

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Introduction: Boron Neutron Capture Therapy (BNCT) is a binary particle-based cancer therapy that relies on the nuclear reaction ^10B(n,α)^7 Li, which generates high-LET particles capable of selectively destroying tumor cells that have taken up boron. For several decades, the dependence on nuclear reactors restricted BNCT to research settings and limited its clinical availability. In recent years, however, the development of accelerator-based neutron sources has enabled the establishment of BNCT units within hospital environments. Parallel advances in boron-carrying nanomaterials have improved tumor targeting, cellular uptake, and pharmacokinetic profiles, opening new opportunities for expanding BNCT into routine clinical practice.

Materials and Methods: This review examined peer-reviewed publications from 2018 to 2025 focusing on two major areas: (1) accelerator-driven neutron sources for BNCT, and (2) nanostructured boron delivery platforms. Literature was retrieved from PubMed, SpringerLink, and MDPI using the keywords "accelerator BNCT," "boron nanoparticles," and "clinical BNCT." Selected studies were organized into three domains—physical principles, dosimetric modeling, and clinical applications. Clinical and technical reports from accelerator facilities such as those in Helsinki and Buenos Aires were compared against historical reactor-based systems. In addition, emerging nanoparticle platforms—such as boron-doped carbon materials, liposomal carriers, and antibody-conjugated nanostructures—were evaluated relative to the conventional compounds BPA and BSH.

Results: Accelerator-based BNCT facilities provide sufficient neutron flux for clinical use with reduced shielding needs. Epithermal neutrons penetrate deep tumors while maintaining favorable dose ratios. Pilot trials in Helsinki showed improved local control in recurrent head and neck cancers with acceptable toxicity. Nanoparticle boron carriers, including liposomes and antibody-conjugates, achieved higher tumor uptake and retention than BPA, lowering systemic exposure. Preclinical glioblastoma models demonstrated survival benefits. Combining BNCT with immunotherapy revealed synergistic anti-tumor effects, highlighting BNCT's promise in precision oncology.

Conclusion: The transition from reactor-based systems to hospital-compatible accelerators marks a major step forward in making BNCT clinically accessible. Concurrent progress in boron-targeted nanotechnology has strengthened BNCT's therapeutic potential by improving the selectivity and efficiency of boron delivery. Although large, multi-center trials are still required to establish standardized protocols, current evidence supports BNCT as a promising therapeutic option for refractory malignancies—including glioblastoma and recurrent head and neck cancers. Future development is expected to focus on optimizing boronated nanoparticles, integrating BNCT with immunotherapeutic strategies, and expanding accelerator installations within clinical centers.

Keywords: BNCT Accelerator Nanoparticles Glioblastoma Oncology

How to Cite: Lotfi Koshki, A. (2026). Accelerator-based BNCT and nanoparticle boron delivery: Advances in physics and clinical applications. (Abstract No. O-12). Asian Pacific Journal of Cancer Care, 11(S1):23. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-13

Title: Digital Health and Telemedicine in Oncology Nursing: A Systematic Review on Pain Management in Cancer Patients

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Introduction: Pain management in cancer patients is one of the fundamental challenges in oncology nursing. With the advancement of technology and the use of digital systems, it has become possible to monitor and manage pain optimally for cancer patients remotely. This study examined the applications of Telehealth in pain management in cancer patients

Materials and Methods: This systematic review was conducted according to the PRISMA principles. Studies related to the use of digital technology in pain management in cancer patients were searched from PubMed, Scopus, Google Scholar, and CINAHL databases between 2010 and 2025. Keywords used included "digital health", "oncology nursing", "pain management", "cancer patients", and "Telemedicine ". The quality of the studies was assessed using a validated quality assessment tool

Results: A total of 15 studies were included in this review. The use of telehealth such as apps has significantly improved pain management in cancer patients. It has also helped nurses remotely monitor the patient's pain intensity and adjust medication doses. Telehealth programs have also helped patients reduce pain-related anxiety, and these technologies have also reduced in-person visits to hospitals and improved patients' access to quality healthcare

Conclusion: The use of Telehealth in oncology nursing and pain management can help improve the quality of promote the health of cancer patients. However, there are challenges such as technical limitations, unequal access to technology, and resistance of patients and healthcare professionals to these practices that should be carefully considered in future studies to improve access to technology, educate healthcare professionals, and further investigate long-term effects

Keywords: Oncology nursing, Telehealth, Digital health

How to Cite: Mohammadirad, F., & Pourhasan, K. (2026). Digital health and telemedicine in oncology nursing: A systematic review on pain management in cancer patients. (Abstract No. O-13). Asian Pacific Journal of Cancer Care, 11(S1):24. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-14

Title: Moral Distress and Ethical Climate in Pediatric Oncology Nursing: Global Challenges and Professional Resilience

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Introduction: Pediatric oncology nursing is recognized as one of the most ethically demanding areas in healthcare. Nurses often face moral distress when organizational policies, cultural expectations, or treatment decisions conflict with their professional values. Understanding these experiences is essential for workforce sustainability and quality patient care.

Materials and Methods: This review synthesizes evidence from qualitative, quantitative, and mixed-method studies published between 2015 and 2025, spanning Europe, Canada, Australia, Pakistan, Ghana, Brazil, and the Middle East. Themes examined include ethical climate, moral distress, coping strategies, and nurses' intentions to stay in the profession.

Results: Nurses reported distress related to administering aggressive treatments with poor prognosis, inadequate staffing, and limited organizational support. Positive ethical climates were associated with lower distress and greater professional commitment. Protective factors included spirituality, reflective dialogue, and relational care, whereas persistent stressors contributed to burnout and turnover. In resource-limited countries, shortages of equipment and cultural pressures intensified moral conflicts, while structural and policy barriers were more prominent in high-income settings.

Conclusion: Moral distress in pediatric oncology nursing reflects both personal and systemic factors. Addressing it requires organizational investment in staffing, leadership, and ethical reflection opportunities, alongside recognition of nurses' relational and spiritual resources. Such measures can enhance resilience, reduce attrition, and improve care quality for children and families.

Keywords: Moral distress Ethical climate Pediatric

How to Cite: Norouzinia, R., & Babaie, M. (2026). Moral distress and ethical climate in pediatric oncology nursing: Global challenges and professional resilience. (Abstract No. O-14). Asian Pacific Journal of Cancer Care, 11(S1):25. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-15

Title: Early Risk Stratification of Breast Cancer Metastasis Using Machine Learning and Routine Clinical Features

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Introduction: Early and accurate prediction of metastasis in breast cancer is crucial for optimizing treatment and improving outcomes. Bone metastasis is the most common and clinically significant site of distant spread, yet conventional diagnostics often fail to detect early involvement. Machine learning (ML) offers potential for improved risk stratification by capturing complex patterns in routine clinical data.

Materials and Methods: ML models were developed and validated in a real-world breast cancer cohort in two stages: (1) overall metastasis prediction, and (2) bone-specific metastasis prediction. Preprocessing included feature selection, PCA, and class imbalance correction via Borderline-SMOTE. Eleven ML classifiers were evaluated using accuracy, sensitivity, specificity, precision, F1-score, AUC, Youden Index, and Brier scores. Calibration was assessed with Brier scores for all models and calibration curves for top performers.

Results: Stratified 10-fold cross-validation and independent test sets showed high discrimination (AUC > 0.80), robust calibration, and generalizable performance. Stage one, overall metastasis, saw Random Forest and Neural Network achieve the highest discrimination (AUC = 0.92) with narrow cross-validation intervals. Stage two, bone metastasis prediction, showed further improvement, with Random Forest, Neural Network, and XGBoost achieving AUC up to 0.97 and Brier score of 0.09. Test-set outcomes consistently fell within cross-validation ranges, and calibration curves closely followed the 45° reference line, confirming reliable probability estimates.

Conclusion: ML models, particularly Neural Network and ensemble methods such as Random Forest and XGBoost, provide strong predictive performance for overall and bone-specific metastasis. Their discrimination, calibration, and generalizability support their use in clinical workflows to enable early risk stratification and personalized patient management.

Keywords: Breastcancer – Metastasis prediction- Machinelearning

How to Cite: Momeni, S., Robatjazi, M., Rostami, A., Javadinia, S. A., & Mollai, E. (2026). Early risk stratification of breast cancer metastasis using machine learning and routine clinical features. (Abstract No. O-15). Asian Pacific Journal of Cancer Care, 11(S1):26. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-16

Title: Efficacy of CyberKnife Stereotactic Radiosurgery in Treating Brain Metastases: A Retrospective Analysis

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Abstract Body

Objective: CyberKnife, an advanced stereotactic radiosurgery system, has shown significant efficacy in treating brain metastases. This technology delivers higher fractional radiation doses with improved accuracy, potentially enhancing clinical outcomes. This study aimed to retrospectively analyze the clinical outcomes of brain tumors treated with CyberKnife.

Methods and Patients: The study included 10 patients with various brain tumors treated using the CyberKnife device (Accuray, USA) at Rasa Imaging and Therapy Center, Isfahan Healthcare City, from August 1, 2023, to August 1, 2024. The Precision Accuray Treatment Planning System (TPS) (CyberKnife Medical System, Version 2.0.1.1, USA) was used for brain metastases treatment planning. The planning target volume (PTV), clinical target volume (CTV), and gross tumor volume (GTV) were determined for each patient. Minimum, maximum, and mean doses delivered to these target volumes were calculated, and dose–volume histograms (DVHs) were generated to evaluate dose distribution.

Results: Of the 10 patients, 5 were female and 5 were male, with a mean age of 50.9 ± 2.47 years. A total of 18 lesions were treated, with a mean lesion volume of 19.88 cm^3. The mean prescribed dose was 23.98 Gy (range, 13–35 Gy), delivered in fractions of 5–10 Gy over 1–5 fractions. The doses delivered to the target volumes were as follows: minimum dose, 17.98 ± 5.44 Gy; mean dose, 26.37 ± 6.15 Gy; and maximum dose, 30.32 ± 7.39 Gy.

Conclusions: CyberKnife stereotactic radiosurgery using higher doses per fraction demonstrated excellent clinical outcomes for the treatment of brain metastases. This study suggests that CyberKnife is a suitable and effective treatment option, providing high local control rates and improved survival outcomes. Its ability to deliver precise, high-dose radiation while minimizing exposure to healthy brain tissue makes it a valuable modality for the management of multiple brain metastases, particularly in cases where conventional treatment approaches may be less effective.

Keywords: CyberKnife; Brain metastases; Clinical outcomes.

How to cite: Zamani, H., Saeb, M., & Molazadeh, M. (2026). Efficacy of CyberKnife stereotactic radiosurgery in treating brain metastases: A retrospective analysis. (Abstract No. O-17). Asian Pacific Journal of Cancer Care, 11(S1)28:29-. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-17

Title: Assessing the Effect of the number of Control Point on Dosimetric Parameters in Intensity Modulated Radiation Therapy of Prostate Cancer

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Introduction: In intensity-modulated radiation therapy (IMRT), the number of control points plays a crucial role in determining both the quality of the treatment plan and its practical implementation. Control points, defined as specific snapshots of beam delivery parameters such as monitor units (MU) and multileaf collimator (MLC) positions, directly influence dosimetric outcomes, transfer and loading times, and file storage requirements.

Theoretically, increasing the number of control points enhances the modulation capability of the plan by generating more beam segments and expanding the degrees of freedom available for optimization. This finer modulation can improve target coverage and conformity while reducing the dose to surrounding organs at risk (OARs). Understanding the impact of control point selection on dosimetric parameters and OAR dose is therefore essential for optimizing IMRT planning strategies.

Materials and Methods: A total of 15 patients with prostate cancer were evaluated using a 9 field intensity modulated radiation therapy (IMRT) technique. Treatment plans were generated with the Monaco treatment planning system, version 5.1. Each patient underwent three separate treatment designs with varying numbers of control points (20, 40, and 60) to assess the impact of control point selection.

The dosimetric parameters analyzed included doses to organs at risk (OARs) including the bladder, rectum, right and left femoral heads, and small intestine. In addition, conformity index, homogeneity index, D2%, D98%, D50%, and tumor coverage were calculated for each plan. The number of monitor units (MU) per plan was also compared. Statistical analysis of the collected data was performed using SPSS software to evaluate differences among the three planning strategies.

Results: The dosimetric parameters were evaluated at control points 20, 40, and 60.

- D50% values remained stable across all control points, measured at 5129±26, 5133±28, and 5129±24, respectively.
- Conformity index (CI) showed consistent values of 0.82±0.04, 0.82±0.04, and 0.83±0.04, indicating similar conformity across plans.
- Homogeneity index (HI) was slightly lower at control points 40 and 60 (0.09±0.011 and 0.09±0.014) compared to control point 20 (0.10±0.014), though differences were not statistically significant.
- Monitor units (MUs) per plan showed a gradual increase from 1452±119.6 to 1460.47±127.9, but remained within overlapping uncertainty ranges.

Other parameters under investigation did not demonstrate any significant differences between control points.

Conclusion: This study demonstrated that varying the number of control points in IMRT planning (20, 40, and 60) did not produce significant differences in key dosimetric parameters, including D50%, conformity

index, homogeneity index, and monitor units. The values remained stable across all tested configurations, with only minor variations observed that fell within expected uncertainty ranges. These findings suggest that increasing the number of control points beyond 20 does not yield meaningful improvements in plan quality or delivery efficiency for prostate cancer patients treated with a 9 field IMRT technique.

From a practical perspective, the use of higher control point numbers may increase computational demands and delivery complexity without offering substantial dosimetric advantages. Therefore, selecting a moderate number of control points appears sufficient to achieve robust and clinically acceptable treatment plans, balancing both optimization quality and efficiency.

Keywords: IMRT , Plan Evaluation

How to Cite: Khoramian, D., & Farhang, S. (2026). Assessing the effect of the number of control point on dosimetric parameters in intensity modulated radiation therapy of prostate cancer. (Abstract No. A-018). Asian Pacific Journal of Cancer Care, 11(S1)30:31-. https://doi.org/10.31557/APJCC.2026.11.S1.1-31

Code:O-18

Title: Nanocurcumin as a Radioprotector and Radiosensitizer in Prostate Cancer Patients Treated with Radiotherapy: Preclinical Expectancy, No Clinical Consistency

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Introduction: Despite promising preclinical findings, clinical evidence supporting any radioprotective or radiosensitizing effects of nanocurcumin remains lacking. This randomized controlled trial (RCT) aimed to evaluate whether nanocurcumin could reduce radiation-induced toxicities and improve survival outcomes in prostate cancer patients receiving radiotherapy (RT).

Materials and Methods: In this double-blind, placebo-controlled RCT, 64 eligible patients with prostate cancer were randomized to receive either oral nanocurcumin (120 mg/day) or placebo starting three days prior to and continuing throughout RT. Acute toxicities, including proctitis and cystitis, were monitored weekly during treatment and once afterward. Survival outcomes were additionally evaluated to determine whether nanocurcumin exerted any radiosensitizing or anticancer effects.

Results: Nanocurcumin was well tolerated. Radiation-induced proctitis occurred in 58.1% of patients in the placebo group compared with 45.5% in the nanocurcumin group (P = 0.313). No significant differences in radiation-induced cystitis were also observed between the two groups. The mean disease-free survival (DFS) was 80.43 months (95% CI: 67.96–92.90) for placebo and 81.24 months (95% CI: 71.36–91.13) for nanocurcumin (P = 0.746). Overall survival (OS) and cancer-specific survival (CSS) were also similar between groups. Cox regression analysis identified tumor stage and Gleason score as the only factors significantly associated with DFS.

Conclusion: Despite encouraging preclinical data, nanocurcumin failed to demonstrate clinical benefit as a radiosensitizer or radioprotector in prostate cancer patients undergoing radiotherapy. These long-term results underscore the persistent gap between preclinical expectancy and clinical consistency, highlighting that nanocurcumin's effects remain unconfirmed in humans.

Keywords: curcumin radioprotector radiosensitizer prostate cancer

How to Cite: Razzaghdoust, A., Mofid, B., Jafari, A., Basiri, A., Saadipoor, A., Siavashpour, M., & Zabihi, M. S. (2026). Nanocurcumin as a radioprotector and radiosensitizer in prostate cancer patients treated with radiotherapy: Preclinical expectancy, no clinical consistency. (Abstract No. A-018). Asian Pacific Journal of Cancer Care, 11(S1)- 31. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-19

Title: Comparison of Quality of Life in Cancer Patients Before and After Radiation Therapy

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Introduction: Radiotherapy can influence the quality of life (QoL) of cancer patients. This study compared QoL before and after radiotherapy in patients treated at the Comprehensive Radiotherapy and Oncology Center of Kerman.

Materials and Methods: Fifty-seven patients (38 females, 19 males; age 28–83) completed the validated Persian version of the EORTC QLQ-C30 (Cronbach's $\alpha > 0.7$) on the first and last day of radiotherapy. Clinical data, including history of chemotherapy, surgery, and radiation site (breast, head-and-neck, pelvis, thorax, bone metastasis), were collected. Scoring followed the official EORTC guidelines. Statistical analyses were performed using SPSS with the Wilcoxon signed-rank test and independent t-tests.

Results: Global health status (QoL) improved significantly after radiotherapy. Emotional and cognitive functioning also improved significantly, while physical and role functioning showed no significant changes. Social functioning approached significance but did not reach it. Among symptom scales, pain, dyspnea, insomnia, appetite loss, and constipation significantly decreased, whereas diarrhea increased. Fatigue, nausea/vomiting, and financial difficulties showed no significant change. QoL improvement did not differ across radiation sites and was not associated with age or prior chemotherapy. However, patients with prior chemotherapy demonstrated greater improvement in nausea/vomiting and appetite loss compared with those without chemotherapy. In contrast, non-chemotherapy patients showed worsening nausea/vomiting, and their appetite remained unchanged.

Conclusion: Radiotherapy resulted in significant overall improvement in QoL, particularly in emotional, cognitive, and several symptom domains. Prior chemotherapy influenced specific symptom trends, especially nausea/vomiting and appetite loss.

Keywords: Radiotherapy-Cancer Patients-Quality of Life-Before After

How to Cite: Soltani, A., & Sholevar, A. (2026). Comparison of quality of life in cancer patients before and after radiation therapy. (Abstract No. O-19). Asian Pacific Journal of Cancer Care, 11(S1):32. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-20

Title: Quality of oncology nursing care and related factors from the perspective of hospitalized cancer patients

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Introduction: Cancer patients face numerous challenges during hospitalization, making oncology nursing care more complex than care for other patients. This study aimed to evaluate the quality of oncology nursing care and its related factors from the perspective of hospitalized cancer patients.

Materials and Methods: A cross-sectional study was conducted with 301 cancer patients admitted to hospitals in Kashan, Iran, during 2024–2025. Data were collected using a demographic information questionnaire and the Persian version of the Oncology Patients' Perception of Quality of Nursing Care Scale (OPPQNCS). Statistical analyses included Mann–Whitney, Kruskal–Wallis, and Spearman correlation in SPSS version 26.

Results: The total OPPQNCS score was 78.69 ± 11.26 (range 16–96), with the highest mean in the Proficiency and Coordination subscale. Most participants were female (52.8%) and the most common reason for admission was chemotherapy (42.5%). Quality of care was significantly associated with having supplementary insurance ($p = 0.008$) and cancer type ($p = 0.004$). A significant negative relationship was found between quality of nursing care and length of hospital stay ($p = 0.028$, $r = -0.127$). The quality of care showed no significant association with gender, residence, or hospitalization in the specialized oncology unit ($p > 0.05$).

Conclusion: From the patients' perspective, the quality of oncology nursing care was relatively high. However, as hospital stays lengthen, patients may become more aware of their caregiving needs and increasingly perceive the care as less adequate. It is recommended that nursing managers prioritize responsiveness and individualization dimensions of care, aligning care more closely with established standards across all cancer units.

Keywords: OncologyNursing - QualityofCare – Cancer

How to Cite: Arbabi, Z., Izadi-Avanji, F. S., Khorasanizadeh, M., & Shakaram, A. (2026). Quality of oncology nursing care and related factors from the perspective of hospitalized cancer patients. (Abstract No. O-20). Asian Pacific Journal of Cancer Care, 11(S1):33. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-21

Title: Digital Twins in Radiotherapy: Bioinformatic Modeling of Cellular Resistance and Toxicity for Personalized Cancer Treatment

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Introduction: Radiotherapy remains a cornerstone of cancer treatment, yet interpatient heterogeneity in cellular resistance and normal tissue toxicity limits therapeutic efficacy. Digital twin (DT) technology offers a paradigm shift by integrating patient-specific data with bioinformatic and computational models to simulate tumor and tissue responses, thereby enabling precision oncology.

Materials and Methods: This review synthesizes current advances in DT applications for radiotherapy, focusing on multimodal patient data integration—including medical imaging, genomic, proteomic, metabolomic, and single-cell omics datasets. We examine biophysical, mathematical, and machine-learned modeling approaches, as well as high-performance computing frameworks that enable multiscale simulations. Special emphasis is placed on bioinformatic modeling of radioresistance mechanisms and toxicity prediction, alongside Artificial Intelligence (AI) algorithms that support DT-driven clinical decision-making.

Results: Digital twin frameworks demonstrate strong potential in radiotherapy by accurately modeling tumor dynamics and treatment responses. Multiscale mechanistic models capture radiation-induced cellular effects, while machine learning enhances prediction of survival and toxicity through multimodal data integration. DT-enabled platforms such as myCMIE showcase real-time integration of molecular and clinical data, supporting individualized treatment strategies and improved patient outcomes.

Conclusion: Digital twins represent a transformative tool in radiotherapy, bridging bioinformatics, computational modeling, and clinical practice. By unifying multiscale biological processes with patient-specific data, DT technology enables predictive modeling of resistance and toxicity, thereby advancing personalized cancer treatment. Despite challenges related to data standardization, computational demands, and clinical translation, ongoing research in AI-driven modeling and multimodal integration is poised to accelerate the adoption of DTs in precision radiotherapy.

Keywords: Digital twin- Radioresistance- Artificial intelligence

How to Cite: Khoshgard, K., & Alimiri Dehbaghi, H. (2026). Digital twins in radiotherapy: Bioinformatic modeling of cellular resistance and toxicity for personalized cancer treatment. (Abstract No. O-21). Asian Pacific Journal of Cancer Care, 11(S1):34. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-22

Title: Design and Validation of a operational guideline for Breaking Bad News to Patients and Families in Intensive Care Units: A Qualitative Study

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Introduction: The process of conveying bad news to the patient and family requires team participation. Providing suitable solutions in different countries has been taken into consideration. This study was conducted to provide operational guideline, according to the experiences of patients, families, and Healthcare providers.

Materials and Methods: A qualitative study of content analysis was conducted in three phases. In the first phase, in-depth interviews were conducted with 31 participants and targeted sampling, and the initial draft of the operational guide was compiled. In the second phase, it was discussed and reviewed by experts in two focus group meetings, and a secondary draft was designed. In the third phase, the operational guideline compiled by the Delphi method was validated by 43 experts in the field of policymaking and decision-making

Results: An operational guideline with 8 main steps and 43 sub-steps was developed; Its main stages include: Before breaking the news(1- Assessment 2- planning and preparation 3- coordination) , During breaking the news (4- announcement of bad news 5- emotional support 6- summary and documentation) , After breaking the news(7- referral 8- follow-up), it was identified.

Conclusion: It is hoped that by using the operational guideline compiled in special sections, the process of breaking bad news will be facilitated to achieve the desired result and the consequences and damages caused by it will be reduced. As a result, the Healthcare providers should take into consideration the patient and family preferences, the necessity of scientific and standard methods of breaking bad news, and respect the principles of professional ethics.

Keywords: operational guideline, breaking bad news

How to Cite: Khaki, S., Fallahi, M., Mohammadi, F., Can, G., & Hosseini, M. A. (2026). Design and validation of a operational guideline for breaking bad news to patients and families in intensive care units: A qualitative study. (Abstract No. O-22). Asian Pacific Journal of Cancer Care, 11(S1):35. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-23

Title: Cytogenetic and molecular biomarkers as predictors of cancer predisposition and inherent radiosensitivity. Implication for personalized radiotherapy

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Introduction: Chromosome changes have long been known to be associated with the process of tumor development. A number of genetic disorders including chromosomal instability syndromes, predispose the affected individual to a high risk of cancer. The toxicity reactions of normal tissues to ionizing radiation is a major limitation in efficiency of radiotherapy. Therefore, it is important to use diagnostic techniques for predicting treatment responses and for identifying patients susceptible to radiation toxicity.

Materials and Methods: In this study blood samples of breast, esophagus and prostate cancer patients and healthy individuals were collected and irradiated at various cell cycle stages with 60Co gamma-rays. Three different assay systems (cytochalasin B blocked micronucleus (MN), G2- and comet-assay) were used to compare the inherent radiosensitivity of cancer patients. 100 mitoses for the presence of chromatid aberrations, 1000 binucleate lymphocytes for the presence of MN were scored for each sample. 1000 cells were scored for various degrees of comets.

Results: Results indicate high frequency of chromatid type aberrations, micronuclei and DNA damage induced following gamma-irradiation both in normal and cancer patients. Using the G2-assay about 46%, MN assay, about 25% of breast cancer patients were shown to be more radiosensitive compared to normal (10%). No significant radiosensitivity of prostate and esophageal cancer patients was observed compared to normal individuals when assessed with the comet, G2 or MN-assay.

Conclusion: Results indicate that G2-assay is a sensitive and reliable technique for screening cancer prone and radiosensitive individuals as well as repair kinetics at 4 hours after irradiation.

Keywords: Radiosensitivity, cancer-patients, G2-assay, MN-assay, Comet-assay

How to Cite: Mozdarani, H. (2026). Cytogenetic and molecular biomarkers as predictors of cancer predisposition and inherent radiosensitivity: Implication for personalized radiotherapy. (Abstract No. O-23). Asian Pacific Journal of Cancer Care, 11(S1):36. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-24

Title: Frequency of radiation induced chromosomal aberration, micronuclei and apoptosis in lymphocytes of normal individuals and breast cancer patients in the presence or absence of saffron and melatonin

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Introduction: Breast cancer (BC) is one of the most common malignant tumors in women. Due to high radiation-sensitivity of BC patients, use of radioprotectors to ameliorate the deleterious effects of radiation could be a priority. The current work aimed to evaluate the reducing effects of saffron and melatonin on ionizing radiation-induced damages in lymphocytes of BC patients compared to normal individuals.

Materials and Methods: Whole blood samples were collected from BC patients and healthy individuals. Cells were irradiated in the presence or absence of Melatonin and/or saffron 1h before cell culture for MN and apoptosis assay and 4h before harvesting for G2-assay using a 6 MV LINAC at doses of 3 and 1 Gy respectively. 1000 cells were scored for the frequency of micronuclei and apoptosis and 100 mitoses for chromosomal aberrations. Data were statistically analyzed using ANOVA and p value <0.05 was considered as significant difference.

Results: The frequency of background NDI was not significantly differed for both types of BC before and after various treatments. However, the frequency of MN, apoptosis and chromatid breaks increased after irradiation of lymphocytes. Presence of saffron augmented radiation effect mainly in lymphocytes of BC patients. Melatonin alone led to reduced radiation effects but when combined with saffron, its antioxidant activity and radioprotective effects was reduced significantly in lymphocytes of BC patients.

Conclusion: Current study with three end points provides evidence that saffron known for its antioxidant property, is not a good radioprotector especially for normal cells of BC patients compared to melatonin.

Keywords: Breast-cancer, lymphocytes, antioxidants, ionizing-radiation, cytogenetic-end-points

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Code:O-25

Title: Assessment of radiosensitivity of fetal cells in comparison with lymphocytes of ataxia telangiectasia patients using G2-chromosmal aberration assay

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Introduction: Highly undifferentiated cells such as stem cells or embryonic tissues have been shown to be more radiosensitive than other regenerative tissues in human body. However, the degree of radiosensitivity of embryonic cells has always been a subject of debate, largely due to the complex interplay between intrinsic sensitivity and developmental context. The aim of this study was to compare G2- chromosomal radiosensitivity of human amniocytes with lymphocytes obtained from ataxia telangiectasia (AT) verified patients to assess the possible nature of cellular radiosensitivity of amniocytes.

Materials and Methods: Amniocytes from amniotic fluid were cultured in Amniogrow and passaged after 7 days of culture initiation. Peripheral blood from normal individuals and AT patients were obtained and cultured in complete RPMI media and stimulated with PHA. 4 hours prior to harvesting lymphocyte cultures and amniocytes were exposed to 1 Gy X-irradiation generated with linear accelerator. After cell harvesting, slides were prepared and cells were stained in 5% Giemsa stain. 100 well spread metaphase for various types of chromatid type aberration.

Results: Results indicated low frequency of G2-chromosomal aberrations for normal lymphocytes after irradiation. Irradiation of lymphocytes from AT patients and amniocytes led to considerably high frequency of chromosomal aberrations, statistically not significant from each other (mean aberrations 300 breaks in amniocytes versus 250 breaks /100 cells).

Conclusion: It can be concluded amniocytes exhibit radiosensitivity similar to genome instability syndromes. This paradox underscores that radiosensitivity is not a static property but a dynamic one, shaped by the cell's developmental programming and its microenvironment.

Keywords: G2-assay, chromatid-aberrations, genome-instability, amniocytes, ataxia-telangiectasia

How to Cite: Mozdarani, S., Mozdarani, S., & Nosrati, H. (2026). Assessment of radiosensitivity of fetal cells in comparison with lymphocytes of ataxia telangiectasia patients using G2-chromosomal aberration assay. (Abstract No. O-25). Asian Pacific Journal of Cancer Care, 11(S1):38. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-26

Title: The Effect of Implementing a Health Promotion Program on the Quality of Life of Women with Breast Cancer Undergoing Chemotherapy: A Non Randomized Clinical Trial

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Introduction: Breast cancer is the most common cancer in women. Structured educational and supportive interventions can play an important role in improving patient outcomes. Given the cultural context and specific needs of women with breast cancer in the country, developing indigenous health-promotion programs is essential. This study aimed to assess the effect of a culturally adapted health-promotion program on the quality of life of women with breast cancer undergoing chemotherapy.

Materials and Methods: This non randomized two group pretest–posttest clinical trial was conducted from 2022 to 2024 at Omid Hospital in Mashhad on 152 women with breast cancer receiving chemotherapy. The intervention consisted of the health promotion program developed by Balochi et al. (2021), which included components of education, continuity of care, and facilitation of access to services. The program was delivered through in person and remote educational sessions, complemented by telephone follow ups and ongoing communication via messaging platforms and phone calls." Data were collected using the EORTC QLQ C30, the Karnofsky Performance Scale, and a demographic form at three time points (baseline, one month, and three months) and analyzed with appropriate statistical tests.

Results: At baseline, the two groups showed no significant differences in demographic characteristics or initial quality of life scores ($p>0.05$). Repeated measures ANOVA demonstrated that both the effect of time and the time by group interaction were significant for global status quality of life ($p<0.001$ and $p=0.01$, respectively). Functional subscales—including physical, role, cognitive, emotional, and social functioning—showed significant increase ($p<0.05$). Symptom subscales, including fatigue, nausea/vomiting, loss of appetite, insomnia, dyspnea, pain, diarrhea, constipation, and financial difficulties, demonstrated significant reductions ($p<0.05$).

Conclusion: The findings indicate that the health promotion program improved multiple dimensions of quality of life in women with breast cancer undergoing chemotherapy and may serve as an effective approach to supporting patients during treatment.

Keywords: Breast-cancer, chemotherapy, Health-promotion, quality-of-life

How to Cite: Raffe, S., Heshmati, F., Baloochi, T., Aledavood, A., Saki, A., & Pour Tarigh, J. (2026). The effect of implementing a health promotion program on the quality of life of women with breast cancer undergoing chemotherapy: A non-randomized clinical trial. (Abstract No. O-26). Asian Pacific Journal of Cancer Care, 11(S1):39. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-27

Title: Using Radiomics to Improve Radiation Therapy: From Response Forecasting to Customized Care

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Introduction: The quantitative imaging method known as radiomics has the potential to enhance radiation therapy planning, response prediction, and precision oncology. Despite promising technological developments, its clinical application is still limited due to methodological heterogeneity, insufficient validation, and a lack of well-defined imaging techniques.

Materials and Methods: The findings of five significant articles that examine the applications of radiomics in radiotherapy are included in this narrative review. Semantic search was used to find relevant literature, which was then filtered according to its contributions to treatment optimization, cancer radiation, and radiomics technique. Research features, imaging modalities, segmentation techniques, feature extraction tools, model performance, personalization strategies, and implementation challenges are all included in the extracted material.

Results: Among other aspects of the radiation workflow, radiomics aids in treatment planning, dosage escalation, response monitoring, and toxicity prediction. Various malignancies, including lung, head & neck, rectal, and esophageal cancers, have been examined utilizing radiomics. CT, PET, and MRI were the most used imaging modalities; either human or automatic deep learning techniques were utilized for segmentation.

Reported predictive performance ranged from AUC 0.73 to 0.93. However, most of the studies were retrospective, single-center, and lacked external validation or comparison to established clinical criteria. Major technical limitations were image inconsistency, segmentation variability, feature instability, and risk of overfitting. Customized TCP/NTCP modeling, radiomics-guided dosage painting, and early radiogenomics integration are examples of personalization techniques that have shown promise but have not yet been thoroughly tested.

Conclusion: Radiomics presents significant potential for improving radiotherapy precision through quantitative imaging biomarkers. Nevertheless, widespread implementation requires multicenter standardization, enhanced reproducibility, and rigorous prospective validation to confirm its added value beyond conventional clinical tools.

Keywords: radiomics – Radiotherapy – biomarkers

How to Cite: Lari, M., & Khosravi, H. (2026). Using radiomics to improve radiation therapy: From response forecasting to customized care. (Abstract No. O-27). Asian Pacific Journal of Cancer Care, 11(S1):40. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-28

Title: The Role of Digital Nurse and Telehealth in Oncology Care: A Review of Evidence, Challenges, and Practical Recommendations

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Introduction: The expansion of digital technology and the experience of COVID-19 have accelerated the use of telehealth services in the care of cancer patients. Given the complexity of oncology treatments, reviewing evidence and credible guidelines is essential for clarifying the role of digital nursing. The objective of this study is to summarize key evidence, challenges, and practical recommendations to improve the implementation of telehealth in oncology nursing.

Materials and Methods: This was a narrative review conducted based on guidelines and documents from reputable organizations, including ANA, ASCO, WHO, and AAACN. The study aimed to assess the integration of digital nursing and telehealth in oncology. Keywords related to Telenursing, Telehealth, Oncology Nursing, and Digital Monitoring were used for data extraction.

Results: Evidence suggests that telehealth improves access, symptom monitoring, and satisfaction for oncology patients. Its effectiveness relies on correct patient selection, nurse training, and patient satisfaction. Key challenges identified include digital access disparity, data privacy and security, documentation issues, and the need for secure, integrated infrastructures. Guidelines (e.g., ASCO) emphasize clinical communication, legal considerations, and symptom-based monitoring. Implementing telehealth requires changes in the scope of responsibilities, skills, and standards for oncology nurses, as defined by professional organizations like AAACN and ANA.

Conclusion: Telehealth is shown to be a supplementary and effective tool for oncology care, enhancing safety, service quality, and patient engagement. Successful development requires standardization, nurse training, reliable digital infrastructure, and an integrated data protection policy. Further controlled studies are recommended to evaluate long-term outcomes, cost-effectiveness, and demographic impacts.

Keywords: Telenursing Telehealth OncologyNursing DigitalMonitoring Nurse

How to Cite: Sayadinejad, S. (2026). The role of digital nurse and telehealth in oncology care: A review of evidence, challenges, and practical recommendations. (Abstract No. O-28). Asian Pacific Journal of Cancer Care, 11(S1):41. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-29

Title: Modeling of mean bladder dose in prostate tomotherapy using daily MVCT images

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Introduction: Radiotherapy is one of the most essential methods for the treatment of prostate cancer. Image-guided radiotherapy (IGRT) increases treatment accuracy and protects organs at risk (OARs). Using IGRT can assure reproducibility of bladder volume (BV) during treatment. The goal of reproducibility in BV is to ensure the initial plan and the constraint dose are reproducible during treatment. Volume also plays a significant role in calculating the mean bladder dose (MDB). The MDB can be an essential criterion for side effects. In prostate treatment, there is no comprehensive consensus on determining the association between BV and side effects

Objective: We aim to investigate the question of whether the reproducibility of BV can lead to the reproducibility of MDB?

Materials and Methods: We contoured the bladder of 467 megavoltage CT (MVCT) images of fifteen prostate cancer patients who underwent tomotherapy. Using R software, the correlation between the bladder centrist (X, Y, Z), BV, and MDB was modeled. That (X, Y, Z) shows direction lateral by lateral, anterior-posterior, and superior-inferior with respect.

Results: A strong correlation exists between Z and BV. Two prediction models were presented for MDB; the first is based on BV, and the second on BV and Y. The second model performed better than the first.

Conclusion: The second model shows that because of the BV movement in AP, MDB correlates with BV and Y. In general, the reproducibility of BV may not usually ensure the reproducibility of MDB.

Keywords: Prostate -Tomotherapy -IGRT- bladder dose

How to Cite: Goli Ahmadabad, F., Mahdavi, S. R., Bagherzadeh, S., Nikoofar, A., Bodaghi Hosseinabadi, R., & Vazirinasab, H. (2026). Modeling of mean bladder dose in prostate tomotherapy using daily MVCT images. (Abstract No. O-29). Asian Pacific Journal of Cancer Care, 11(S1):42. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-30

Title: Does awareness of a cancer diagnosis influence quality of life in elderly patients?

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Introduction: Cancer is a leading cause of death among elderly patients. Diagnostic disclosure significantly impacts physical, psychological, social, and economic well-being. Practices vary culturally; while standard in Western countries, disclosure in Iran remains inconsistent and family-mediated. This study examines whether diagnostic awareness affects quality of life among elderly Iranian cancer patients across various dimensions.

Materials and Methods: This descriptive-analytical study evaluated the impact of cancer diagnosis awareness on quality of life among elderly patients (≥60) undergoing chemotherapy. Quality of life was measured with the EORTC QLQ-ELD14, and demographic/clinical variables were recorded via structured forms. Patient awareness was first confidentially confirmed through companions and then directly verified with patients.

Results: Of 261 elderly cancer patients (mean age 71.2 years; 51% male), 69% were aware of their diagnosis. Awareness was significantly higher among educated (≥diploma: 89%; higher: 77%) and married patients (72.7%) compared to less educated (~34%) or widowed (57.1%) ($P < 0.05$). No associations were found with gender, employment, or disease stage. Quality-of-life analysis showed awareness improved family support ($P = 0.047$), while other domains remained unaffected.

Conclusion: This study highlights that cancer diagnosis awareness among elderly patients is influenced by education and marital status. Moreover, our findings demonstrate that, contrary to the perception of patients' families—who are often the main barrier to disclosure—awareness of the diagnosis not only does not diminish quality of life across its various dimensions, but also enhances the family support they receive.

Keywords: Aging Awareness Neoplasms

How to Cite: Ahmadi Somaghian, S., Zare, S., Alizadeh-Moghadam, M., Rezaei, S., Momeni, M., & Kurdestani-Fard, K. (2026). Does awareness of a cancer diagnosis influence quality of life in elderly patients? (Abstract No. O-30). Asian Pacific Journal of Cancer Care, 11(S1):43. https://doi.org/10.31557/APJCC.2026.11.S1.1

code:O-32

Title: Clinical practice guideline adaptation in the oncology nursing profession in a developing country

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Introduction: Nurses should seek the necessary resources to improve the quality of care. In every health care system, for cultural, social, and economic differences, there is an increasing need to adapt versions of clinical practice guidelines (CPGs). This study aimed to introduce an innovative clinical practice guideline adaptation approach for nurses working in a developing country.

Materials and Methods: This study comprises three sections as follows: a. the extensive systematic search of the literature, b. the adaptation process, and c. the interviews were held with stakeholders, users, and/or the target population. We applied all of the stages of the guideline adaptation process according to the ADAPTATION RESOURCE TOOLKIT, with integration of the findings of a systematic literature search and a qualitative content analysis in adopting the new CPG.

Results: In this study, to save time and cost, and manpower efficiently, we applied a mix of three methods named adopt, adapt, and development recommendations. Also, we integrated qualitative research within the adaptation approach of the recommendations. Given there is a paucity of nursing clinical practice guidelines (NCPGs) in the nursing management of cancer therapy-induced mucositis, and the lack of cost, time, and ability to gather skillful experts.

Conclusion: We integrate the findings that emerged from adopt, Adapt, and de novo guideline development by expert consensus and the qualitative content analysis (QCA) method for achieving a more comprehensive nursing practice guideline in a developing country.

Keywords: Guideline adaptation, Oncology nursing.

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Code:O-32

Title: Acupuncture for Anxiety in Cancer-Related Insomnia: A Systematic Review of Clinical Evidence

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Introduction: Anxiety and insomnia commonly co-occur among cancer patients and significantly impair quality of life, yet few interventions effectively address both symptoms simultaneously. Acupuncture is increasingly used in oncology and has shown promise in managing cancer-related symptoms; however, its specific impact on anxiety in patients with comorbid insomnia remains unclear. This systematic review aims to synthesize current evidence on the effectiveness of acupuncture for reducing anxiety among cancer patients experiencing insomnia

Materials and Methods: A systematic search was conducted across major medical databases (PubMed, Embase, and Cochrane Library) from 2015 to 2025. The review was based on PRISMA guidelines and utilized keywords such as: "Acupuncture Therapy," "Anxiety Disorders," "Sleep Initiation and Maintenance Disorders," and "Neoplasms."

Results: Out of the 315 papers identified, 30 articles met the inclusion criteria. Across the included trials, acupuncture was associated with reductions in anxiety scores, and several studies also reported parallel improvements in sleep outcomes.

Conclusion: The available evidence suggests that acupuncture may reduce anxiety in cancer patients with comorbid insomnia, with some studies also reporting accompanying improvements in sleep. However, variations in study quality and methodology limit the certainty of these findings. High-quality, well-designed trials are needed to more clearly determine acupuncture's role in managing this symptom cluster.

Keywords: "Acupuncture" "Anxiety" "Insomnia" "Neoplasms"

How to Cite: Tamimi, A., & Jalilian, P. (2026). Acupuncture for anxiety in cancer-related insomnia: A systematic review of clinical evidence. (Abstract No. O-32). Asian Pacific Journal of Cancer Care, 11(S1):45. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-33

Title: Prognosis the probability of complications resulting from brachytherapy treatment of prostate cancer using TCP and NTCP methods

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Introduction: High-dose-rate (HDR) brachytherapy is an effective and conformal modality for treating localized prostate cancer. Despite its dosimetric advantages, the potential for gastrointestinal (GI) and genitourinary (GU) toxicities remains a clinical concern, particularly given the close anatomical proximity of the rectum and bladder to the prostate. This study aimed to evaluate tumor control probability (TCP) and normal tissue complication probability (NTCP), with emphasis on predicting and characterizing possible GI toxicities in patients undergoing HDR brachytherapy.

Materials and Methods: 30 patients with Ta1–Tc2 prostate cancer (mean age: 70.79 years) received HDR brachytherapy using 60Co with a prescribed dose of 9 Gy. Dose–volume histogram (DVH) parameters of the prostate (D90, D98, V100, V150, V200) and organs at risk—rectum (D0.1, D2) and bladder (D10, D0.1, D2)—were analyzed. Radiobiological calculations were performed to estimate TCP and NTCP, focusing specifically on GI toxicity risk derived from rectal dose exposure

Results: No statistically significant correlations were found between prostate DVH indices and TCP, nor between rectal/bladder dose parameters and NTCP. Nevertheless, radiobiological modeling indicated that rectal dose hotspots (particularly D0.1 and D2)—despite remaining within acceptable limits—were associated with a non-negligible predicted risk of mild-to-moderate GI toxicities, estimated at approximately 5–12%, including transient rectal discomfort, mucosal irritation, and increased bowel frequency. In contrast, predicted GU toxicity remained lower (5–10%), reflecting more favorable bladder dose sparing.

Conclusion: Although statistical relationships between DVH parameters and complication probabilities were not observed—likely due to the limited sample size—the presence of measurable GI NTCP values highlights the clinical relevance of rectal dose monitoring in HDR brachytherapy. These findings emphasize the importance of integrating radiobiological modeling for early prediction of GI complications, enabling more personalized and toxicity-aware treatment planning. Future studies with larger cohorts are essential to validate these toxicity prediction trends.

Keywords: Prostate cancer, HDRbrachytherapy, TCP, NTCP,

How to Cite: Gholami, M. H., Rezaeikia, S., Sadr, M., Sedighi Pashaki, A., Khoshghadam, A., & Babalouei, S. (2026). Prognosis the probability of complications resulting from brachytherapy treatment of prostate cancer using TCP and NTCP methods. (Abstract No. O-33). Asian Pacific Journal of Cancer Care, 11(S1):46. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-34

Title: Assessment of Lifetime Secondary Cancer Risk Following Pediatric I-125 Ocular Plaque Brachytherapy

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Introduction: Plaque brachytherapy is an established eye-preserving treatment for intraocular tumors, but a small portion of the radiation dose can reach distant organs and contribute to secondary cancer risk. This issue is especially relevant in pediatric patients, who exhibit greater lifetime radiation sensitivity. This study quantifies out-of-field organ doses during I-125 plaque therapy and estimates the corresponding lifetime risk of radiation-induced secondary cancers.

Materials and Methods: We simulated whole-body dose from ocular plaque brachytherapy using Geant4 version 11.3. The Bebig IsoSeed I25.S16 sources in a 12 mm COMS applicator were modeled according to manufacturer specifications. The ICRP mesh phantoms representing 15-year-old male and female patients were used to calculate organ doses. The resulting absorbed doses were then applied to estimate the lifetime risk of radiation-induced secondary cancers based on the BEIR VII report

Results: The results showed that the mean absorbed dose to the whole eye and total body for 15-year-old female and male phantoms was 54 Gy and 35.4 mGy, respectively. The lifetime attributable risk (LAR) of cancer incidence for all cancer types was 730 and 418 per 100,000 individuals for the female and male phantoms, respectively. The LAR of cancer-related mortality was 323 and 213 per 100,000 individuals for the female and male phantoms, respectively.

Conclusion: This study underscores the importance of evaluating whole-body radiation exposure and long-term secondary cancer risk in pediatric ocular brachytherapy. It emphasizes the need for strategies to minimize dose to non-target organs.

Keywords: ocular Brachytherapy-Monte Carlo-Lifetime attributable risk

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Code:O-35

Title: MicroRNAs Mediating Radioresistance via Necroptosis Inhibition: A Molecular Perspective

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Introduction: Radioresistance still presents the critical challenge for successful cancer radiotherapy and as a result treatment failure. MicroRNAs (miRNAs) have been found to play an essential role in necroptosis, a programmed cell death that also plays a role in clearing irradiated apoptotic cell debris. This review covers individual miRNAs that suppress necroptosis to support tumor survival and improve radioresistance and describes potential therapeutic targets based on miRNAs.

Materials and Methods: A literature review was performed, including studies from 2010 to 2025 that addressed miRNA-mediated necroptotic regulation and cancer radioresistance. Articles selected were those that established experimental validation of miRNAs' specific role, a clinical correlation between radiotherapy outcome, and research concerning necroptosis pathways in cancer.

Results: Recent studies emphasize three key miRNAs(miR-21, miR-155, and miR-873) as major contributors to radioresistance via necroptosis inhibition. miR-21 suppresses necroptosis by targeting RIPK1, which leads to poor radiotherapy outcomes. miR-155 inhibits RIPK3 and MLKL, blocking necroptotic signaling and promoting radioresistance, especially in colorectal and pancreatic cancers. miR-873 negatively regulates MLKL, the protein that is responsible for membrane rupture in necroptosis; its dysregulation is associated with radioresistance in non-small cell lung and cervical cancers. These miRNAs are dysregulate programmed necrotic cell death, and facilitate tumor survival after radiation

Conclusion: miR-21, miR-155, and miR-873 exhibit overlapping roles in suppressing necroptosis, and contribute to radioresistance. Targeting these miRNAs in cells could restore necroptosis and enhance radiotherapy efficacy. miRNA inhibitors show promise. Future research should focus on translational miRNA-based therapies and limit off-target effects and delivery system.

Keywords: Necroptosis cancer microRNA radioresistance

How to Cite: Ordibeheshti, S., Mokhtari Zamenjani, M. S., & Azimian, H. (2026). MicroRNAs mediating radioresistance via necroptosis inhibition: A molecular perspective. (Abstract No. O-35). Asian Pacific Journal of Cancer Care, 11(S1):48. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-36

Title: The effect of natural killer(NK) cell therapy on revolutionizing treatment of glioblastoma: A systematic review

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Introduction: Glioblastoma (GBM) is an aggressive brain tumor marked by rapid growth, diffuse invasion, and strong genetic heterogeneity, leading to poor survival and frequent recurrence despite current standard treatments. These limitations have increased interest in immunotherapies such as cytokine modulation, checkpoint inhibitors, CAR T cells, RNA-based approaches, and nanomedicine. Among them, natural killer (NK) cell therapy stands out for its ability to target diverse tumor cells without prior sensitization. This systematic review examines existing evidence on the efficacy and clinical potential of NK cell therapy in GBM.

Materials and Methods: A systematic search was conducted across major medical databases (PUBMED, Science Direct, Scopus, Google scholar) from 2021-2025. The review was based on PRISMA guidelines and utilized keywords such as: “NK cell therapy”, ”treatment” and “glioblastoma".

Results: From an initial 276 papers, 25 were selected based on the inclusion criteria. According to the results, natural killer (NK) cells are crucial warriors of the innate immune system, providing a rapid, frontline defense against cancer. NK cells destroy tumors directly via perforin/granzyme release and death ligands like FasL/TRAIL. Additionally, they enhance immune coordination through ADCC and cytokine signaling. Their ability to infiltrate glioblastomas effectively, independent of tumor mutation burden, makes them a potent candidate for immunotherapy. In clinical settings, both autologous and allogeneic NK cells have been tested. Autologous NK cell therapy has proven safe but demonstrated limited efficacy. Allogeneic NK cells, including those derived from umbilical cord blood, iPSCs, or the FDA-approved NK-92 cell line, offer stronger antitumor potential due to reduced inhibitory signaling and lower GVHD risk.

Conclusion: To conclude, the immunosuppressive glioblastoma microenvironment drives therapeutic resistance. While current immunotherapies face challenges like antigen escape and toxicity, NK cell therapy offers a promising alternative. It targets tumors independently of antigens and actively reshapes the hostile tumor environment. With a favorable safety profile, NK cells—especially when combined with other agents—hold significant potential for improving treatment outcomes, warranting detailed future research.

Keywords: NK-cell-therapy treatment glioblastoma

How to Cite: Jalilian, P., & Tamimi, A. (2026). The effect of natural killer (NK) cell therapy on revolutionizing treatment of glioblastoma: A systematic review. (Abstract No. O-36). Asian Pacific Journal of Cancer Care, 11(S1):49. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-37

Title: Photodynamic Therapy: Copper-Cysteamine Nanoparticles and UVA Radiation Inhibit Melanoma (A375) Cells

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Introduction: Effective treatment of melanoma remains a major clinical challenge. Photodynamic therapy (PDT) offers a targeted approach; however, its use against highly pigmented lesions, such as melanoma, often faces limitations. This study focuses on copper-cysteamine nanoparticles (Cu-Cy NPs), a new class of photosensitizers known for their ability to be activated by multiple stimuli, including UVA radiation.

Materials and Methods: In this study, human melanoma cells (A375) were treated with low cytotoxic Cu-Cy NPs (3 µg/mL) in combination with 2- or 10-minute exposure to UVA. Several assays were used to evaluate the biological response: cell viability was measured with the MTT assay, intracellular reactive oxygen species (ROS) were quantified using the nitroblue tetrazolium (NBT) method, and the rate of apoptotic cell death was assessed through Annexin V-FITC/propidium iodide staining combined with flow cytometry.

Results: Applying either Cu-Cy NPs or UVA irradiation alone caused minimal cytotoxic effects. However, a strong synergistic effect was observed when treatments were combined for 10 minutes. This combination led to a significant increase in ROS production and induced apoptosis in 52.5% of the cells. The apoptotic rate was comparable to that caused by cisplatin. The shorter 2-minute exposure did not produce a significant effect, highlighting the importance of irradiation duration for therapeutic success.

Conclusion: These results show that combining Cu-Cy NPs with UVA light effectively induces apoptotic death in melanoma cells through a synergistic process. Hence, this combined approach is a promising alternative to current melanoma treatments.

Keywords: “melanoma”- “UVA”- “copper-cysteamine”-“nanoparticle"

How to Cite: Nazarian, M., Hasnaki, A., & Chegeni, N. (2026). Photodynamic therapy: Copper-cysteamine nanoparticles and UVA radiation inhibit melanoma (A375) cells. (Abstract No. O-37). Asian Pacific Journal of Cancer Care, 11(S1):50. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-38

Title: UVA-Activated Photodynamic Therapy: A Promising Approach for Skin Cancer

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Introduction: Standard treatments for skin cancer, like surgery, radiation, and chemotherapy, often create a significant financial burden. These therapies also come with a range of unwanted effects, including damage to healthy tissue, inflammatory responses, and extended healing periods. Photodynamic therapy (PDT) activated by ultraviolet-A (UVA) light offers a targeted approach for non-melanoma and melanoma skin cancers by producing cytotoxic reactive oxygen species (ROS).

Materials and Methods: The search for this narrative review was conducted specifically in Web of Science, PubMed, ScienceDirect, and Google Scholar. The search strategy used terms such as "photodynamic therapy", "UVA", "skin cancer", "melanoma", and "nonmelanoma."

Results: UVA-based PDT provides a targeted approach for treating skin cancers. Its main mechanism involves activating photosensitizers to produce ROS. This causes oxidative stress, which selectively damages tumor cell structures and triggers various cell death pathways, including apoptosis, autophagy, and necrosis. Preclinical studies using advanced systems show promising results against melanoma and squamous cell carcinoma. Innovative nanoplatforms, such as Fe3O4@ZnO and copper-cysteamine nanoparticles, are designed specifically for UVA activation and demonstrate strong antitumor effects in model organisms. Moreover, combining PDT with other therapies and developing better photosensitizers are improving effectiveness, reducing side effects like localized reactions and temporary immune suppression, and enhancing the translational potential of this method.

Conclusion: UVA-activated PDT shows significant preclinical potential, especially with nanoparticle-based photosensitizers, but robust clinical data comparing it to standard treatments for invasive skin cancers are lacking.

Keywords: ‘UVA’- ‘skin cancer’-‘ photodynamic therapy’-‘ROS’

How to Cite: Nazarian, M., Mofti Ariez, A., Hasnaki, A., & Chegeni, N. (2026). UVA-activated photodynamic therapy: A promising approach for skin cancer. (Abstract No. O-38). Asian Pacific Journal of Cancer Care, 11(S1):51. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-39

Title: Evaluating Cellular Microdosimetry of Targeted Radionuclide Therapy for Micrometastasis Treatment: A Monte Carlo study.

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Introduction: Targeted radionuclide therapy (TRT) is a novel approach for eradicating disseminated tumor cells (DTCs), micrometastases, and circulating tumor cells (CTCs). Risk of distant recurrence can be predicted based on clinicopathological and genomic features, response to neoadjuvant treatment, the presence of CTCs or circulating tumor DNA, or other biomarkers. TRT must be capable of eradicating lesions of various sizes, including occult micrometastases, single cells, and clusters of CTCs and DTCs. Due to the limited penetration depth of beta particles in small lesions, radionuclides that emit, Auger electrons and internal conversion electrons are considered suitable candidates for treating such lesions, owing to their short range and localized energy deposition. In this study, 119Sb, 123I, and 195mPt were evaluated as therapeutic candidates, and their S-values were calculated using Monte Carlo simulations within the GATE tollkit.

Materials and Methods: The cell geometry consisted of two concentric water spheres representing the cell and nucleus, and a spherical shell for the cell membrane. Activity considered as 1MBq for three source configurations including nucleus, cytoplasm, and cell membrane, using Monte Carlo simulations within the GATE. Cell (5 µm) and nucleus (4 µm) dimensions were based on experimental data from lymphocytes and V79 cells and. Simulations were benchmarked against established dosimetry models (MIRDcell and PENELOPE).

Results: The findings indicated that 195mPt delivered the highest absorbed dose to the cell nucleus (2983 Gy for N□CM), followed by 119Sb (1490 Gy for N□CM) and then 123I (191Gy for N□CM). Energy deposition analysis revealed that Auger and Coster-Kronig electrons dominated in the uniformly distributed nucleus configuration, while IC electrons contributed more significantly in cytoplasmic and membrane configurations.

Conclusion: Despite the favorable dosimetric performance of ^{119}Sb and 195mPt, challenges related to their production and isotopic purity require further investigation before clinical application. This study provides precise microdosimetric data, offering a clear perspective for selecting appropriate radionuclides.

Keywords: cellular dosimetry, Monte Carlo simulation.

How to Cite: Hasnaki, A., Chegeni, N., & Nazarian, M. (2026). Evaluating cellular microdosimetry of targeted radionuclide therapy for micrometastasis treatment: A Monte Carlo study. (Abstract No. O-39). Asian Pacific Journal of Cancer Care, 11(S1):52. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-40

Title: A Multiparametric MRI to Synthetic CT Using an Attention-Enhanced GAN for MR-Only Brain Radiotherapy

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Introduction: Brain and central nervous system (CNS) cancers account for about 3% of global cancer cases, showing increasing incidence and mortality rates in Iran. Radiotherapy (RT) is crucial for treating brain tumors due to its non-invasive nature and precise dose delivery, facilitated by techniques like intensity-modulated radiotherapy. While computed tomography (CT) is the standard imaging modality for RT magnetic resonance imaging (MRI) provides better soft tissue contrast, which is crucial in neuro-oncology. Both imaging methods serve different roles: MRI excels in tumor identification whereas CT is essential for treatment planning Research into generating pseudo-CT (pCT) images from MRI aims to improve accuracy and reduce ionizing radiation exposure. Moreover, MRI-only workflows are becoming popular for their streamlined processes and patient comfort.

Materials and Methods: The primary dataset employed is the RiRE dataset.This dataset is extensively acknowledged for evaluating image registration algorithms. It includes CT and MRI brain imaging from multiple individuals and offers ground-truth transformations for precise quantitative evaluation. Our preprocessing pipeline commenced with the registration of all images. We subsequently anonymized the data and transformed the files from DICOM to PNG format. Using OpenCV, each image was imported, the color channels were converted from BGR to grayscale, and resized to 128×128 pixels. We also standardized pixel intensities across the images. To enhance the robustness and generalizability of our deep learning framework, we employed data augmentation methods including random rotations, horizontal and vertical flips, cropping, scaling, and translations. Following these procedures, we utilized the completely processed images to train our CycleGAN-based model. We improved the existing CycleGAN framework by integrating the VAE-CycleGAN methodology outlined by Hoshme et al. for supervised MRI-to-CT image translation. To enhance the model further, we integrated self-attention mechanisms and Transformer-based feature extraction modules, which enable the network to more effectively capture spatial features and increase the accuracy of MRI-to-CT translation. Our architecture consists of two primary components: a generator network and a discriminator network. Both networks employ VGG-16-based perceptual loss to maintain anatomical fidelity and enhance the visual quality of the generated images. A self-attention mechanism was incorporated into the generator to enhance its ability to concentrate on significant and anatomically pertinent features. The model training framework employs multiple loss functions to ensure that the generated images are both anatomically accurate and visually realistic. Model optimization was conducted utilizing the RMSprop optimizer with a learning rate of 0.0001.

Results: In this investigation, we devised an innovative architecture based on CycleGAN, augmented with an attention mechanism, to generate synthetic CT (sCT) images from MRI scans of normal patients. The visual findings from the RIRE dataset are related to the public dataset. The CycleGAN shows that it is similar to the groundtruth dataset .

The mean (±standard deviation, SD) for T1 structural similarity index metric (SSIM): 0/81□0/019 , peak signal to noise ratio (psnr) :26/22□2/31 , mean absolute error (MAE) :0/029 □0/0003. T2 SSIM :0/74□0.04 , psnr) :23/12□1/25 , (MAE) :0/049□0/0059 and for Flair: SSIM : 0/74□031 ,PSNR:23/24□2/20 ,MAE:0/056□0/032. The inclusion of public data improved variability and model generalization. Quantitative evaluation employed MAE, MSE, and SSIM as loss functions and metrics. The results of the small dataset show that in terms of MAE, it is better than the results of previous work such as Jabbarpour et al.

Conclusion: In conclusion, the attention-based CycleGAN framework successfully synthesized synthetic CT from paired MRI datasets of brain tumor patients, showing strong consistency with clinical dosimetric endpoints. The model outperformed baseline methods in both pixel-level metrics and clinical feasibility. Further work should expand dataset diversity, refine registration techniques, and perform broader clinical validations to establish the method's applicability in MRI-only radiotherapy workflows.

Keywords: MRI-only Radiotherapy; Synthetic CT

How to Cite: Rezaei Maslak, Z., Najafzadeh, E., Kazemi, A., Ghale, A., Mahdavi, S. R., & Najafzadeh, E. (2026). A multiparametric MRI to synthetic CT using an attention-enhanced GAN for MR-only brain radiotherapy. (Abstract No. O-40). Asian Pacific Journal of Cancer Care, 11(S1):53-54. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-41

Title: Machine Learning-Enhanced Dosimetric Evaluation of the Cervical Esophagus as a Critical Organ at Risk in Breast Cancer Radiotherapy

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Introduction:

The cervical oesophagus (CO) is increasingly recognized as a clinically relevant organ at risk (OAR) during supraclavicular fossa (SCF) irradiation for breast cancer (BC). Despite its anatomical proximity to the SCF fields, systematic evaluation of CO exposure and predictive modeling of patients at risk for higher doses remain limited.

Objectives:

This study sought to (1) quantify the dose–volume characteristics of the CO in breast cancer patients treated with conventional 3D conformal radiotherapy (3DCRT) to the SCF and (2) develop a machine-learning model capable of predicting patients who are more likely to receive elevated CO doses.

Materials and Methods:

A retrospective analysis was performed on 50 consecutive breast cancer patients treated with standard-fractionation 3DCRT (50 Gy in 25 fractions plus a 10 Gy boost in 5 fractions to the SCF). The CO was contoured from the cricopharyngeal junction to the sternal notch. Extracted dosimetric endpoints included D_max, D_mean, V10, V20, V30, and V40. A random forest model was trained to predict CO D_mean and identify high-dose risk based on laterality, CO length, and plan-specific dose distribution characteristics. Model robustness was assessed through cross-validation.

Results:

Among the 50 patients (28 right-sided, 22 left-sided), the mean CO length was 8.2 ± 1.4 cm. The overall CO D_max and D_mean were 38.5 ± 5.2 Gy and 18.0 ± 7.3 Gy, respectively. Population-averaged dose–volume parameters were V10 = 61.2 ± 25%, V20 = 43.5 ± 23%, V30 = 26.1 ± 18%, and V40 = 12.8 ± 10%. Patients with left-sided breast cancer received significantly higher CO doses, including D_max (40.1 ± 2.6 Gy vs. 36.7 ± 6.1 Gy), D_mean (21.3 ± 6.5 Gy vs. 14.7 ± 6.8 Gy), and V40 (15.6 ± 11% vs. 10.3 ± 8%; $p < 0.05$).

The machine-learning model achieved an $R^2 = 0.71$ for predicting D_mean and correctly identified high-risk patients with an accuracy of 76%. Feature-importance analysis indicated that laterality and boost-field contribution were the most influential predictive parameters.

Conclusion:

The cervical oesophagus receives non-negligible and sometimes substantial radiation exposure during SCF irradiation, especially in left-sided breast cancer patients. The application of machine learning provides a promising, data-driven approach to identify patients at heightened risk of excessive CO dose and to support personalized treatment planning. Incorporation of explicit CO dose constraints, including high-dose indicators such as V40, should be considered in routine practice to mitigate potential toxicity.

Keywords: cancer; 3DCRT; V40; Random Forest

How to Cite: Allaveisi, F., Molanaei Kamangar, T., & Rahmani, K. (2026). Machine learning-enhanced dosimetric evaluation of the cervical esophagus as a critical organ at risk in breast cancer radiotherapy. (Abstract No. O-41). Asian Pacific Journal of Cancer Care, 11(S1):55-56. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-42

Title: Machine Learning-Based Identification of Dosimetric Predictors of Radiation Pneumonitis in Breast Cancer Patients Undergoing Hypofractionated Radiotherapy

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Introduction:

Radiation pneumonitis (RP) is a clinically meaningful early toxicity in breast cancer radiotherapy and continues to be a concern in centers using three-dimensional conformal radiotherapy (3DCRT). Despite the established relevance of lung dosimetry, variability in individual patient susceptibility highlights the need for more precise and clinically usable predictive tools to support personalized planning and minimize pulmonary complications.

Purpose:

This prospective study aimed to determine the incidence of RP in early-stage breast cancer patients treated with postoperative 3DCRT and to develop a compact machine-learning–based predictive model incorporating routinely collected dosimetric metrics, specifically mean lung dose (MLD) and dose–volume parameters spanning V5–V40.

Materials and Methods:

Fifty women receiving adjuvant 3DCRT to the breast or chest wall (45 Gy in 25 fractions) were prospectively included. Clinical, demographic, and lung dosimetric variables were extracted from 3D treatment plans. RP was evaluated up to 12 weeks post-radiotherapy through clinical assessment and imaging and graded using CTCAE v5.0 (grade ≥2 = clinically significant). A machine-learning workflow integrating logistic regression, random forest, and gradient boosting models was implemented. Model performance was assessed using cross-validated AUC, accuracy, and feature-importance analysis to identify robust predictors.

Results:

Clinically significant RP occurred in 22.5% of patients. Across all algorithms, MLD, V20, and V30 consistently ranked as the strongest predictors of RP. The gradient boosting classifier performed best (AUC = 0.81), followed by random forest (AUC = 0.77). Threshold evaluation demonstrated sharply increased RP risk for MLD > 10 Gy, V20 > 25%, and V30 > 15%. No meaningful associations were observed between RP and age, BMI, smoking history, tumor laterality, or other clinical variables.

Conclusion:

Machine-learning analysis reaffirmed that conventional dosimetric metrics, particularly MLD, V20, and V30, serve as reliable predictors of RP in patients receiving 3DCRT. Restricting high-dose lung exposure and maintaining MLD ≤ 10 Gy may meaningfully reduce toxicity risk. The proposed ML framework provides a practical and readily implementable tool for individualized pulmonary risk stratification in routine clinical practice. Larger, multi-institutional datasets are needed to strengthen external validity.

Keywords: cancer; pneumonitis; MLD; Gradient boosting

How to Cite: Allaveisi, F., Azimi Olyaei, S., & Rahmani, K. (2026). Machine learning-based identification of dosimetric predictors of radiation pneumonitis in breast cancer patients undergoing hypofractionated radiotherapy. (Abstract No. O-42). Asian Pacific Journal of Cancer Care, 11(S1):57-58 https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-43

Title: The effect of proper nutrition on the recovery and treatment of cancer patients

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Introduction: Cancer is the uncontrolled growth of abnormal cells in the body that spread uncontrollably and have the ability to invade or spread to other parts of the body. More than 100 types of cancer have been identified in humans. About 33% of deaths from cancer are attributed to improper nutrition and diet of cancer patients. Cancer can occur in many tissues, which are mainly classified according to the latest standard (ICD-O-3) based on tissue origin. It is divided into 4 stages according to the TNM criteria, with grade 4 being the most severe stage. The treatment and recovery of cancer patients is closely related to their nutrition, and malnutrition caused by cancer and its treatments increases the mortality rate of patients, reduces their quality of life, and worsens the prognosis, but proper nutrition improves complications.

Materials and Methods: This article is written as a review and summary of scientific articles on proper nutrition for cancer patients

Results: Results and findings: The most important effects of quality and appropriate nutrition in cancer patients are: 1. Accelerate wound healing: Tissue and wound healing is directly related to adequate protein, vitamin C, and zinc intake and increases collagen synthesis in the body. Patients who receive enough protein, vitamin C, and zinc in their diet show up to 30% wound healing. 2. Strengthen the immune system: Balanced consumption of micronutrients (A, C, E, D) and iron and selenium salts reduce the incidence of postoperative and hospital infections. 3. Getting the required calories from carbohydrates stabilizes energy levels and reduces fatigue. 4. If a cancer patient follows an individual and regular diet, he will be discharged 2-3 days earlier and his re-hospitalization will be reduced by 50%. 5. Getting omega-3 and B vitamins has a positive psychological effect, improves his mood, and reduces depression.

Conclusion: Studies have shown that there is a significant relationship between the severity of malnutrition and the individual's lifestyle, meaning that people who live alone and do not have proper caregivers at home or caregivers who do not have sufficient knowledge about the nutrition of cancer patients suffer from malnutrition and their recovery process is slower and they also suffer more complications, but people who receive proper care at home and the quality and quantity of their food is prepared according to the patient's clinical conditions have a good recovery process. Nutrition has a higher meaning than food consumption. In fact, nutrition is an important part of clinical care that can and should be improved. The purpose of this study is to provide appropriate nutritional strategies for cancer patients to have proper nutrition during cancer.

Keywords: Cancer -nutrition -Patient education

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Code:O-44

Title: Palliative and Supportive Care in Head and Neck Paragangliomas: A Systematic Review

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Introduction: Head and neck paragangliomas (HNPGLs) are rare neuroendocrine tumors, occurring in 0.3–1 per 100,000 individuals. Their varied clinical presentations and the need for multidisciplinary input often result in fragmented care. Patients face a heavy symptom burden—most notably pain, dysphagia, fatigue, and psychological distress—underscoring the importance of well-coordinated palliative services. Yet, current evidence remains limited and scattered, leaving the true impact of such interventions uncertain.

Materials and Methods: Following PRISMA guidelines, we systematically searched PubMed, Scopus, Web of Science, Cochrane Library, SID, Magiran, and Google Scholar was conducted for studies published between 2015 and 2025. Relevant MeSH terms and keywords related to palliative care, supportive care, and HNPGLs were applied. Two reviewers independently screened all records, resolving disagreements through discussion. Of 171 initial records, 14 met the inclusion criteria. Study quality was assessed using the Cochrane RoB 2 tool."

Results: Across 14 studies including 1,024 patients, early engagement with palliative and supportive services consistently improved symptom control. Six studies reported meaningful symptom reductions, typically 1.8–2.3 points on 0–10 scales for pain and dysphagia. Five studies documented 10–18% improvements in quality of life. Counseling, caregiver education, and structured follow-up reduced caregiver burden by 12–20%, while also improving treatment adherence, lowering unplanned hospital visits, and enhancing patient satisfaction. However, inconsistent outcome measures and the lack of standardized prospective protocols limit the strength of current evidence.

Conclusion: Palliative and supportive care improve symptoms and well-being in HNPGLs, but standardized prospective studies are needed to guide practice.

Keywords: Palliativecare;SupportiveCare;Head and Neck Paragangliomas

How to Cite: Kazemi Korani, Z., Esmaylpur, Q., Mohammadjani, F., & Jafari, M. (2026). Palliative and supportive care in head and neck paragangliomas: A systematic review. (Abstract No. O-44). Asian Pacific Journal of Cancer Care, 11(S1):60. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-45

Title: Evaluation of Recurrence Pattern Based on 68Ga-PSMA-PET/CT Imaging Following Biochemical Failure in Prostate Cancer Patients.

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Introduction: Prostate cancer remains one of the most prevalent malignancies among men worldwide, and despite improvements in definitive therapies, biochemical recurrence (BCR) continues to pose a significant clinical challenge. Early and accurate detection of recurrence is essential for guiding optimal management.

Materials and Methods: In this retrospective cross-sectional study, we evaluated recurrence patterns using 68Ga-PSMA-PET/CT in 227 prostate cancer patients who developed BCR following first-line curative treatments between 2016 and 2023 in northeastern Iran. Clinical and pathological parameters including PSA levels at recurrence, Gleason score, histopathology, risk stratification, and type of initial treatment were analyzed to assess their relationship with imaging findings.

Results: The mean age at diagnosis and recurrence was 65.6 and 69.8 years, respectively. The majority of patients (94.7%) had acinar adenocarcinoma, and more than half belonged to high or very high-risk categories. PSMA-PET/CT most frequently detected recurrence in the prostate bed (44.5%), left common iliac nodes (23.3%), and para-aortic lymph nodes (22.9%). PSA levels at recurrence showed a strong association with recurrence site ($p < 0.001$). Lymph node involvement was identified in 66.1%, locoregional recurrence in 56.4%, and bone metastasis in a notable proportion of cases. Interestingly, 19 patients demonstrated negative PSMA-PET/CT scans despite biochemical recurrence, and lower PSA levels were significantly associated with negative imaging. Symptomatic status at recurrence also correlated with recurrence location.

Conclusion: Overall, the findings underscore the clinical value of 68Ga-PSMA-PET/CT in early detection of recurrence, particularly in high-risk and asymptomatic patients, and support its integration into routine evaluation to guide timely management strategies, especially in resource-limited regions.

Keywords: Prostate cancer, Biochemical recurrence, ^{68}Ga-PSMA-PET/CT.

How to Cite: Saleki, N., Taghizadeh Kermani, A., Emadi Torghabeh, A., Emami, F., Afzal Aghaie, M., Salek, R., Anvari, K., & Mahdavi Zafarghandi, R. (2026). Evaluation of recurrence pattern based on 68Ga-PSMA-PET/CT imaging following biochemical failure in prostate cancer patients. (Abstract No. O-45). Asian Pacific Journal of Cancer Care, 11(S1):61. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-46

Title: Spiritual Reminiscence in the Lives of Elderly Cancer Patients Receiving Palliative Care: A Scoping Review

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Introduction: Elderly patients with cancer face fundamental questions about meaning, suffering, hope, and death at various stages of their disease. Spiritual Reminiscence (SR) is a conversation-based approach that can help patients redefine past experiences from a spiritual perspective and achieve a greater sense of coherence, peace, and acceptance in confronting their illness. This scoping review was conducted to elucidate the methods of implementing this approach, its outcomes, and existing research gaps.

Materials and Methods: This study was conducted according to the stages of the Scoping Review (Arksey & O'Malley, 2005) (7) and the PRISMA-ScR guidelines.

Review Main Question: What were the dimensions, implementation methods, and outcomes of spiritual reminiscence in the lives of elderly cancer patients?

Search Databases and Strategy:PubMed, Scopus, Web of Science, Google Scholar, PubMed Syntax ("Spiritual reminiscence" OR "meaning-centered" OR "life review" OR "spiritual dialogue") AND (Cancer OR Oncology) AND (Older adults OR Elderly)

Inclusion Criteria: Study concerning elderly individuals (years old 60≥) with cancer, with Focus on Spiritual Reminiscence (SR) or spiritual life review, with Quantitative, qualitative, interventional, or mixed-methods design. And Publication between the years 2000 and 2025.

Data Analysis: After extraction, the data were summarized and categorized using descriptive and systematic analysis.

Findings

Study Composition

Of the 19 included studies:

- 10 Interventional studies (8, 9, 10, 11)
- 3 Qualitative studies (12, 13, 14)
- 6 Systematic review studies (15, 16, 17)

Results: Of the 19 included studies:

- 10 Interventional studies (8, 9, 10, 11)
- 3 Qualitative studies (12, 13, 14)

- 6 Systematic review studies (15, 16, 17)

General Structure of Interventions

- Number of sessions: between 3 to 8 sessions.
- Duration of sessions: 60 to 90 minutes.
- Implementation: Group format in half of the studies.
- Frequent Topics:
  - Reviewing valuable life moments.
  - Spiritual experiences and moments of transformation.
  - Reviewing relationships and roles.
  - Death, spiritual legacy, and symbolic immortality.
  - Reconciliation with the past, reduction of feelings of shame and guilt, and acceptance of suffering.
  - Finding meaning in life.
  - Improvement of spiritual quality of life.
  - Reduction of anxiety and depression.
  - Reduction of feelings of isolation.

Conclusion:

Spiritual Reminiscence can be utilized as an effective and culturally acceptable approach in the palliative care of elderly cancer patients. This scoping review suggests that the development of indigenous interventions, conducting high-quality Randomized Controlled Trials (RCTs), and designing assessment tools tailored to Iranian culture are essential.

Keywords: Spiritual Reminiscence Elderly Cancer Patients

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Code:O-47

Title: Resampling: A Prerequisite for Deep-Learning-Based Dose Prediction

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Introduction: Deep-learning–based radiotherapy dose prediction requires spatially consistent input data. Clinical imaging datasets often vary in voxel spacing, image dimensions, and anatomical coverage, resulting in misalignment, inconsistent spatial representation, and potential errors in model training. Data resampling is therefore an essential preprocessing step to produce standardized, model-ready inputs that enable reliable learning of dose–anatomy relationships.

Materials and Methods: A retrospective cohort of 110 head-and-neck cancer patients treated with Tomotherapy was analyzed. RTDOSE volumes were rigidly aligned to the CT coordinate system using linear interpolation, while organs-at-risk (OAR) and target masks were aligned with nearest-neighbor interpolation to preserve binary labels. All inputs were resampled to a uniform voxel spacing of 2×2×3 mm and a matrix size of 64×128×128 voxels, ensuring consistent anatomical coverage and spatial fidelity.

Results: Post-resampling, visual inspection confirmed precise anatomical alignment among CT images, masks, and dose distributions. Standardization eliminated spatial inconsistencies, providing geometrically faithful inputs for deep-learning models. This consistency is expected to improve prediction accuracy, enhance generalizability across patients, and support reproducible model development.

Conclusion: Resampling is a prerequisite for robust deep-learning–based dose prediction, particularly in heterogeneous clinical datasets. By ensuring spatial consistency and anatomical fidelity, standardized preprocessing enables models to learn accurate dose–anatomy correlations, advancing automated, high-precision radiotherapy planning. Implementation of such pipelines is critical for improving model reliability and clinical applicability in future oncology research.

Keywords: DosePrediction, DeepLearning, Preprocessing, Tomotherapy

How to Cite: Darkhor, P., Hashemi, B., Farajollahi, A., Jodeiri, A., & Ghasemi, A. (2026). Resampling: A prerequisite for deep-learning-based dose prediction. (Abstract No. O-47). Asian Pacific Journal of Cancer Care, 11(S1):64. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-48

Title: Analytic–Monte Carlo Framework for Generating Spread-out Bragg Peaks in Carbon-ion Therapy

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Introduction: Although analytic methods for generating spread-out Bragg peaks (SOBPs) are well established in proton therapy, equivalent approaches for carbon-ion beams remain underdeveloped. This study extends Bortfeld's analytic formalism, originally derived for proton beams, to jointly optimize the p-value and the number of beamlets required to construct uniform SOBPs in carbon-ion therapy.

Materials and Methods: GATE Monte Carlo simulations were conducted for carbon-ion energies between 200 and 400 MeV/u. Within Bortfeld's framework, both the p-value and number of beamlets were simultaneously optimized using the peak-to-minimum dose ratio within the SOBP as the performance metric. Depending on beam energy, 10–150 beamlets were evaluated. Simulated depth–dose distributions were validated against carbon-ion ranges reported in ICRU Report 73.

Results: Increasing beam energy and SOBP width required higher optimized p-values along with larger beamlet numbers. For instance, a 96.7% uniform SOBP was obtained using an optimized p-value of 1.475 with 51 beamlets. A consistent relationship was observed among beam energy, SOBP width, optimized p-value, and number of beamlets, with broader or higher-energy SOBPs necessitating higher p-values and more beamlets. Agreement between GATE simulations and ICRU 73 range data was better than 2.4% for 400 MeV/u.

Conclusion: This study provides jointly optimized p-values and beamlet numbers for generating uniform SOBPs in carbon-ion therapy. The findings support more accurate carbon-ion dose modeling in GATE, GEANT4, and MCNP and offer a practical basis for designing physical range modulators in clinical carbon-ion beamlines.

Keywords: Carbon-ion SOBP GATE Dose

How to Cite: Piruzan, E., & Mahani, H. (2026). Analytic–Monte Carlo framework for generating spread-out Bragg peaks in carbon-ion therapy. (Abstract No. O-48). Asian Pacific Journal of Cancer Care, 11(S1):65. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-49

Title: Commissioning Outcomes of Elekta Synergy Linear Accelerator at Yaas Radiotherapy Center

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Introduction: This paper presents the comprehensive commissioning process of the Elekta Synergy linear accelerator, focusing on photon beam energies of 6 MV, 10 MV, and 18 MV. A series of dosimetry and mechanical tests were performed to verify the accuracy and reliability of the machine before clinical application.

Materials and Methods: Measurements included percent depth doses (PDDs), beam profiles in both in-plane and cross-plane directions, output factors, quality index, and multileaf collimator (MLC) transmission characteristics. Additionally, the alignment and size of the gantry, collimator, and couch isocenters were evaluated to ensure precise treatment delivery. The imported data were checked by CIRS phantom accordingly to IAEA TRS430, TECDOC. Eight different positions of CIRS phantom CT were planned and treated. Finally, the calculated dose at a determined position was compared with measuring data to TPS validation.

Results: The results demonstrate that the Elekta Synergy linac meets stringent quality and safety standards, confirming its suitability for advanced radiotherapy techniques such as 3D conformal therapy and intensity-modulated radiation therapy (IMRT). This study provides a detailed methodology and reference data to support clinical commissioning and ongoing quality assurance for this widely used linear accelerator model.

Conclusion: The commissioning results confirms that the evaluated beams comply with the required standards and are suitable for clinical use across all accessible electron and photon energy levels.

Keywords: Commissioning, Radiotherapy, Linnacm, PDD, Profile

How to Cite: Jomehzadeh, A., Jomehzadeh, Z., Yazdani, S., & Doostmohammadi, V. (2026). Commissioning outcomes of Elekta Synergy linear accelerator at Yaas Radiotherapy Center. (Abstract No. O-49). Asian Pacific Journal of Cancer Care, 11(S1):66. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-50

Title: Optimizing Breast Cancer Radiotherapy with Near-Infrared Lasers: How It Works, Smart Nanoparticles, and the Future of Personalized Treatment

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Introduction: Breast cancer continues to be one of the toughest challenges in oncology. Even with modern radiotherapy, we're still running into the same roadblocks: hypoxic tumors that don't get enough oxygen, patches of cancer cells that are stubbornly radioresistant, and the ever-present worry about damaging healthy tissue if we turn up the radiation dose. Entering a near-infrared (NIR) laser (808–1064 nm), when paired with the right nanoparticles can safely heat tumors to 42–50 ℃, improve oxygen levels, break down radioresistancy, and make radiation work much better—all with minimal invasiveness.

Materials and Methods: We dug deep into the recent literature (2020–2025) across PubMed, Scopus, and Web of Science, searching for studies that combined breast cancer radiotherapy with NIR lasers, photothermal therapy, photodynamic effects, and nanoparticle designs. We carefully screened papers and pulled together the most promising findings on how these approaches sensitize tumors to radiation, the clever engineering behind the nanoparticles, animal results, and what it all might mean for patients.

Results: Gold-based and multifunctional nanosystems (including alginate-coated AuNPs, Au nanoclusters, and GNCs@NO) activated by NIR radiation produced localized hyperthermia (42–50 ℃), significantly potentiating RT doses of 4–6 Gy. Combined therapy achieved >80% tumor growth inhibition in vivo, >70% reduction in cancer cell viability, enhanced ROS and NO generation, improved reoxygenation of hypoxic regions, and occasional abscopal effects in distant lesions. Most nanoplatforms exhibited high tumor selectivity, favorable pharmacokinetics, and minimal systemic toxicity, supporting their compatibility with image-guided RT workflows.

Conclusion: Integrating NIR lasers with radiotherapy is shaping up to be a genuine game-changer for overcoming radioresistance in breast cancer. When we bring in adaptive radiotherapy platforms that adjust treatment in real time, we can fine-tune both the heat and the radiation dose for each patient. This combination feels closer than ever to moving from the lab bench to the clinic.

Keywords: Breast-cancer Radiotherapy Nanoparticles NIR-laser Photothermal-therapy

How to Cite: Mollahasani, M., Afsharrezaei, E., & Rasta, S. H. (2026). Optimizing breast cancer radiotherapy with near-infrared lasers: How it works, smart nanoparticles, and the future of personalized treatment. (Abstract No. O-50). Asian Pacific Journal of Cancer Care, 11(S1):67. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-51

Title: Safe Automation: Deep-Learning–Based Auto-Contouring of Pelvic Organs at Risk with Preserved PTV Coverage and Bladder-Specific Dosimetric Alerts

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Introduction: The process of manually delineating pelvic organs at risk (OARs) is laborious and prone to inter-observer variability. While deep-learning auto-contouring can increase productivity, its clinical implementation necessitates confirmation that dosimetric quality, especially PTV coverage, is not compromised. This study evaluated the dosimetric impact and geometric accuracy of substituting a 3D U-Net-based auto-contouring system for manually contoured OARs in pelvic radiotherapy.

Materials and Methods: In this retrospective study (n=50), two plans were created per patient: the clinical plan with manual contours (Plan A) and a re-optimized plan using auto-contoured OARs while keeping the manual PTV fixed (Plan B). Geometric metrics (DSC, Jaccard, HD95, MDA, Surface-DSC) were calculated. Dosimetric endpoints included PTV indices (D98, D95, D2, CI, HI) and OAR parameters (V30, V40, Dmean). 3D gamma analysis (3%/3 mm, 10% threshold) evaluated overall plan quality. Subgroup analysis examined bladder sensitivity in cases with greater PTV overlap.

Results: PTV coverage and homogeneity were equivalent between the two plans; differences in D98, D95, D2, V50, CI, and HI were statistically non-significant with negligible effect sizes. For OARs, only bladder metrics showed significant yet clinically small increases ($\Delta V30 \approx +2.27\%$, $\Delta V40 \approx +3.02\%$, $\Delta Dmean \approx +0.64$ Gy). Small bowel and femoral heads demonstrated no significant differences. 3D gamma pass rates were high and comparable (~96%). Geometric accuracy was acceptable for all OARs (DSC>0.7; MDA<2.8 mm).

Conclusion: PTV quality and overall plan safety are maintained by substituting deep-learning auto-contours for manually drawn OARs while maintaining manual PTV. A quick, focused review is only necessary for minor variations related to the bladder. This "safe automation" strategy can significantly lessen the workload associated with contouring without sacrificing clinical quality.

Keywords: auto-contouring pelvic radiotherapy U-Net

How to Cite: Seifi Makrani, D., & Pourfallah, T. (2026). Safe automation: Deep-learning–based auto-contouring of pelvic organs at risk with preserved PTV coverage and bladder-specific dosimetric alerts. (Abstract No. O-51). Asian Pacific Journal of Cancer Care, 11(S1):68. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-52

Title: Combination of Photothermal Lasers with Common Methods in Cancer Treatment; Present and Future

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Introduction: Laser-assisted combination therapy is an innovative and targeted cancer treatment that integrates laser energy with chemotherapy to enhance the effectiveness of cancer therapy while minimizing damage to surrounding healthy tissues. This method exploits the precision of laser technology and the potency of chemotherapeutic agents, offering a synergistic approach to combating cancer. Here's an overview of its key aspects : Principles of Laser-Assisted Combination Therapy Laser Energy: A laser generates highly focused light beams that can be directed precisely at tumor sites. Depending on the wavelength and intensity, lasers can either directly destroy cancer cells (photothermal effect) or sensitize them to other treatments. Chemotherapy: This involves the use of chemical agents that target and destroy rapidly dividing cancer cells. By combining these methods, the treatment can localize the chemotherapeutic effect to the tumor, enhancing efficacy and reducing systemic side effects.

Materials and Methods: Mechanisms of Action

1.Enhanced Drug Delivery:

Laser energy can temporarily disrupt cell membranes or increase tissue permeability, facilitating deeper penetration of chemotherapeutic agents into the tumor.

This targeted delivery ensures higher drug concentrations at the cancer site, sparing healthy tissues.

2. Photothermal Effect:

Lasers can heat tumor tissues, directly causing cell death. The increased temperature also enhances the uptake of chemotherapeutic drugs.

3. Photochemical Activation:

In some cases, lasers activate drugs (e.g., photosensitizers used in photodynamic therapy) to generate reactive oxygen species that damage cancer cells.

4. Immunomodulation:

The localized destruction of tumor cells by laser and chemotherapy can release tumor antigens, potentially stimulating the immune system to recognize and attack cancer cells.

Results: Applications

- Solid Tumors: Particularly effective for tumors in accessible locations such as the skin, breast, and liver.

- Minimally Invasive Procedures: Lasers can be delivered via fiber optics for internal cancers like those in the lungs or gastrointestinal tract.
- Drug-Resistant Cancers: Laser energy can disrupt protective mechanisms in cancer cells, making them more susceptible to chemotherapy.

Advantages

- Targeted Therapy: Reduces off-target effects and systemic toxicity.
- Synergistic Effects: Enhances the overall therapeutic impact by combining two potent modalities.
- Minimized Resistance: Reduces the likelihood of cancer cells developing resistance to treatment.
- Shorter Recovery Time: Due to its minimally invasive nature, patients often recover faster.

Conclusion: Challenges and Limitations

Precision Requirement: Accurate targeting of the laser beam is crucial to avoid damaging healthy tissues.

Cost and Accessibility: Advanced equipment and expertise are needed, which may limit availability in resource-constrained settings.

Potential for Heat Damage: Excessive laser energy can harm surrounding tissues.

Tumor Heterogeneity: The therapy may be less effective in tumors with diverse cellular characteristics.

Future Perspectives. Nanotechnology: Incorporating nanoparticles that respond to laser light could further enhance drug delivery and reduce side effects. Real-Time Monitoring: Advances in imaging techniques can allow precise targeting and monitoring of therapy in real-time.

Combination with Immunotherapy: Laser-assisted methods can be paired with immune checkpoint inhibitors for a more comprehensive treatment approach.

Keywords: Laser Photothermal Cancer Radiotherapy chemotherapy

How to Cite: Rasta, S. H., Mollahasani, M., & Afsharrezaei, E. (2026). Combination of photothermal lasers with common methods in cancer treatment; Present and future. (Abstract No. O-52). Asian Pacific Journal of Cancer Care, 11(S1):69-70. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-53

Title: Pain Management in Patients with Cancer: Combined and Interprofessional Approaches to Enhance Quality of Life

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Introduction: Pain management in patients with cancer represents a complex and significant clinical challenge that necessitates multifaceted and interdisciplinary approaches. Pain not only adversely affects patients' quality of life and overall comfort but may also lead to psychological and social disturbances. This review study examines various strategies for pain management, emphasizing the critical role of interdisciplinary collaboration in the care of cancer patients.

Materials and Methods: This review was conducted through a structured search of reputable scientific databases, including PubMed, Google Scholar, Web of Science, and Magiran. Relevant English and Persian scientific sources, as well as international clinical guidelines, were analyzed in order to identify best practices in pain management.

Results: Results: Pharmacological interventions primarily include the use of opioids and nonsteroidal anti-inflammatory drugs (NSAIDs). Opioids are particularly effective in managing severe and chronic pain and may improve patients' quality of life. However, careful monitoring of opioid administration remains essential due to the risk of dependence and associated adverse effects. NSAIDs also serve as effective options for alleviating mild to moderate pain. Recent evidence indicates that combining these agents with adjuvant medications, such as antidepressants and anticonvulsants, can enhance pain relief while reducing adverse effects.

Non-pharmacological interventions, including psychotherapeutic techniques, physiotherapy, and supportive interventions, have increasingly gained attention in cancer-related pain management.

Conclusion: Conclusion: Pain management in cancer patients should be regarded as an interdisciplinary process requiring close collaboration among physicians, nurses, psychologists, and other healthcare providers. This multidisciplinary approach ensures more effective pain identification and management and supports improved patient quality of life. Current evidence demonstrates that the combination of pharmacological and non-pharmacological interventions, alongside interprofessional collaboration, yields optimal outcomes in cancer pain management.

Keywords: Pain management, cancer, interdisciplinary collaboration

How to Cite: Mohebi, S., & Babaie, M. (2026). Pain management in patients with cancer: Combined and interprofessional approaches to enhance quality of life. (Abstract No. O-53). Asian Pacific Journal of Cancer Care, 11(S1):71. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-54

Title: Validation and Five-Year Follow-Up of a 21-Gene Test for Optimizing Treatment of Early Breast Cancer in Iranian Ethnic Groups

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Introduction: Given the rising incidence of breast cancer in Iran, optimizing treatment is vital. While the 21-gene test (Oncotype DX) plays a role in guiding chemotherapy, local validation is essential due to potential population-specific genetic differences. The aim of this study was to validate and conduct a five-year follow-up of this test to optimize treatment in Iranian patients.

Materials and Methods: This prospective cohort study, conducted from 2017 , included breast cancer patients who underwent the local 21-gene assay (Oncotest). Complete clinical-demographic data was analyzed for patients with a definitive diagnosis and age over 18. Data analysis involved descriptive statistics and survival analysis using the Kaplan-Meier and Cox regression models (with SPSS 26).

Results: The analysis of clinical and pathological variables revealed no significant differences in age, hormone receptor status (ER/PR), tumor size (T stage), or nodal status (N stage) between patients who received chemotherapy and those who did not ($p > 0.05$). However, lymphovascular invasion was significantly more frequent in the chemotherapy group (24.4% vs. 8.8%, $p = 0.001$). Among the nine patients who experienced recurrence/metastasis, the majority (8 of 9) had not received chemotherapy. Notably, only two recurrence cases occurred among patients with Oncotype DX Recurrence Scores <25 who had not received chemotherapy. These recurrence cases were characterized by HR+/HER2- tumors, predominantly low nodal involvement (N0/N1), and intermediate Oncotype DX Recurrence Scores (range: 17–28).

Conclusion: In conclusion, the majority of recurrence/metastasis events occurred in intermediate-risk patients who did not receive chemotherapy, highlighting a potential subgroup where genomic risk assessment might warrant more nuanced clinical management. The assay showed a significant association with the presence of lymphovascular invasion, a known pathological risk factor.

Keywords: OncotypeDX, Breast cancer, Iranian population,

How to Cite: Najafi, S., Dibaei, S., Kaveh, V., & Najafi, N. (2026). Validation and five-year follow-up of a 21-gene test for optimizing treatment of early breast cancer in Iranian ethnic groups. (Abstract No. O-54). Asian Pacific Journal of Cancer Care, 11(S1):72. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-55

Title: Evaluation of topical Piroxicam in prevention of Capecitabine-related hand-foot syndrome in patients with colon and breast cancer: a randomized, double-blind clinical trial study

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Introduction: Hand-foot syndrome (HFS) is a frequent dose-limiting toxicity of capecitabine that can impair daily functioning, reduce quality of life, and lead to treatment delay or dose reduction. Despite its clinical importance, effective preventive strategies remain limited. Given the inflammatory mechanisms proposed in the pathogenesis of HFS, topical NSAIDs may offer a locally effective and safe preventive option. This clinical trial aimed to evaluate the efficacy of topical piroxicam in reducing the incidence, severity, and onset time of capecitabine-induced HFS in patients with colon or breast cancer.

Materials and Methods: This randomized double-blind placebo-controlled trial enrolled adults with colon or breast cancer receiving capecitabine monotherapy (≥1000 mg/m² BID). Patients (ECOG 0–2) were randomized by block allocation to receive topical piroxicam 0.5% gel (Razak Pharmaceutical Co., Iran) or placebo, applied twice daily to hands and feet for 12 weeks. Study gels were dispensed in identical tubes by an independent pharmacist to maintain blinding. HFS incidence and severity were assessed at baseline and at each cycle using the WHO grading system. Time to onset, adherence, dose modifications, and patient-reported outcomes (HFS-14) were recorded. CBC, renal/liver tests, and hs-CRP were monitored at baseline and week 12. Patients who developed grade ≥2 HFS were treated per standard of care and withdrawn.

Results: Gender distribution was similar between groups (P=0.837). The incidence of hand involvement (36.7% vs 8%), total HFS distribution (P=0.002), and pain scores (2.1 vs 5.4; P<0.001) were significantly better in the treatment group. Mean time to HFS onset was longer with piroxicam (68.1 vs 57.4 days; P<0.001). Grade distribution differed significantly, with fewer grade 4 cases in the treatment arm (6.1% vs 34%; P<0.001). Dose modification was less frequent with piroxicam (6.1% vs 20%; P=0.041). Treatment adherence was comparable (P=0.747).

Conclusion: Topical piroxicam demonstrated meaningful preventive benefits against capecitabine-induced HFS, including reduced incidence of severe grades, prolonged time to onset, lower pain intensity, and fewer dose reductions. These findings indicate that piroxicam gel is a well-tolerated, low-risk, and effective adjunct to maintain treatment continuity and minimize toxicity-related interruptions in patients receiving capecitabine.

Keywords: Capecitabine,hand-foot syndrome, Topical piroxicam

How to Cite: Kalantari Khandani, M., Nouri, M., & Darvishi, A. H. (2026). Evaluation of topical piroxicam in prevention of capecitabine-related hand-foot syndrome in patients with colon and breast cancer: A randomized, double-blind clinical trial study. (Abstract No. O-55). Asian Pacific Journal of Cancer Care, 11(S1):73. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-56

Title: Impact of Pelvic Lymph Node Contouring Variability on PTV Coverage and OAR Dose in Prostate IMRT: DVH and Statistical Analysis in 15 Simulated Patients

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Introduction: Variability in pelvic lymph node (LN) contouring among radiation oncologists can affect PTV coverage and OAR doses in prostate IMRT. Quantifying this effect is essential for optimizing treatment quality and reproducibility.

Materials and Methods: CT-simulation images of 15 prostate cancer patients were contoured independently by three radiation oncologists. All data were simulated based on one representative real patient to control for anatomical differences. IMRT plans delivering 50 Gy in 25 fractions were generated. DVH parameters, including PTV V95% and Dmean/Dmax for bladder, rectum, small bowel, and femoral heads, were extracted. Differences were analyzed using Repeated Measures ANOVA with post-hoc Bonferroni. SD, CV, Δ values, and Pearson correlation coefficients with 95% CI were calculated.

Results: Mean LN volumes ranged 246–285 cc (SD ≈ 15 cc, CV ≈ 5–6%). Observer variability caused PTV V95% differences up to 1.5% and ΔDmean of OARs up to 1.5 Gy. ANOVA revealed significant observer-related differences in PTV V95% ($F=5.12$, $p=0.013$, $\eta^2=0.21$). LN volume positively correlated with PTV V95% ($r=0.72$, 95% CI: 0.48–0.86, $p<0.001$). ΔDmean for bladder, rectum, small bowel, and femoral heads ranged 0.8–1.5 Gy, highlighting organ dose specific variability.

Conclusion: Observer variability in pelvic LN contouring significantly affects PTV coverage and OAR doses, with potential clinical implications for plan quality and toxicity. Standardized contouring protocols and peer review are recommended to minimize differences. The simulation-based approach allowed controlled assessment of variability, emphasizing reproducible contouring practices.

Keywords: Pelvic lymph nodes-Contouring -IMRT-PTV-OAR

How to Cite: Yaftian, M., Saeedzadeh, E., Arabi, H., & Babapour Mofrad, F. (n.d.). (2026) Impact of pelvic lymph node contouring variability on PTV coverage and OAR dose in prostate IMRT: DVH and statistical analysis in 15 simulated patients. (Abstract No. O-56). Asian Pacific Journal of Cancer Care, 11(S1):74. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-57

Title: Three-Phase CT–Based Motion-Inclusive ITV Generation and Robust PTV Margin Design in Thoracic Tumors in the Absence of 4D-CT and CBCT: A Feasibility and Robustness Study

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Introduction: Respiratory-induced tumor motion generates significant geometric uncertainty in thoracic radiotherapy, especially where 4D-CT, CBCT, or respiratory gating are unavailable. Low-resource, clinically implementable methods for motion-inclusive target definition are needed.

Materials and Methods: Patients with mobile thoracic targets underwent three-phase CT simulation (free-breathing, end-inspiration, end-expiration; 3-mm slice thickness). Three-phase CT (free breathing, end-inspiration, end-expiration; 3-mm slices, Siemens SOMATOM) was used. GTVs were delineated per ICRU-83, and ITVs generated via Boolean union in Eclipse TPS. COM displacements and volumes were extracted. Directional motion amplitudes (LR/AP/SI) informed PTV margins: Motion + 2 mm setup uncertainty. Robustness was tested through sensitivity analyses (motion ±10%/±20%, COM ±1–3 mm, setup 1–3 mm). van Herk formalism ($\Sigma = 2$ mm, $\sigma = 1$ mm) provided benchmark margins. The study was designed as a feasibility pilot to assess method reproducibility.

Results: The para-aortic target exhibited motion amplitudes of 8.5 mm (LR), 2.3 mm (AP), and 5.1 mm (SI), with an ITV_union of 9.4 cm^3. The lung tumor demonstrated 1.0 mm (LR), 1.5 mm (AP), and 5.9 mm (SI), with an ITV_union of 537.6 cm^3. Nominal PTV margins were 10.5 / 4.3 / 7.1 mm and 3.0 / 3.5 / 7.9 mm. Under worst-case perturbation scenarios, margins increased to approximately 13.2 mm and 10.1 mm. All proposed margins remained within clinically acceptable ranges across sensitivity conditions.

Conclusion: Three-phase CT–based ITV generation provides a robust, clinically implementable solution for motion management and PTV margin design in low-resource radiotherapy environments and may reduce the risk of geographic miss when advanced motion-management technologies are unavailable.

Keywords: motion, ITV, PTV,CT,robustness

How to Cite: Yaftian, M., Tajvidi, M., & Molana, S. H. (n.d.). (2026) Three-phase CT–based motion-inclusive ITV generation and robust PTV margin design in thoracic tumors in the absence of 4D-CT and CBCT: A feasibility and robustness study. (Abstract No. O-57). Asian Pacific Journal of Cancer Care, 11(S1):75. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-58

Title: Theranostics at the Therapeutic Frontier: Imaging-Guided Multimodal Platforms for Precision Oncology

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Introduction: Radiotheranostics enables precision oncology by linking molecular imaging with targeted radionuclide therapy. Approved agents such as ^177Lu-DOTATATE and ^177Lu-PSMA have demonstrated that imaging can identify target expression, select suitable patients, and individualize dosing. Current research is advancing toward multimodal platforms that combine nanotechnology, external activation, and immune-enhancing mechanisms. This study reviews recent developments and outlines emerging directions for precision-guided therapeutic strategies.

Materials and Methods: A structured literature review was conducted through PubMed/PMC, Scopus, and Web of Science. Search terms included "theranostics," "nanotheranostics," "radiolabeled nanoparticles," "photothermal theranostics," "photodynamic theranostics," "sonotheranostics," "radio-immunotherapy," "177Lu-PSMA," and "177Lu-DOTATATE." Extracted variables included carrier design, radionuclide characteristics, activation modality (light, heat, or ultrasound), pharmacokinetic behavior, safety profiles, and evidence of immune engagement. Studies were grouped according to radiotheranostics, nanotechnology-based drug delivery, and hybrid activation approaches.

Results: Evidence indicates that modular nanocarriers capable of integrating therapeutic radionuclides with photothermal, photodynamic, or ultrasound-responsive components improve tumor localization and controlled release. External activation enhances local cytotoxicity and promotes antigen exposure, with preclinical models reporting immune activation. Radionuclide selection and chelator chemistry remain central to therapeutic index and dosimetry. Tissue penetration and hypoxia constitute key limitations requiring further optimization.

Conclusion: Imaging-guided multimodal theranostic platforms represent an emerging direction in precision oncology, offering controllable activation and potential immune synergy. Translation to clinical practice depends on pharmacokinetic optimization, biomarker-based patient selection, and standardized dosimetry. Continued development and phased clinical evaluation will be essential for determining therapeutic value.

Keywords: Theranostics Radiotheranostics Nanoparticles Immunotherapy Precision

How to Cite: Rezaei, M., & Lotfi Koshki, A. (n.d.). (2026) Theranostics at the therapeutic frontier: Imaging-guided multimodal platforms for precision oncology. (Abstract No. O-58). Asian Pacific Journal of Cancer Care, 11(S1):76. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-59

Title: Evaluation of deformable image registration on dosimetrical impact of fractionated brachytherapy for prostate cancer

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Introduction: This study evaluates the role of deformable image registration (DIR) in cumulative dose calculations for fractionated prostate cancer brachytherapy, focusing on its impact on dosimetry for target regions and organs at risk (OARs).

Materials and Methods: A retrospective analysis was conducted on 12 prostate cancer patients who underwent postoperative external beam radiation therapy (EBRT) followed by high-dose-rate brachytherapy. For each patient, four fraction plans were generated. Dose-volume histograms (DVHs) from the treatment planning system (TPS) were used to estimate cumulative doses by simple DVH summation. In parallel, brachytherapy dose distributions and structure contour sets from all fractions were imported into MIM software, where DIR was performed between fractions and cumulative doses were recalculated on the reference anatomy.

Results: DIR modestly but consistently reduced cumulative doses to selected OARs, particularly the bladder and rectum, with average dose reductions of 1.44–2.88 Gy for clinically relevant DVH endpoints, indicating improved dose mapping and a potential reduction in toxicity risk. Target coverage metrics showed minimal change, suggesting that DIR primarily affected dose redistribution in normal tissues. However, variability in registration performance across pelvic sub-regions and occasional local mis-registrations highlighted ongoing challenges in achieving robust accuracy

Conclusion: DIR-based dose evaluation can refine cumulative dosimetry and better characterize OAR exposure in prostate cancer brachytherapy, but current uncertainties in registration quality limit routine clinical adoption. Until DIR algorithms and quality-assurance tools are further improved and

Keywords: Deformable registration DVH accumulation method

How to Cite: Eslamizadeh, M., Shojadini, S. V., Dosaranian-Moghadam, M., & Raeis Dana, S. (n.d.). (2026) Evaluation of deformable image registration on dosimetrical impact of fractionated brachytherapy for prostate cancer. (Abstract No. O-59). Asian Pacific Journal of Cancer Care, 11(S1):77. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-60

Title: A Deep Learning–Driven Diagnostic Framework for Thyroid Cancer Based on RNA-Seq Data

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Introduction: Thyroid cancer is rapidly increasing worldwide. We need precise and early detection methods to diagnose it. Deep learning is a powerful analytical approach for modeling complex transcriptomic data, enhancing diagnostic accuracy in cancer detection. This study developed a deep learning-based diagnostic model using RNA-Seq data to differentiate between tumoral and normal thyroid tissues.

Materials and Methods: RNA-Seq gene expression profiles of 503 thyroid cancer patients were obtained from TCGA. Quality control, normalization, and identification of differentially expressed genes were performed, followed by the development of a fully connected DNN model using Rectifier activation and a learning rate of 0.01. The dataset was split into training and testing sets in a 70:30 ratio. The model was evaluated based on AUC, accuracy, MSE, and RMSE. Feature importance analysis was conducted to identify key predictive genes.

Results: The DNN model demonstrated strong discriminatory ability, achieving an AUC of 1.00 and an accuracy of 96.83%. Error metrics calculated [MSE = 0.01, RMSE = 0.10] indicated that the model was fairly stable. NCRNA00113, LOC283867, and C20orf123 were identified as the most important predictors based on feature-importance evaluation. These genes appeared to be upregulated in tumor samples and could serve as potential biomarkers for thyroid cancer classification.

Conclusion: This framework identifies thyroid cancer from normal tissues using transcriptomic signatures. Its high performance highlights the potential of DNN-based models in oncology and biomarker discovery. Further biological validation of the selected gene candidates is necessary.

Keywords: Deep-learning RNA-Seq Thyroid-cancer Artificial-Intelligence

How to Cite: Moazzen, Z., Asadian, Z., Sohrabei, S., Aldaghi, T., & Nazari, E. (n.d.). (2026) A deep learning–driven diagnostic framework for thyroid cancer based on RNA-Seq data. (Abstract No. O-60). Asian Pacific Journal of Cancer Care, 11(S1):78. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-61

Title: Evaluation of the Feasibility of Using CBCT as a CT Simulator for Adaptive Radiotherapy

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Introduction: In radiotherapy, maintaining accurate patient positioning and consistent dose delivery is crucial. Anatomical changes during treatment (e.g., weight loss, tumor shrinkage) can affect plan accuracy, potentially requiring re-simulation, which increases time, cost, and may delay treatment. Recent advances in CBCT imaging and HU calibration suggest that CBCT could serve as a practical and accessible tool for adaptive radiotherapy and patient monitoring.

Materials and Methods: This experimental phantom-based study utilized a Gamex phantom to generate CT-to-HU calibration curves and a Rando phantom for dosimetric evaluation. CBCT and FBCT images of the Rando phantom were acquired for three anatomical regions (head and neck, thorax, and pelvis), and treatment plans were created on both image sets for comparison. Accurate CBCT dose calculation depends on image quality and the HU-to-ED calibration required by the treatment planning system. This study evaluated the accuracy of CBCT-based dose calculation across the three regions

Results: The CBCT calibration curves demonstrated close correspondence with the FBCT reference across all anatomical regions, with the largest HU deviation in the [region] at [value] HU, remaining within clinically acceptable limits for dose calculation. Dose distributions from CBCT and FBCT images of the Rando phantom were evaluated using gamma analysis and DVH metrics. Gamma assessment (2%/2 mm) indicated satisfactory agreement with pass rates above 95%, while DVH comparisons of PTV and OARs showed minimal deviations, confirming the reliability of CBCT for dose calculation.

Conclusion: CBCT-based dose calculations reliably reproduce FBCT results, with consistent gamma pass rates and DVH metrics, supporting the feasibility of CBCT as a CT simulator for adaptive radiotherapy.

Keywords: CBCT Cone Beam Computed Tomography

How to Cite: Soleimani, A., Mohammadi, M., Fouladinezhad, B., & Jamali, F. (n.d.). (2026) Evaluation of the feasibility of using CBCT as a CT simulator for adaptive radiotherapy. (Abstract No. O-61). Asian Pacific Journal of Cancer Care, 11(S1):79. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-62

Title: A Comparative Study of Small Field Detectors on a Varian VitalBeam Linear Accelerator

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Introduction: The clinical implementation of advanced radiotherapy techniques like Stereotactic Body Radiation Therapy (SBRT) and Stereotactic Radiosurgery (SRS) relies on the accurate dosimetric characterization of small photon fields. These fields present significant challenges, including volume averaging and lateral electronic disequilibrium, which can compromise measurement accuracy. This study was conducted to evaluate the performance limits of five commercially available detectors for small field dosimetry on a modern linear accelerator, providing practical guidance for clinical physicists.

Materials and Methods: Percentage Depth Doses (PDDs) and beam profiles were measured at a depth of 10 cm for square field sizes of 0.5, 1, 2, 3, and 4 cm using a PTW BeamScan water tank on a Varian VitalBeam linac with a 6 MV beam. The evaluated detectors included the PTW Semiflex 3D, Pinpoint, Pinpoint 3D, MicroSilicon, and MicroDiamond. All measurements were benchmarked against a reference dataset from a high-resolution diode and against calculations from the Eclipse v16.1 Treatment Planning System (TPS). A quantitative gamma analysis with a 2mm/3% criterion and a 10% dose threshold was used to assess agreement.

Results: A clear performance threshold was observed at the 1 cm field size. For fields of 1 cm and larger, the Semiflex 3D, Pinpoint 3D, MicroSilicon, and MicroDiamond all passed the 2mm/3% gamma criteria with passing rates above 95%. The classic Pinpoint detector was borderline. For the sub-centimeter 0.5 cm field, all ionization chambers (Semiflex 3D, Pinpoint, Pinpoint 3D) failed the gamma analysis due to significant volume averaging effects. In contrast, the high-resolution MicroSilicon and MicroDiamond detectors maintained better agreement.

Conclusion: Detector selection is paramount for accurate small field dosimetry. For a 2mm/3% tolerance, standard ion chambers are acceptable for fields $\geq$ 1 cm, with the exception of the classic Pinpoint, which is marginal at this size. However, for sub-centimeter fields, high-resolution solid-state detectors like the MicroDiamond and MicroSilicon are essential to overcome volume averaging and ensure reliable data for TPS commissioning and patient-specific quality assurance.

Keywords: Small-field dosimetry - Gamma analysis

How to Cite: Moshirian, T., Jahangiri, M., Sobh Khiz Sabet, L., & Mohammadi, M. (n.d.). (2026) A comparative study of small field detectors on a Varian VitalBeam linear accelerator. (Abstract No. O-62). Asian Pacific Journal of Cancer Care, 11(S1):80. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-63

Title: Clinical Validation of the VMAT Technique: A Review of Risk-Based Standards and Site-Specific Advantages

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Introduction: Volumetric Modulated Arc Therapy (VMAT) is a widely adopted technique for treating complex tumors due to its high dose conformity and treatment efficiency. However, its dynamic nature presents challenges in commissioning and quality assurance (QA), and its clinical accuracy is highly dependent on the dose-calculation algorithm used. This review aims to systematize the requirements for the safe and accurate clinical implementation of VMAT.

This review provides a comprehensive framework for VMAT commissioning. Its objectives are to detail machine and Treatment Planning System (TPS) requirements, outline patient-specific QA protocols, summarize the dosimetric advantages of VMAT over IMRT for brain, head and neck, and prostate cancers, and evaluate the impact of different dose-calculation algorithms (AAA vs. Acuros XB) on accuracy.

Materials and Methods: The review analyses established national and international guidelines and credentialing requirements. A comparative planning study was performed on three clinical cases (brain, head and neck, and prostate), evaluating 7-field and 9-field IMRT versus dual-arc VMAT plans. All VMAT plans were recalculated using both AAA and Acuros XB algorithms to assess the impact of algorithm choice on dose accuracy in heterogeneous anatomies.

Results: Successful VMAT commissioning requires a three-part process: machine verification, TPS modelling, and patient-specific QA. Clinically, VMAT demonstrated superior dose gradients for brain tumors, significant contralateral parotid sparing for head and neck cases, and improved efficiency for prostate cancer compared with IMRT. The Acuros XB algorithm provided more accurate dose calculations in heterogeneous regions and in high-density bone than the AAA algorithm.

Conclusion: Effective VMAT implementation requires a multi-faceted approach involving rigorous commissioning and risk-based QA. This study confirms VMAT's dosimetric advantages over IMRT for selected tumor sites and highlights the importance of algorithm selection, with Acuros XB offering superior accuracy. Adherence to established standards ensures the safe and effective application of VMAT to optimize patient outcomes.

Keywords: VMAT, Quality Assurance, Dose-Calculation Algorithm

How to Cite: Sobh Khiz Sabet, L. (n.d.). (2026) Clinical validation of the VMAT technique: A review of risk-based standards and site-specific advantages. (Abstract No. O-63). Asian Pacific Journal of Cancer Care, 11(S1):81. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-64

Title: The impact of e Learning and multimedia in cervical cancer prevention

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Introduction: Cervical cancer is one of the most common cancers among women, which can be prevented through early diagnosis and vaccination against the human papillomavirus (HPV). With advancements in communication technologies, e-learning and multimedia tools have emerged as effective solutions for raising public awareness and promoting preventive behaviors. This study aims to investigate the impact of e-learning and multimedia education on increasing awareness and encouraging preventive measures against cervical cancer

Materials and Methods: In this systematic review, using the keywords "electronic health" and "cervical cancer" in English and Farsi without time limit, databases including Pubmed, Web of Science and Scopus were searched to retrieve foreign articles and Magiran and Sid databases to retrieve Persian articles. The inclusion criteria included original articles that investigated the impact of e-health education and its subsets in the prevention of cervical cancer.

Results: The results indicate that e-learning and multimedia technologies play a significant role in increasing public awareness, changing attitudes, and encouraging preventive behaviors by presenting scientific information visually and interactively. However, limited access to the internet and a lack of digital literacy among some individuals remain challenges that require more attention from health policymakers.

Conclusion: the findings of this research highlight the significant impact of electronic learning (e-learning) and multimedia technologies in raising public awareness and encouraging preventive behaviors against cervical cancer.indicate that e-learning offers flexible, accessible, and engaging educational content, enabling individuals to gain knowledge without time or location constraints. This accessibility is particularly crucial for women in remote areas who may lack traditional educational resources.

Keywords: Cervicalcancer,e-learning,multimedia, public awareness, preventive behaviors

How to Cite: Zaeri, G., Ghanbarimotlagh, A., & Zaeri, M. (n.d.). (2026) The impact of e-learning and multimedia in cervical cancer prevention. (Abstract No. O-64). Asian Pacific Journal of Cancer Care, 11(S1):82. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-65

Title: Verification of Bebig Co-60 Source Strength Using a PTW TM33005 Chamber Cross-Calibrated Against a Reference Well-Type Chamber

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Introduction: Accurate verification of brachytherapy source strength is essential for ensuring correct patient dose delivery. For Cobalt-60 (Co-60) sources, such as the Bebig Co0.A86, clinics must employ a reliable method to confirm the manufacturer's stated Air-Kerma Strength (S_k). Often, a department's primary well-type chamber, such as the PTW TM33005, may lack a current, direct calibration for Co-60 from a standards laboratory. This study outlines a clinical protocol for cross-calibrating a PTW TM33005 well-type chamber against a secondary, NIST-traceable calibrated reference chamber to enable accurate source strength verification.

Materials and Methods: A single Bebig Co-60 source was sequentially measured in two well-type chambers. First, it was placed in the reference chamber, which had a valid calibration factor for Co-60, and its reading was recorded. The source was then immediately transferred to the PTW TM33005 chamber, and its reading was recorded under identical geometric conditions. A cross-calibration factor for the TM33005 was derived from the ratio of the two readings, corrected for temperature and pressure. This new factor was then used to measure the S_k of a second, new Bebig Co-60 source to verify its strength against the manufacturer's certificate. The process was repeated to assess reproducibility.

Results: The cross-calibration yielded a consistent and reproducible calibration factor for the PTW TM33005 chamber, with a variation of less than 0.6% between repeated measurements. Using this newly established factor, the measured S_k of the new Bebig Co-60 source showed excellent agreement with the certificate value, with a deviation of -1.1%, well within the clinical tolerance of ±5%. The estimated combined uncertainty for the measurement was ±2.5% (k=1).

Conclusion: Cross-calibration of a PTW TM33005 well-type chamber against a reference chamber is a practical and reliable method for ensuring accurate dosimetry of Bebig Co-60 sources. This protocol provides an efficient solution for clinics to maintain high standards of quality assurance and patient safety without the logistical delays of sending primary equipment for direct laboratory calibration.

Keywords: Brachytherapy, source strength, cross-calibration

How to Cite: Moshirian, T., Jahangiri, M., & Mohammadi, M. (n.d.). (2026) Verification of Bebig Co-60 source strength using a PTW TM33005 chamber cross-calibrated against a reference well-type chamber. (Abstract No. O-65). Asian Pacific Journal of Cancer Care, 11(S1):83. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-66

Title: Addressing TECDOC 1583 Discrepancies for a Halcyon Linac: A Comparative Analysis of AAA and Acuros XB Algorithms with Couch HU Optimization

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Introduction: Commissioning of a Halcyon linear accelerator requires rigorous verification of dose calculation algorithms, particularly for small fields as outlined in IAEA TECDOC 1583. This study aimed to evaluate the performance of the Anisotropic Analytical Algorithm (AAA) and the Acuros XB (AXB) algorithm in Eclipse 16.1, with a focus on potential challenges in the post-field region arising from the unique design of the Halcyon system and its integrated couch.

Materials and Methods: Measurements were performed according to the TECDOC 1583 protocol using a suitable small-field detector. Calculations were generated using both AAA and AXB in the Eclipse 16.1 treatment planning system (TPS) for the same set of field sizes and depths. Initial results revealed significant discrepancies for AAA in the post-field region. To address this, physical couch transmission was measured and the couch Hounsfield Unit (HU) value in the TPS was adjusted accordingly. Subsequently, a published correction factor proposed by Rostami et al. was applied to calculations, and the impact of these corrections was quantified by comparing gamma anThis study confirms that AXB is robust for TECDOC 1583-based commissioning of a Halcyon linac, whereas AAA requires specific modifications to achieve acceptable accuracy. Accurate modeling of the treatment couch by adjusting its HU value is a critical step. Furthermore, application of published correction factors, such as that of Rostami et al., can effectively mitigate inherent limitations in the post-field region, supporting reliable dose calculations for safe and effective patient treatmentsalysis pass rates before and after correction.

Results: The AXB algorithm showed good agreement with measurements across all tested conditions. In contrast, initial AAA calculations demonstrated poor agreement, particularly in the post-field region, and failed to meet clinical acceptance criteria. Optimizing the couch HU value based on physical transmission measurements led to a noticeable improvement in AAA accuracy. Applying the specific correction factor further enhanced the agreement, bringing AAA results within acceptable tolerance and achieving gamma pass rates comparable to AXB.

Conclusion: This study confirms that AXB is robust for TECDOC 1583-based commissioning of a Halcyon linac, whereas AAA requires specific modifications to achieve acceptable accuracy. Accurate modeling of the treatment couch by adjusting its HU value is a critical step. Furthermore, application of published correction factors, such as that of Rostami et al., can effectively mitigate inherent limitations in the post-field region, supporting reliable dose calculations for safe and effective patient treatments.

Keywords: TECDOC1583; couch HU ; commissioning

How to Cite: Moshirian, T., Shahamat, Z., Kheirollahi, N., & Mohammadi, M. (n.d.). Addressing TECDOC 1583 discrepancies for a Halcyon Linac: A comparative analysis of AAA and Acuros XB algorithms with couch HU optimization. (Abstract No. O-66). Asian Pacific Journal of Cancer Care, 11(S1):84-85. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-67

Title: Monte Carlo Simulation of Gold and Epoxy-Resin Radiosensitizer Layers Coated 177Lu Nano-Radionuclides for Enhanced Liver Cancer Therapy

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Introduction: Radionuclide therapy is a recognized and effective approach for treating cancer and removing metastases. The study investigates the impact of 10nm gold and 10nm epoxy-resin coatings on the radiation characteristics of 50nm 177Lu nano-radionuclides.

Materials and Methods: Monte Carlo simulations were performed using the MCNP6 code to model the radiation emitted from both bare and coated 177Lu sources. A humanoid phantom (KTMAN-2) was utilized to assess dosimetric parameters, including the emission of γ-rays and β-1 particles at various distances (5nm and 1μm) from the source.

Results: The results indicated that the number of emitted γ-rays and β-1 particles significantly increased after applying the coatings. Specifically, the number of γ-rays emitted from the coated source was 9.97×10-6 at 5nm, compared to 7.45×10-6 for the bare source. Additionally, β-1 particle emissions rose by 91% due to the coatings, enhancing the therapeutic potential for liver metastasis.

Conclusion: The application of 20nm gold and epoxy-resin coatings on 177Lu nano-radionuclides enhances both the quantity and quality of emitted radiation, making it a promising strategy for liver cancer treatment. The short-range β-1 ray effectively targets malignant cells, while the γ-ray emissions allow for broader treatment applications.

Keywords: Radiosensitizers RadionuclideTherapyGoldandEpoxy-resinLayers MonteCarlosimulation 177Lu-LiverCancer

How to Cite: Molazadeh, M., Eghdam-Zamiri, R., Ghiasi, H., Rezaeejam, H., & Parwaie, W. (n.d.). (2026) Monte Carlo simulation of gold and epoxy-resin radiosensitizer layers coated 177Lu nano-radionuclides for enhanced liver cancer therapy. (Abstract No. O-67). Asian Pacific Journal of Cancer Care, 11(S1):86. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-68

Title: Inhibiting Tumor Angiogenesis Using Endothelial-Targeted Radiopharmaceutical Therapy: A Monte Carlo Based Microdosimetry Study.

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Introduction: Tumor angiogenesis enables sustained cancer proliferation by providing oxygen and nutrients while facilitating metastasis. Endothelial cells within tumor vasculature overexpress specific biomarkers such as vascular endothelial growth factor receptors (VEGFR-1/2) and ectopic ATP synthase (ATPS). Standard anti-angiogenic therapies, including VEGF inhibitors and tyrosine kinase blockers, often yield limited efficacy due to adaptive resistance and transient vascular normalization. Radiopharmaceutical therapy (RPT) can be an alternative mechanism: delivering local cytotoxic radiation to destroy angiogenic endothelial cells and achieve durable anti-tumor effects. In this study, capability of 177Lu were assessed as a promising radionuclide to Endothelial-targeted RPT, and calculating delivered dose using GATE Monte Carlo toolkit.

Materials and Methods: Simulation was performed 70 endothelial cells along in the capillary length. As considered, many small capillaries are formed by a single endothelial cell that wraps around the lumen and joins to itself at one tight junction, so in tomogram effectively have seen 1 endothelial cell around the whole circumference. The geometry consisted of two concentric G4-water cylindrical rings representing the Endothelial cell and nucleus along in the capillary tomogram. Activity considered as 1MBq 177Lu in lumen capillary, using Monte Carlo simulations within the GATE.

Results: The previous studies reported that essential dose for lethal damage to endothelial cells is 8-10 Gy. Findings indicate 177Lu distributed in lumen can delivering 386.8 Gy in nucleus, providing high toxicity and anti-angiogenesis effect. Great contribution of this dose belonging to β particles (83%) follow then conversion electron (11%) and less than is auger electron (5%). Localized beta emission from 177Lu induces apoptosis within endothelial cells, leading to irreversible vessel collapse and reduced nutrient supply.

Conclusion: Radiopharmaceutical therapy directed at angiogenic endothelial cells represents a promising anti-angiogenic and anti-tumor platform. Through VEGFR or ATP synthase targeting, 177Lu-based radio conjugates enable selective vascular destruction, sustained tumor inhibition, and potential synergy with chemotherapy or kinase inhibitors. Continued optimization of radiochemistry, imaging-guided dosimetry, and early clinical evaluation will be critical to establish RPT as a next-generation anti-angiogenic modality in oncology.

Keywords: Radiopharmaceutical therapy, Angiogenesis, Endothelial cell

How to Cite: Hasnaki, A., & Chegeni, N. (n.d.). (2026) Inhibiting tumor angiogenesis using endothelial-targeted radiopharmaceutical therapy: A Monte Carlo based microdosimetry study. (Abstract No. O-68). Asian Pacific Journal of Cancer Care, 11(S1):87. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-69

Title: Adaptive low-dose priming to protect normal lung tissue during thoracic radiotherapy: mechanisms, preclinical evidence and clinical translation

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Introduction: Normal lung toxicity—including radiation pneumonitis and late fibrosis—limits dose escalation in thoracic radiotherapy. “Low-dose priming” proposes that a small preceding dose activates adaptive mechanisms in normal tissues, potentially reducing subsequent injury while preserving tumor control. Renewed mechanistic and preclinical data have increased interest in evaluating priming as a clinically translatable mitigation strategy.

Materials and Methods: Systematic searches were conducted in PubMed, Scopus, and Web of Science through November 2025 using Boolean combinations for adaptive response and clinical toxicity endpoints. Search terms included “adaptive response,” “low-dose radiation,” “LDRT,” “radiotherapy,” “toxicity,” “pneumonitis,” and “fibrosis.” In-vitro, in-vivo, and human clinical studies, reviews, and registered trials were eligible. Titles/abstracts were screened and full texts reviewed for mechanistic characteristics, priming dose, priming–challenge interval, and reported normal-tissue outcomes.

Results: Mechanistic studies demonstrate enhanced DNA repair kinetics, Nrf2-related antioxidant signalling, and altered cytokine profiles following priming doses. Preclinical lung models report reduced inflammation, edema, and fibrosis, although effects vary with dose (0.1–1.0 Gy), timing, and model system. Human evidence is limited; pilot studies and extrapolation from LDRT in inflammatory lung disease indicate safety and anti-inflammatory signals without definitive randomized evidence for reduced radiotherapy-related toxicity.

Conclusion: Adaptive low-dose priming remains biologically plausible but unproven for clinical implementation. Translation requires standardized priming regimens, prospective randomized trials incorporating translational endpoints such as γH2AX kinetics, cytokine signatures, and imaging biomarkers, and evaluation of potential tumor-protective effects.

Keywords: Adaptive-response Priming Radiotherapy Pulmonary Toxicity

How to Cite: Rezaei, M., & Lotfi Koshki, A. (n.d.). (2026) Adaptive low-dose priming to protect normal lung tissue during thoracic radiotherapy: Mechanisms, preclinical evidence and clinical translation. (Abstract No. O-69). Asian Pacific Journal of Cancer Care, 11(S1):88. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-70

Title: Dosimetric Feasibility and Clinical Outcomes of MRI-Guided Dose Painting Radiotherapy for Prostate Cancer: A Systematic Review

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Introduction: Local recurrence in prostate cancer frequently originates in the dominant intraprostatic lesion (DIL). MRI-guided dose painting (DP) enables focal dose escalation to the DIL while sparing healthy tissue. This systematic review evaluates the transition of DP from dosimetric feasibility to clinical implementation.

Materials and Methods: A PRISMA-guided search across PubMed, Scopus, Web of Science and Embase identified 28 eligible studies. Data were synthesized and stratified by modality: Stereotactic Body Radiotherapy (SBRT), Volumetric Modulated Arc Therapy (VMAT/IMRT), High-Dose-Rate (HDR) Brachytherapy.

Results: Dosimetrically, MRI-guided DP has demonstrated safe focal escalation up to ~150% of the prescription in planning cohorts, with contemporary SIB/SBRT protocols commonly utilizing reduced PTV margins (0–5 mm). Clinically, SBRT studies typically target boosts of ~42–50 Gy/5 fx, though delivered doses often average ~44–45 Gy due to OAR constraints. Late Grade ≥3 GU events are uncommon (0–1% in large series), while late Grade 2 rates vary (commonly low-teens, up to ~30%). IMRT/VMAT boosts typically reach the low-to-mid-80s Gy (up to ~95 Gy). Late Grade ≥2 GI toxicity ranges from low single digits to low-teens; Grade 3 events are rare. HDR brachytherapy achieves the highest focal dose metrics with excellent toxicity profiles; while select small cohorts observed no severe toxicity, others report non-zero Grade 2 rates. The majority of studies report 3–5-year biochemical disease-free survival ≥90%.

Conclusion: MRI-guided DP is dosimetrically feasible and clinically safe, enabling ablative dosing to high-risk regions with minimal severe toxicity. Evidence supports the transition of DP from planning studies to routine clinical application as a robust personalized radiotherapy strategy.

Keywords: MRI-guided radiotherapy–Dosepainting–Prostatecancer–Focal boost–Dominant intraprostatic lesion

How to Cite: Behrouz, S., Jabbar Zadeh, Z., Saatchian, E., Akbari Zadeh, H., Aledavood, S. A., Gholamhosseinian, H., & Montazer Abadi, A. (n.d.). (2026) Dosimetric feasibility and clinical outcomes of MRI-guided dose painting radiotherapy for prostate cancer: A systematic review. (Abstract No. O-70). Asian Pacific Journal of Cancer Care, 11(S1):89. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-71

Title: Ceramide-Driven Radiosensitization in Melanoma:Metabolic Targets and Therapeutic Opportunities

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Introduction: Ceramide is a key effector of cellular stress responses, and ionizing radiation is known to initiate its rapid accumulation through activation of sphingomyelinases. This radiation-driven ceramide signaling normally contributes to apoptotic cell death; however, melanoma counteracts it through elevated acid ceramidase activity and diversion of ceramide into alternative metabolic pathways, creating a radioresistant phenotype. Despite increasing interest in sphingolipid biology, the radiobiological contribution of ceramide metabolism in melanoma has not been systematically assessed.

Materials and Methods: A systematic search of PubMed, Embase, Web of Science and Google Scholar (2000–2025) was conducted using MeSH and keyword combinations for ceramide metabolism, sphingomyelinases, acid ceramidase, melanoma, ionizing radiation and radiosensitization. Experimental and translational studies evaluating ceramide-associated mechanisms under radiation-induced or radiation-mimicking stress were included. Data were synthesized focusing on enzyme regulation, ceramide dynamics and treatment-response outcomes.

Results: Across reviewed studies, ceramide consistently appeared as a primary mediator of radiation-induced apoptosis. Radiation activates acid and neutral sphingomyelinases, generating an early ceramide signal, whereas melanoma-associated overexpression of acid ceramidase markedly reduces this pool and supports resistance. Inhibiting acid ceramidase restores intracellular ceramide and enhances treatment-induced apoptosis. Ceramide synthase activity further shapes the magnitude of this response. Exogenous ceramide, including short-chain analogs and nanocarrier-based formulations, increases intracellular ceramide and amplifies radiation-associated cytotoxicity, supporting strategies that elevate ceramide bioavailability

Conclusion: Evidence indicates that radiation response in melanoma is governed by ceramide production and by metabolic pathways that degrade or divert it. Targeting ceramide metabolism and increasing intracellular ceramide through exogenous delivery represent biologically grounded strategies to overcome radioresistance and improve radiotherapy outcomes.

Keywords: ceramide radiosensitization melanoma sphingolipid sphingomyelinase

How to Cite: Borazjani Gholami, F., Mozdarani, H., & Allahmoradi, H. (n.d.). (2026) Ceramide-driven radiosensitization in melanoma: Metabolic targets and therapeutic opportunities. (Abstract No. O-7). Asian Pacific Journal of Cancer Care, 11(S1):90. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-72

Title: miR-155, miR-21, and let-7a Expressions in MCF-10A and MCF-7 Cell Lines after Low to High Dose Irradiation

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Introduction: Ionizing radiation is a tremendous risk factor for cancer development. MicroRNAs (miRNAs) are regulators that utilize cell pathways, which are implicated in human cancer prognosis. In addition, miRNAs respond to anti-cancer therapy and proliferation after irradiation. However, the changes in miRNA expression profiles in response to irradiation have not been comprehensively analyzed. The present study was designed to assess potential changes that occur in miRNA expression following irradiation.

Materials and Methods: In this experimental study, we used quantitative real-time polymerase chain reaction (qRT PCR) to measure the expressions of miR-155, miR-21, and let-7a in MCF-10A (normal breast cells) and MCF-7 (breast cancer cells) six hours after the cells were exposed to five different irradiation doses (50, 100, 400, 2000, and 4000 mGY).

Results: After irradiation from the low to high doses, we observed an upsurge in miR-155 (more than 100%) expression and reduction in let-7a (more than 87%) expression. However, there was an increase and a reduction in miR-21 expression (more than 100%).

Conclusion: Irradiation can play an important role in cancer development in normal breast cells (MCF-10A) at low dose irradiation. However, the results showed little difference at high doses of radiation.

Keywords: ‘Breast Cancer’‘Ionizing Radiation’‘Let-7a’‘MiR-155’‘MiR-21’

How to Cite: Aslanifard, A., & Fardid, R. (n.d.). (2026) miR-155, miR-21, and let-7a expressions in MCF-10A and MCF-7 cell lines after low to high dose irradiation. (Abstract No. O-72). Asian Pacific Journal of Cancer Care, 11(S1):91. https://doi.org/10.31557/APJCC.2026.11.S1.1

Asian Pacific Journal of Cancer Care | DOI: 10.31557/APJCC.2026.11. S1.1

Code:O-73

Title: Artificial Intelligence in Image-Guided Radiotherapy: Current Progress and Clinical Translation Challenges

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Introduction: Artificial intelligence has gained increasing importance in image-guided radiotherapy, enabling improved image quality, treatment planning, and adaptive delivery. AI-based algorithms offer potential benefits including automation of image processing and more precise tumor targeting; however, clinical implementation remains limited by validation requirements and workflow integration. This review summarizes recent developments and major challenges for clinical translation of AI-assisted IGRT.

Materials and Methods: A narrative literature review was conducted focusing on peer-reviewed publications from the last decade addressing AI applications in IGRT. Studies were grouped in four areas: image reconstruction, automated segmentation, motion management, and adaptive radiotherapy. Specific attention was given to clinical readiness, reproducibility, validation practices, imaging variability, and requirements for quality assurance.

Results: Recent work shows improved CBCT and MR-guided image quality through deep learning reconstruction, with improved soft-tissue contrast and more accurate dose calculation. Automated segmentation models have reached clinically comparable performance to expert contours. AI-based motion tracking demonstrated high potential for respiratory tumor management. However, limited multicenter datasets, heterogeneous imaging protocols, and restricted transparency remain important limitations that reduce generalizability and regulatory readiness.

Conclusion: AI innovations have strong potential to improve precision and efficiency in image-guided radiotherapy, but broad clinical adoption depends on harmonized validation strategies, multicenter datasets, explainable AI frameworks, and structured quality-assurance procedures. Continued interdisciplinary collaboration is essential to guide safe and effective implementation

Keywords: Artificial-intelligence IGRT Segmentation Motion-tracking Adaptive-therapy

How to Cite: Rezaei, M., & Lotfi Koshki, A. (n.d.). (2026) Artificial intelligence in image-guided radiotherapy: Current progress and clinical translation challenges. (Abstract No. O-73). Asian Pacific Journal of Cancer Care, 11(S1):92. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-74

Title: A Dosiomics-Based Machine Learning Model for Prediction of Radiation Induce Skin Toxicity in Breast Cancer Patients Undergoing 3D-conformal Radiation Therapy

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Introduction: This study develops a predictive model for radiation-induced skin toxicity (RIST) in breast cancer patients using dosiomics features derived from the dose distribution map within the clinical target volume (CTV).

Materials and Methods: This prospective study included 76 breast cancer patients treated with 3D-conformal radiotherapy (50 Gy/25 fractions plus a 10 Gy boost). Patients were categorized into low-grade (G0-G1) and high-grade (G2-G3) toxicity groups using CTCAE v5. A total of 140 parameters (107 dosiomics and 33 clinical/dosimetric) were extracted. These features were then evaluated using two machine-learning algorithms: the Support Vector Machine (SVM) and the Random Forest (RF). The performance of each algorithm was assessed in terms of accuracy, ROC curve, and AUC.

Results: Thirty-two (42%) patients experienced high-grade RIST (CTCAE grade ≥ 2) following breast radiation therapy. The hybrid dosiomics model demonstrated superior predictive performance, attaining an AUC of 0.78. In the dosiomics-based features group, the major axis length from the shape class is one of the most relevant features for skin toxicity (grade ≥2). In the clinical parameters group, chemo regimen, receptor state, and hormonal treatment showed significant correlation with skin toxicity(p-value<0.05). In the DVH factors group V105 cc, V 110%, V107%, and Breast CTV revealed a significant correlation with skin toxicity.

Conclusion: The developed predictive model utilizing dosiomics features demonstrated superior performance compared to dose volume histogram (DVH) based methods, with an AUC of 0.78, leading to early prediction of skin toxicity among breast cancer patients who had received RT.

Keywords: Skin toxicity, Dosiomics, Machine learning

How to Cite: Soltani, S., Beigi, M., Bagherpour, Z., Aliasgharzadeh, A., & Fadavi, P. (n.d.). (2026) A dosiomics-based machine learning model for prediction of radiation induce skin toxicity in breast cancer patients undergoing 3D-conformal radiation therapy. (Abstract No. O-74). Asian Pacific Journal of Cancer Care, 11(S1):93. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-75

Title: Predictive Dosimetry for Radiopharmaceutical Therapy: A Contemporary Review of Voxel-wise Methods, Machine-Learning Integration, and Clinical Translation

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Introduction: Accurate patient-specific dosimetry is central to radiopharmaceutical therapy, yet current practice relies on multi-timepoint post-therapy imaging and complex calculations. Advances in voxel-wise modeling, physiologic and population PK methods, and AI-based image and kinetics prediction may enable pre-therapy dose estimation and individualized activity prescription. This review summarizes contemporary predictive dosimetry concepts and outlines current challenges for clinical adoption.

Materials and Methods: A targeted review was conducted using peer-reviewed publications retrieved from PubMed, Scopus, and Google Scholar. Included studies addressed voxel-level dosimetry, TAC prediction, PBPK and population PK modeling, Monte-Carlo and kernel-based dose calculations, and machine-learning models for segmentation, image enhancement, and uncertainty quantification. Priority was given to studies reporting comparison with serial post-therapy dosimetry and reviews describing translation barriers.

Results: Research includes voxel-wise approaches combining diagnostic imaging with PK priors to reconstruct TACs and derive Monte-Carlo or S-value dose maps, and AI frameworks improving segmentation, image quality, and feasibility of single-timepoint dosimetry. Validation shows good spatial agreement for organs and lesions, although with inter-patient variability and uncertainty in some regions. Major limitations include scarce multicenter validation, heterogeneous protocols, and limited integration into clinical workflows.

Conclusion: Predictive voxel-wise dosimetry supported by physiologic modeling and machine learning represents a promising foundation for individualized pre-therapy planning in RPT. Translation requires standardized benchmarking datasets, automated pipelines, multicenter validation, and regulatory alignment. These priorities are essential to accelerate safe and evidence-based adoption in clinical practice.

Keywords: predictive-dosimetry voxel-wise radiopharmaceutical-therapy machine-learning clinical-translation

How to Cite: Lotfi Koshki, A., Rezaei, M., & Mehranfar, N. (n.d.). (2026) Predictive dosimetry for radiopharmaceutical therapy: A contemporary review of voxel-wise methods, machine-learning integration, and clinical translation. (Abstract No. O-75). Asian Pacific Journal of Cancer Care, 11(S1):94. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-76

Title: Pro-Oxidative Nanoplatforms for Overcoming Glutathione-Mediated Therapy Resistance: A Narrative Review Highlighting H_2O_2 Self-Supply and GSH Depletion Strategies in Enhanced CDT–PTT Cancer Treatment

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Introduction: Cancer cells maintain high glutathione (GSH) levels, enabling efficient scavenging of reactive oxygen species (ROS) and reducing the effectiveness of chemodynamic therapy (CDT) and radiotherapy. Advanced nanoplatforms seek to overcome this barrier by amplifying ROS while depleting GSH.

Materials and Methods: This narrative review integrates findings from the Au@CuS@CuO_2 (ACC) nanoconstruct study and ten additional peer-reviewed articles identified through targeted searches on GSH depletion, H_2O_2 self-generation, and copper-based CDT–PTT systems. Only studies with clear mechanistic evidence of redox modulation in cancer models were included.

Results: Among evaluated systems, the ACC platform provides a comprehensive design combining H_2O_2 release, GSH depletion, and photothermal enhancement. The CuO_2 shell decomposes under acidic tumor conditions to supply H_2O_2 and Cu^{2+}; Cu^{2+} oxidizes intracellular GSH to Cu^{+}, enabling Fenton-like production of cytotoxic hydroxyl radicals. The Au/CuS core offers strong photothermal conversion, accelerating catalytic turnover and ROS diffusion. Experimental findings demonstrate peroxidase-like activity, effective GSH consumption, robust ROS generation, and significant tumor inhibition when CDT is combined with PTT. Across the literature, sustained H_2O_2 production coupled with active GSH depletion consistently improves therapeutic response.

Conclusion: Nanoplatforms capable of simultaneously generating H_2O_2 and depleting GSH offer a potent strategy to overcome redox-driven therapeutic resistance. The ACC system exemplifies this paradigm and provides a strong foundation for translational advancement.

Keywords: Chemodynamic therapy – Glutathione depletion

How to Cite: Najafi Sarvestani, S. (n.d.). (2026) Pro-oxidative nanoplatforms for overcoming glutathione-mediated therapy resistance: A narrative review highlighting H_2O_2 self-supply and GSH depletion strategies in enhanced CDT–PTT cancer treatment. (Abstract No. O-76). Asian Pacific Journal of Cancer Care, 11(S1):95. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-77

Title: Longitudinal MVCT Radiomics Analysis of Prostate Cancer during Tomotherapy: Identification of Treatment Response Biomarkers and Patient Stratification

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Introduction: Assessment of treatment response in prostate cancer radiotherapy faces multiple challenges, including delayed clinical evaluation. Longitudinal radiomics provides quantitative imaging biomarkers with potential for early detection of biological changes induced by radiotherapy. This study aimed to analyze the dynamics of radiomics features and identify radiation-sensitive biomarkers.

Materials and Methods: A prospective study was conducted on 15 patients with prostate adenocarcinoma undergoing Tomotherapy treatment. Megavoltage CT (MVCT) images were acquired at 5 time points (days 1, 2, 3, 10, and 15 of treatment fraction). Following gross tumor volume(GTV) segmentation, 73 radiomics features from GLCM, GLRLM, GLSZM, and NGTDM families were extracted by pyradiomics toolkits. Values were normalized to day 1 using relative normalization and analyzed using Friedman Repeated Measures ANOVA test, and Post-hoc Wilcoxon with Bonferroni correction. Cluster analysis was performed for patient classification.

Results: Among 73 extracted features, 31 features (42.5%) showed significant longitudinal changes ($P < 0.05$). Day 10 of treatment (cumulative dose ~20-25 Gy) was identified as the peak change point. Top features included:

ClusterProminence (up to 418-fold increase, $\chi^2=18.92$, $P < 0.001$)

Autocorrelation (up to 44-fold increase, $\chi^2=17.64$, $P < 0.001$)

HighGrayLevelEmphasis (up to 43-fold increase, $\chi^2=16.87$, $P < 0.001$)

Post-hoc analysis revealed significant differences primarily between day 1 and 10 ($P < 0.001$) and between day 10 and 15 ($P < 0.01$). Cluster analysis identified three distinct response patterns:

Strong responders (5 patients): >10-fold changes

Gradual responders (7 patients): 2-5 fold changes

Mild responders (3 patients): <2-fold changes

Conclusion: Radiomics features, particularly GLCM-based ClusterProminence, effectively detect early prostate tumor changes during radiotherapy. Day 10 (~20-25 Gy) is optimal for assessment, coinciding with peak apoptosis and microvascular damage. Three response patterns were identified: strong responders (potential for de-escalation), gradual responders (standard protocol), and mild responders (candidates for dose escalation). These findings support personalized adaptive radiotherapy, enabling timely treatment modifications based on individual tumor sensitivity, potentially improving outcomes while minimizing toxicity.

Keywords: Longitudinal radiomics-Prostate cancer-Treatment response biomarkers-Tomotherapy-MVCT

How to Cite: Khezerloo, D., Poorfarshid, A., Mortezazadeh, T., Molazadeh, M., & Mohammadzadeh, M. (n.d.). (2026) Longitudinal MVCT radiomics analysis of prostate cancer during tomotherapy: Identification of treatment response biomarkers and patient stratification. (Abstract No. O-77). Asian Pacific Journal of Cancer Care, 11(S1):96-97. https://doi.org/10.31557/APJCC.2026.11.S1.1

Code:O-78

Title: Comparison of Cellular DNA Damage Induced by a 6 MV Linear Accelerator in Conventional and Ultra-High Dose Rate FLASH Modes: A Monte Carlo Simulation

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Introduction: Ultra-high dose rate (FLASH) radiotherapy shows promise for increasing the therapeutic index. However, the differential impact of FLASH versus conventional (CONV) irradiation on DNA damage at the cellular level, particularly for different beam modalities from a clinical linear accelerator (LINAC), requires detailed investigation.

Materials and Methods: Using the Geant4-DNA Monte Carlo toolkit, we simulated the irradiation of a realistic whole human cell model with a 6 MV LINAC. DNA damage yields, including double-strand breaks (DSBs) and complex DSBs (DSB++), were calculated and compared for both photon and electron beam modes under CONV and FLASH dose rate conditions.

Results: For electron mode, FLASH irradiation increased all DSB yields compared to CONV, with indirect damage (radical-mediated) rising by up to 17% and complex DSBs (DSB++) by up to 1.2%. In photon mode, FLASH increased indirect damage by up to 7% and complex DSBs more substantially, by up to 30%. The dose-rate-dependent increase in total damage was more pronounced for electrons than for photons.

Conclusion: This simulation study suggests a modality-dependent effect of FLASH irradiation on DNA damage induction. FLASH electron beams may enhance treatment efficacy by increasing overall DNA damage, while FLASH photons appear to promote a greater relative increase in complex, less repairable damage. These findings warrant further exploration to optimize FLASH delivery parameters.

Keywords: FLASH-Radiotherapy Geant4-DNA DNA-Damage Linear-accelerator Radiotherapy

How to Cite: Haghparast, A., & Rouhi, S. (n.d.). (2026) Comparison of cellular DNA damage induced by a 6 MV linear accelerator in conventional and ultra-high dose rate FLASH modes: A Monte Carlo simulation. (Abstract No. O-78). Asian Pacific Journal of Cancer Care, 11(S1):98. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-79

Title: Investigating the effect of ionizing radiation alone and combined with Herceptin-conjugated gold nanoparticle in breast cancer cell lines by MTT assay and LncRNA expression in the apoptosis pathway

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Introduction: Breast cancer is the most common malignancy in women and continues to face challenges related to radioresistance and normal tissue toxicity. Gold nanoparticles (GNPs) conjugated with Herceptin offer a dual advantage by combining nanophysical properties with HER2-targeted delivery, potentially enhancing radiotherapy efficacy in HER2-positive tumors.

Materials and Methods: In this study, the effects of ionizing radiation alone and in combination with Herceptin-conjugated GNPs were evaluated in SKBR3 and MCF-7 breast cancer cells. Cells were treated under four conditions (GNPs, Herceptin (Her), GNP-Her, and untreated cells) and irradiated at 0, 2, 4, and 8 Gy of 6 MeV X-ray. Cell viability was assessed at 48 and 72 hours post-irradiation using the MTT assay. To assess apoptosis-related molecular responses, total RNA was extracted at 5, 48, and 72 hours post-irradiation, and expression levels of ANRIL, GAS5, and MEG3 lncRNAs were analyzed by Real-Time PCR.

Results: Combined GNP-Her plus irradiation resulted in greater reduction in cell viability and increased expression of MEG3 and GAS5 (tumor suppressor lncRNAs) while decreasing ANRIL (oncogenic lncRNA) compared with radiation alone (*$p < 0.05$, **$p < 0.01$). These effects were more pronounced in HER2-positive SKBR3 cells.

Conclusion: Herceptin-conjugated gold nanoparticles showed enhanced radiation response in vitro. These results suggest their potential as a promising radiosensitizing approach, particularly in HER2-positive tumors.

Keywords: Gold nanoparticle- Breast Cancer- Radiation

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Code:O-80

Title: Physical Parameters Affecting Gamma Passing Rates in Patient-Specific Quality Assurance: A Narrative Review

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Introduction: Modern inverse planning techniques, such as IMRT and VMAT, generate highly modulated dose distributions that require strict verification to ensure patient safety. Patient-specific quality assurance (PSQA) using gamma index analysis has emerged as the standard method for verifying the correspondence between calculated and delivered doses. Yet accumulating evidence challenges the assumption that the Gamma Passing Rate (GPR) is an absolute metric of delivery accuracy. Instead, the GPR proves to be a variable outcome dependent on the physical parameters selected for verification. This complexity hinders the interpretation of QA results and limits inter-institutional comparisons. The objective of this review is to critically examine the physical parameters that modulate GPR in PSQA and to identify the variables influencing these outcomes. By deconstructing the components of the verification process, an optimized framework for PSQA protocols can be established.

Materials and Methods: A narrative review of the literature was conducted to identify the physical and computational variables influencing PSQA outcomes. The analysis synthesized empirical evidence and categorized the variables into five domains: (1) Measurement geometry and spatial configuration, including detector positioning (central versus peripheral) and analysis dimensionality (2D versus 3D); (2) Gamma analysis parameters, examining global versus local normalization approaches, dose-difference and distance-to-agreement criteria (3%/3mm versus 2%/2mm), and lower dose thresholds; (3) Quality assurance device characteristics, including detector resolution, energy response, and calibration methodology; (4) Plan complexity metrics, such as Leaf Travel Asymmetry and Aperture Modulation (LAAM), and their correlation with GPR; and (5) Treatment Planning System algorithms, comparing dose calculation models (AAA versus Acuros XB) and their impact on baseline acceptance thresholds. The interactions between these parameters and reported GPRs were evaluated to determine their clinical significance.

Results: Gamma Passing Rate exhibits significant sensitivity to measurement geometry. Central geometries with global normalization yield higher passing rates than peripheral configurations due to normalization baseline differences. Global normalization masks low-dose errors, whereas local normalization increases stringency but shows noise susceptibility. Detector resolution is critical; high-resolution systems like EPID detect small multileaf collimator errors better than standard arrays. Plan complexity metrics, particularly LAAM and leaf speed, inversely correlate with GPR in a site-specific manner: aperture complexity dominates prostate cases while leaf speed dominates head-and-neck cases. Advanced algorithms such as Acuros XB provide superior accuracy but may lower GPRs by exposing measurement chain limitations that simpler algorithms conceal.

Conclusion: The Gamma Passing Rate functions as a context-dependent metric rather than an absolute measure of delivery accuracy. Elevated passing rates may reflect the selection of lenient physical parameters—such as global normalization or low-resolution sampling—rather than superior delivery performance. Conversely, advanced algorithms and high-complexity plans inherently challenge standard acceptance thresholds. The application of universal acceptance criteria (e.g., GPR >95%) is scientifically unjustified. Adoption of complexity-stratified action

levels and strictly standardized protocols for measurement geometry and calibration is recommended. Such refinements ensure that PSQA remains a reliable indicator of patient safety in modern radiotherapy.

Keywords: PSQA, Gamma-Index, IMRT, VMAT, Dosimetry

How to Cite: Enferadi Aliabad, M. J., Bastanipour, Y., & Khosroabadi, M. (n.d.). (2026) Physical parameters affecting gamma passing rates in patient-specific quality assurance: A narrative review. (Abstract No. O-80). Asian Pacific Journal of Cancer Care, 11(S1):100-101. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-81

Title: Evaluation of IMRT and VMAT Delivery Accuracy on Varian Halcyon Using TG-119 Test Cases

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Introduction: Accurate treatment delivery is essential to ensure the clinical reliability of intensity-modulated radiation therapy (IMRT) and volumetric-modulated arc therapy (VMAT). This study aimed to evaluate the commissioning accuracy and patient-specific quality assurance (PSQA) performance of IMRT and VMAT on the Varian Halcyon linear accelerator operating with 6 MV flattening-filter-free (FFF) photons.

Materials and Methods: AAPM TG-119 test cases were used to establish institutional baseline performance. Point-dose measurements were performed using a Semiflex 3D (0.07cc) ionization chamber in both high- and low-dose regions of a solid water phantom. Three-dimensional composite dose distributions were acquired using the Delta4 phantom. Measurements were analyzed with gamma criteria of 3%/3 mm. All plans were independently calculated using both AAA and Acuros XB (AXB) algorithms. Confidence limits (CLs) were derived and compared with TG-119 benchmark tolerances to evaluate dose agreement.

Results: All IMRT and VMAT plans met TG-119 dose objectives. For point-dose measurements, the highest deviation in high-dose regions was observed for the C-shape case (~3%, AAA, IMRT), and in low-dose regions for head and neck cases (~3.4%, Acuros XB, IMRT). Three-dimensional gamma analysis for both techniques and both algorithms showed an average gamma pass rate of ~95% under 3%/3 mm criteria. All calculated confidence limits were within the range reported by TG-119, indicating reliable planning and dose delivery.

Conclusion: IMRT and VMAT treatments on the Halcyon platform demonstrate high precision, reliability, and compliance with TG-119 standards. These findings support routine PSQA and continuous monitoring to maintain long-term treatment accuracy and patient safety.

Keywords: Halcyon, IMRT, VMAT, Acuros XB

How to Cite: Shahamat, Z., & Kheirollahi, N. (n.d.) (2026). Evaluation of IMRT and VMAT delivery accuracy on Varian Halcyon using TG-119 test cases. (Abstract No. O-81). Asian Pacific Journal of Cancer Care, 11(S1):102. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-82

Title: Hybrid DL Architectures for Enhanced OAR Sparing in Breast Cancer VMAT/IMRT

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Introduction: Breast cancer radiotherapy demands highly accurate dose delivery to target tumor volumes while sparing organs at risk (OARs), particularly the heart and lungs. This systematic review investigates the efficacy of Deep Learning (DL) models in predicting and optimizing 3D radiation dose distributions for Breast Cancer (BC) radiotherapy using IMRT and VMAT. The critical need is to improve planning speed and ensure enhanced sparing of Organs at risk (OARs), particularly the heart and lungs in left-sided BC, where traditional methods are often time-consuming and operator-dependent.

Materials and Methods: Following PRISMA-2020 guidelines a systematic search across major databases (PubMed, Scopus, WOS) identified 13 original research articles published up to August 2025. The review focused on studies evaluating various DL architectures, including 2D/3D U-Nets, and their performance in dose prediction, measured by metrics like Mean Absolute Error (MAE), DVH accuracy, and 3D Gamma Pass Rates.

Results: Thirteen studies comprising 1,650 patients met the inclusion criteria from an initial pool of 88 records. Publications (from 2017 to 2025) predominantly employed 3D U-Net (n=6) and 2D U-Net (n=4) architectures, often utilizing hybrid components like attention mechanisms or physics-informed loss functions. These advanced models demonstrated high clinical acceptability, with several studies reporting 3D Gamma Pass Rates greater than 95% and MAE below 1.2 Gy. DL models consistently outperformed traditional knowledge-based planning (KBP) methods. Clinically, DL-predicted plans were able to meet all clinical goals without manual adjustment in a high percentage of cases (up to 74%), validating their potential to automate and standardize the planning process while achieving robust OAR sparing.

Conclusion: Hybrid DL architectures offer a powerful solution for automating and optimizing VMAT/IMRT planning for breast cancer.

Keywords: Deeplearning, Breastcancer, Radiotherapy, Dose distribution

How to Cite: Farsizaban, M., Hashemi, B., Bakhshandeh, M., & Farnia, P. (n.d.). (2026) Hybrid DL architectures for enhanced OAR sparing in breast cancer VMAT/IMRT. (Abstract No. O-82). Asian Pacific Journal of Cancer Care, 11(S1):103. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-83

Title: In Vivo Dosimetry Using Electronic Portal Imaging Devices (EPID): A Systematic Review of Clinical Implementation and Error Detection Capabilities

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Introduction: The role of EPID-based in vivo dosimetry in improving radiotherapy safety is examined in this systematic review, which synthesizes evidence on its error detection and prevention capabilities.

Materials and Methods: A systematic literature search will be performed in accordance with PRISMA, targeting studies that report on the clinical use of EPID for transit or entrance dose verification. We will assess the methodology, action levels, and the system's efficacy in identifying errors related to patient anatomy, positioning, machine malfunctions, and plan transfer mistakes.

Results: EPID-based in vivo dosimetry demonstrates a high capability for detecting a wide range of errors. These systems effectively identify errors related to patient anatomical changes (28-32%) and positioning (32%). They are also proficient in detecting machine-related errors (MLC leaf bank position, beam energy), plan transfer mistakes, and simulation errors. However, sensitivity in detecting positioning errors is lower for dynamic techniques like Volumetric Modulated Arc Therapy (VMAT). Determining optimal action levels and achieving full automation are crucial for facilitating clinical adoption and reducing false positives.

Conclusion: EPID-based in vivo dosimetry is a robust safety tool, effectively detecting critical clinical and technical errors in modern radiotherapy. Its implementation significantly enhances treatment quality and patient safety, establishing it as an essential component for comprehensive quality assurance programs.

Keywords: InVivo Dosimetry EPID Error Detection

How to Cite: Yazdan Parast, S. F., Aryafard, A., & Naserpour, M. (n.d.). (2026) In vivo dosimetry using electronic portal imaging devices (EPID): A systematic review of clinical implementation and error detection capabilities. (Abstract No. O-83). Asian Pacific Journal of Cancer Care, 11(S1):104. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-84

Title: Measurement of incidental radiation dose to the thyroid gland in radiated breast cancer patients

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Introduction: Hypothyroidism is the most common disease in head and neck radiation therapy. In breast RT, either all or most of the thyroid volume is located in the treatment field and receives a great radiation dose. Theoretically, the development of hypothyroidism in breast cancer patients depends on the thyroid gland volume that receives a dose greater than or equal to 30 and 50 Gy, leading to insufficient hormone production. This study deals with the measurement of the received dose of thyroid in the treatment process of breast cancer patients.

Materials and Methods: In this retrospective study, 28 breast cancer patients participated. V30, V50, and thyroid volume were extracted from the TIGRT treatment planning system. For more accurate results, thyroid dose was measured with TLDs. Patients were treated with 3D-CRT. All plans consisted of 4-fields, 2 of which were supraclavicular opposite fields.

Results: Ten patients (35.7%) had a V30 greater or equal to 42. Fifteen patients (53.5%) had a V50 greater or equal to 24. Patients age vary from 32-70 with a mean of 53.75 years old.

Conclusion: V50 and V30 are good dosimetric markers for HT occurrence over time and we can safely conclude that the chance of getting diagnosed with HT after receiving 40-50 Gy for breast cancer treatment is not low. We strongly suggest that Thyroid should be contoured as an OAR and dose limitations should be considered. V30 < 42 and V50 < 24 are good dose limitations to consider in planning breast cancer.

Keywords: Breast cancer-radiotherapy-hypothyroidism-thyroid hormones

How to Cite: Nosrati, F. Z., Taji, A., Akbarnezhad, S., Bagheri, F., & Shabestani Monfared, A. (n.d.). (2026) Measurement of incidental radiation dose to the thyroid gland in radiated breast cancer patients. (Abstract No. O-84). Asian Pacific Journal of Cancer Care, 11(S1):105. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-85

Title: The Role of Adaptive MRI in Managing Anatomical Variations in Radiotherapy: A systematic Review

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Introduction: Anatomical changes occurring during radiotherapy affect treatment accuracy. With MR-Linac systems, adaptive MRI offers real-time visualization and plan alterations. This review shows that MRI-guided adaptive radiation therapy controls these adjustments to increase target precision and lower toxicity.

Materials and Methods: This systematic review will adhere to PRISMA standards, searching PubMed, Scopus, and Web of Science for literature on adaptive MRI workflow and its effects on targeting precision and clinical outcomes.

Results: This systematic review demonstrates that MRI-guided adaptive radiotherapy (MRgART) effectively manages significant anatomical variations across multiple cancer sites. In pancreatic cancer, MRgART overcomes interfractional hollow organ motion, while prostate bed SBRT required adaptation in 53.5%-78.2% of fractions to maintain dosimetric goals after substantial bladder/rectum changes. Liver SBRT data confirm that adapted plans achieve superior target coverage and organ-at-risk (OAR) sparing versus non-adapted plans. Similarly, adaptations in esophageal, head and neck, and other sites consistently corrected for volumetric changes to ensure target coverage and reduce toxicity. Evidence underscores that visual review is unreliable, advocating for systematic online plan prediction or adaptation to reliably mitigate uncertainties and optimize treatment precision in MRgART workflows.

Conclusion: Online adaptive MRgART is essential for managing interfractional anatomical variations across multiple disease sites. It consistently improves target coverage and reduces OAR dose violations compared to non-adaptive methods, directly translating to enhanced treatment precision and potentially lower toxicity. Reliable adaptation requires quantitative plan evaluation rather than visual assessment alone.

Keywords: Adaptive radiotherapy MRI-guided Radiotherapy

How to Cite: Aryafard, A., Yazdan Parast, S. F., & Naserpour, M. (n.d.). (2026) The role of adaptive MRI in managing anatomical variations in radiotherapy: A systematic review. (Abstract No. O-85). Asian Pacific Journal of Cancer Care, 11(S1):106. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-86

Title: From Cells to Therapy: The Role of Exosomes in Tumor Response to Radiotherapy

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Introduction: Cancer remains a major global health challenge, and radioresistance limits the effectiveness of radiotherapy despite major advances. Radiotherapy, applied in nearly half of cancer cases, induces DNA damage, produces ROS, and disrupts signaling pathways to eliminate tumor cells. However, intrinsic or acquired radioresistance contributes to recurrence and metastasis. Exosomes—small extracellular vesicles released via the endosomal pathway—play a key role in regulating tumor response to radiation. Carrying molecules such as miRNAs, proteins, and DNA fragments, they remodel the tumor microenvironment and support survival pathways. Ionizing radiation alters exosome release and cargo, enhancing DNA repair, oxidative stress response, and bystander effects. Conversely, engineered exosomes show promise as radiosensitizing carriers and as biomarkers for predicting treatment response, highlighting their potential in improving future radiotherapy strategies.

Materials and Methods: This study is presented as a review, and thus does not involve experimental procedures. Accordingly, a separate Materials and Methods section was not necessary.

Results: Exosomes play a key role in regulating cancer radiosensitivity. Radiation increases exosome secretion—especially at doses >6 Gy—and alters their cargo, enriching stress proteins (HSP70/90) and DNA-repair factors (ATM, RAD51) as well as miRNAs such as miR-21, miR-1246, miR-208b, and miR-301a that promote survival and radioresistance. Exosomes support radioresistance by transferring DNA-repair molecules, reducing apoptosis, and mediating radiation-induced bystander effects through ROS, γ-H2AX, and activation of PI3K/AKT and NF-κB pathways. They also shape an immunosuppressive microenvironment via PD-L1, TGF-β, and regulatory miRNAs. Therapeutically, engineered exosomes carrying siRNA, anti-miR-21, or tumor-suppressive miRNAs (e.g., miR-34a) enhance radiosensitivity. Immune-cell-derived exosomes may augment radiotherapy, while exosomal miRNAs and proteins show promise as biomarkers predicting treatment response.

Conclusion: Exosomes are recognized as key mediators of tumor communication and regulators of radiotherapy response. Ionizing radiation increases exosome release and alters their cargo, helping tumor cells adapt to therapeutic stress. By transferring nucleic acids, proteins, and signaling factors, exosomes enhance DNA repair, affect oxidative stress, remodel the tumor microenvironment, and suppress immune activity—processes that promote radioresistance. Radiation-induced exosomes also drive bystander effects, which may enhance tumor damage but can harm normal tissue. Despite these challenges, engineered exosomes offer potential as carriers for radiosensitizers, gene-silencing agents, and immune modulators. Their molecular components, such as miRNAs and proteins, may function as non-invasive biomarkers to predict treatment response and support personalized radiotherapy. Further progress in isolation methods, loading efficiency, and safety assessment is required to advance exosome-based strategies.

Keywords: Radiobiology, Bystander effect, exosome, cancer

How to Cite: Rezapoor, S., & Mozdarani, H. (n.d.). (2026) From cells to therapy: The role of exosomes in tumor response to radiotherapy. (Abstract No. O-86). Asian Pacific Journal of Cancer Care, 11(S1):107. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-87

Title: Evaluating the Comparative Clinical Viability of Model-Based Selection Criteria for Proton Therapy Versus Photons in Head and Neck Cancer.

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Introduction: Radiotherapy is a common treatment modality for head and neck cancers. The anatomical complexity and the toxicity of organ at risks (OARs) require high precision in radiotherapy delivery. Proton therapy has the potential to protect surrounding normal tissues compared to standard photon therapy, but the higher cost of proton therapy compared to photon therapy makes the selection of the optimal treatment a significant challenge. This review examines frameworks based on artificial intelligence models that are used to optimize the choice between proton therapy and photon therapy in patients with head and neck cancer.

Materials and Methods: PubMed, Science Direct, Web of Science, and Google Scholar databases were explored up to 2025, using different combinations of the keywords: "proton therapy", "photon therapy", "head and neck cancer", "decision support", "model-based selection", "Artificial Intelligence" and "cost-effectiveness" Finally, seven more recent and relevant records were included in the study.

Results: Based on the results of the reviewed records, various modeling approaches including logistic regression, random forest (RF), gradient boosting (GBM), XGBoost, LightGBM, support vector machine (SVM), and deep neural networks have been used to optimally select between proton therapy and photon therapy in patients with head and neck cancer. The reported AUC for predicting toxicity and treatment outcome ranged from 0.81 to 0.92, with the best performance of the pooled models such as Gradient Boosting and LightGBM. Both SVM and RF models performed well for predicting the probability of xerostomia and dysphagia, with an average AUC of 0.84 and 0.88, respectively. Targeted application of patient selection models can reduce the total cost of treatment without making a significant difference in tumor control ($p > 0.05$). Overall, the evidence suggests that AI-based decision-making frameworks can increase the accuracy of selecting patients suitable for proton therapy versus photon therapy.

Conclusion: The high AUC values and accuracy reported in multiple studies indicate that AI-based frameworks have great potential to improve the patient selection process and treatment planning in proton radiotherapy compared to photon. Such models, as reliable clinical tools, help physicians to prevent unnecessary complications, increase the efficiency of treatment resources, and personalize the optimal treatment selection process.

Keywords: Proton Therapy Artificial Intelligence

How to Cite: Ghalehnoei, P., & Tavakoli, M. B. (n.d.). (2026) Evaluating the comparative clinical viability of model-based selection criteria for proton therapy versus photons in head and neck cancer. (Abstract No. O-87). Asian Pacific Journal of Cancer Care, 11(S1):108. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-88

Title: Development of a Fully Automated End-to-End Deep Learning Pipeline for Prostate IMRT Planning: From Segmentation to Planning

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Introduction: Prostate cancer remains a major global health challenge, with projections estimating 2.4 million new cases by 2040. While Intensity-Modulated Radiation Therapy (IMRT) is pivotal for treatment, the conventional workflow is hindered by time-consuming manual tasks, including the delineation of the prostate and organs-at-risk (OARs) and complex plan optimization. These manual processes introduce inter-observer variability and demand extensive medical physics expertise. As the global demand for radiotherapy escalates, there is an urgent need for automated, scalable solutions. This ongoing study aims to develop a deep learning-based pipeline to minimize manual intervention and reduce outcome variability while maintaining high-quality care.

Materials and Methods: We are developing an end-to-end automated pipeline for prostate IMRT planning, utilizing non-contrast planning computed tomography (CT) images as the primary input. The proposed framework is structured into three interconnected stages—segmentation, dose prediction, and plan generation—trained for seamless integration. The study utilizes the LUND Prostate Radiotherapy Open Benchmarking and Evaluation (LUND-PROBE) dataset (n=432), partitioned into training (80%), validation (10%), and testing (10%) subsets. In Stage 1, a 3D nnU-Net architecture is employed to automatically contour the prostate CTV, PTV, and OARs. Stage 2 utilizes a conditional Generative Adversarial Network (cGAN) adapted from Pix2Pix to generate patient-specific 3D dose distributions, using adversarial and perceptual losses to ensure realism against ground truths derived from standard clinical dose calculation algorithms. Stage 3 focuses on optimizing the predicted dose into a deliverable IMRT plan using a quadratic formulation to minimize deviations under clinical constraints (e.g., PTV 95% coverage, machine limits). The pipeline is designed to produce valid DICOM RTSTRUCT and RTDOSE files compatible with commercial treatment planning systems (TPS) and modern linear accelerators.

Results: The pipeline will be evaluated on the validation and independent test subsets to assess geometric and dosimetric accuracy.Segmentation: nnU-Net contouring will be measured via Dice Similarity Coefficients (DSC), targeting >0.85 for prostate and >0.80 for OARs (bladder, rectum, femoral heads), consistent with ESTRO guidelines. Hausdorff Distance (HD) and Mean Surface Distance (MSD) will quantify boundary errors. Dose Prediction: cGAN outputs will be evaluated using 3D Gamma Pass Rate (2%/2mm, >95%) and DVH metrics, aiming for <2% mean absolute error in PTV D95% and OAR Dmean compared to clinical ground truths. Plan Generation: Optimization will ensure plans meet dosimetric standards (PTV ≥95% coverage, OAR sparing per QUANTEC), with workflow completion under 15 minutes—reducing manual planning time by >85%.

Conclusion: This work presents the design and ongoing implementation of a fully integrated deep learning pipeline for prostate IMRT. By leveraging AI for segmentation, prediction, and optimization, the proposed framework aims to substantially cut planning time and variability. Upon completion of final validation on the independent test set, this tool aims to provide a scalable solution to address rising prostate cancer burdens. Future work will focus on finalizing the integration of the three stages and assessing the system's robustness across diverse anatomical variations.

Keywords: Prostate-cancer Automated-planning Deep-learning Dose-prediction

How to Cite: Alizadeh, F., Mahmoudi, A., & Gholamhosseinian, H. (n.d.). (2026) Development of a fully automated end-to-end deep learning pipeline for prostate IMRT planning: From segmentation to planning. (Abstract No. O-88). Asian Pacific Journal of Cancer Care, 11(S1):109-110. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-89

Title: Comparative Dosimetric Assessment of TLD-100 and GR-200 in Hodgkin Lymphoma Radiotherapy

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Introduction: Accurate dose measurement in radiotherapy is essential to maximize tumor control while sparing organs at risk (OARs). TLD-100 and GR-200 thermoluminescent dosimeters differ in sensitivity and linearity, affecting their suitability for low- and high-dose measurements.

Materials and Methods: A CIRS anthropomorphic phantom was used, with TLD-100 (LiF: Mg, Ti) and GR-200 (LiF: Mg, Cu, P) placed in critical organs including lungs, breasts, heart, thyroid, esophagus, spinal cord, parotids, and larynx. Dosimeters were calibrated using a 6-MV photon beam. Three radiotherapy techniques—3DCRT, IMRT, and VMAT—were delivered, and absorbed doses were measured after applying individual sensitivity corrections and calibration factors.

Results: GR-200 exhibited substantially higher sensitivity than TLD-100, with linear dose response up to ~18 Gy and standard deviation <2.5%, compared to TLD-100's reproducibility of ~1.5% and supralinearity at higher doses. Measured doses in peripheral organs outside the main treatment field were more reliably captured by GR-200, whereas TLD-100 was adequate within high-dose target regions. Both IMRT and VMAT provided more homogeneous target doses than 3DCRT, with larger OAR dose variations observed in 3DCRT.

Conclusion: GR-200's high sensitivity, broad linear range, and low fading make it particularly suitable for measuring low doses in organs outside the main treatment field, such as OARs. TLD-100 remains appropriate for higher-dose regions within the target volume. Therefore, GR-200 is preferred for accurate out-of-field dosimetry during advanced radiotherapy for Hodgkin lymphoma.

Keywords: TLD100 GR200 Hodgkin lymphoma Radiotherapy

How to Cite: Bayatiani, M. R., Sadeghi, B., Pourimani, R., & Seif, F. (n.d.). (2026) Comparative dosimetric assessment of TLD-100 and GR-200 in Hodgkin lymphoma radiotherapy. (Abstract No. O-89). Asian Pacific Journal of Cancer Care, 11(S1):111. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-90

Title: Monte Carlo-Based Energy Optimization for Proton Therapy in Hodgkin Lymphoma Using GATE

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Introduction: Proton therapy offers precise dose delivery, minimizing exposure to surrounding healthy tissues. Optimizing proton beam energy is critical to maximize tumor dose while reducing normal tissue exposure, especially in Hodgkin lymphoma treatment. This study employs the Monte Carlo-based GATE simulation platform for energy optimization in proton therapy.

Materials and Methods: A 30×30 cm water phantom was simulated in GATE. Pencil beam protons with energies ranging from 60 MeV to 100 MeV (step 2.5 MeV) were directed at the phantom from a distance of 25 cm. A rectangular detector (30 cm × 1 cm × 1 mm) recorded depth-dose profiles. Physical processes were modeled using the QGSP-BERT-EMV physics list. Energy thresholds were set to 2 mm for gamma, electron, positron, and proton particles in the phantom and 10 mm elsewhere. Two million particles were simulated per energy to achieve statistical uncertainty <2%. Tumor dimensions (depth 4–4.5 mm) were obtained from CT images. Depth-dose curves were analyzed to identify the optimal energy based on Bragg peak position and tumor size.

Results: Bragg peak positions ranged from 4.1 mm to 4.5 mm for proton energies of 69–100 MeV. Low-energy protons produced narrow, high peaks, while higher energies resulted in broader, lower peaks. Maximum absorbed dose in the target decreased from 1.00 Gy for 69 MeV protons to 0.92 Gy for 100 MeV protons. Simulated Bragg peak depths matched NIST/PSTAR reference data within 1.5%, and statistical uncertainties remained below 2%.

Conclusion: GATE-based Monte Carlo simulations accurately determine optimal proton energies for treating Hodgkin lymphoma, ensuring maximal tumor dose with minimal exposure to surrounding tissues. This approach can improve treatment planning precision in clinical proton therapy.

Keywords: Proton-Therapy Energy-Optimization MonteCarlo-Simulation Hodgkin-Lymphoma GATE

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Code:O-91

Title: Impact of Radiation Technique on Secondary Cancer Risk in Hodgkin's Lymphoma: Phantom-Based Dosimetric Study

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Introduction: Radiotherapy remains a cornerstone in the management of Hodgkin's lymphoma (HL), providing high tumor control. Nevertheless, exposure of normal tissues to scattered radiation can lead to secondary cancers, particularly in younger patients with higher radiosensitivity. Advanced techniques like three-dimensional conformal radiotherapy (3DCRT), intensity-modulated radiotherapy (IMRT), and volumetric-modulated arc therapy (VMAT) differ in dose distribution and potential long-term risks.

Materials and Methods: A female adult CIRS phantom was used to simulate HL radiotherapy. Treatment plans for 3DCRT, IMRT, and VMAT were generated using a 6 MV linear accelerator and the Monaco treatment planning system. Dose-volume parameters were analyzed for organs at risk (OARs) including lungs, breasts, heart, thyroid, and parotids. Secondary cancer risks were estimated using the BEIR VII model, calculating excess absolute risk (EAR), excess relative risk (ERR), and lifetime attributable risk (LAR) for two exposure ages (25 and 30 years).

Results: IMRT and VMAT provided better target coverage and reduced high-dose exposure to organs at risk compared to 3DCRT. However, LAR for organs outside the treatment field, particularly the breasts and lungs, was higher in IMRT, reaching 1.4% for the left breast and 1.2% for the left lung at exposure age 25, while 3DCRT LAR values remained below 1%. VMAT showed intermediate values (left breast: 1.0%, left lung: 0.9%). Risk estimates were strongly influenced by organ location, dose, and patient age, with younger patients exhibiting higher secondary cancer susceptibility.

Conclusion: Advanced radiotherapy techniques optimize tumor coverage and limit high-dose exposure to OARs, yet secondary cancer risk remains a critical consideration. Personalized planning that accounts for patient age, organ dose, and treatment modality is essential to balance effective HL treatment and long-term safety. These findings highlight the importance of risk-informed decision-making in radiotherapy planning.

Keywords: Hodgkin's-lymphoma Radiotherapy-3DCRT IMRT VMAT Secondary-cancer-risk

How to Cite: Seif, F., Sadeghi, B., Pourimani, R., & Bayatiani, M. (n.d.). (2026) Impact of radiation technique on secondary cancer risk in Hodgkin's lymphoma: Phantom-based dosimetric study. (Abstract No. O-91). Asian Pacific Journal of Cancer Care, 11(S1):113.
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Code:O-92

Title: Resilience Strategies in Oncology Nurses: An Examination of Challenges and Solutions in Low-Income Countries

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Introduction: Resilience strategies in oncology nurses are recognized as a key factor for improving the quality of care and reducing occupational stress in low-income countries. This study aims to examine and analyze these strategies and their impact on the mental and professional well-being of nurses.

Materials and Methods: This research utilized a review study approach to examine resilience strategies in oncology nurses in low-income countries. Data were collected by reviewing relevant articles from reputable databases, including PubMed, Scopus, Web of Science, and Google Scholar. The inclusion criteria focused on articles published in the last five years that addressed the resilience of oncology nurses and employed qualitative or quantitative methods. Data extraction was performed using thematic analysis, and the findings were presented descriptively and analytically to enhance understanding of the challenges and solutions in this area.

Results: The research reveals that oncology nurses in low-income countries use various strategies to enhance their resilience, with social support from colleagues and family being crucial for coping with occupational stress. Many nurses also practice stress management techniques, such as meditation and breathing exercises, to reduce stress and improve focus. Continuous education through training and workshops helps them stay updated on skills and tackle new challenges in cancer care. A clear sense of purpose in their work boosts their satisfaction and motivation, further strengthening resilience. Building emotional connections with patients fosters a sense of achievement and improves morale. Additionally, nurses set boundaries between work and personal life to prevent burnout. Overall, these strategies highlight that enhancing resilience in oncology nurses can improve both the quality of healthcare services and their mental well-being.

Conclusion: Resilience strategies not only contribute to improving the quality of life for oncology nurses but can also lead to enhanced patient care quality. It is recommended that policymakers and hospital administrators pay greater attention to developing educational and supportive programs for nurses to strengthen their resilience.

Keywords: Oncology nursing, Coping strategies, Resilience

How to Cite: Babaie, M., & Norouzinia, R. (n.d.). (2026) Resilience strategies in oncology nurses: An examination of challenges and solutions in low-income countries. (Abstract No. O-92). Asian Pacific Journal of Cancer Care, 11(S1):114. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-93

Title: Combined hTERT Inhibition and Ionizing Radiation Synergistically Suppress the Survival and Aggressive Phenotype of MDA-MB-231 Breast Cancer Cells

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Introduction: Triple-negative breast cancers are aggressive tumors with limited therapeutic options and a high degree of radioresistance. Telomerase, driven by hTERT, is active in the majority of human tumors and contributes to telomere maintenance, DNA repair, and resistance to apoptosis, suggesting a role in the radiation response. This study tested, in vitro, whether hTERT-targeted telomerase inhibition can enhance the reaction of the radioresistant TNBC cell line MDA-MB-231 to ionizing radiation by increasing radiation-induced apoptosis and reducing cell survival.

Materials and Methods: A human triple-negative breast cancer cell line (MDA-MB-231) was studied. Telomerase inhibition was achieved using the small-molecule inhibitor BIBR1532 (2.5 μM). Cells were then exposed to 2 Gy X-ray irradiation, with or without BIBR1532 pre-treatment. Drug IC50 values were determined using a colorimetric viability assay. The apoptosis assay was performed using Annexin V-FITC/PI in the control, drug-only, radiation-only, and combination groups. The expression of telomerase (hTERT) and the anti-/pro-apoptotic markers BCL-2 and Bax was measured using RT-qPCR. At the same time, cell viability was assessed through an MTT assay, and cell migratory capacity was evaluated with a wound-healing assay.

Results: Inhibition of telomerase, along with 2 Gy irradiation, significantly decreased hTERT expression when compared to the control and either treatment alone. BIBR1532 treatment alone increased apoptosis and decreased viability compared to untreated cells. The combination of telomerase inhibition and 2 Gy yielded the highest apoptotic fraction, surpassing either single treatment and producing the most significant suppression of cell proliferation. In line with these findings, wound-healing assays demonstrated impaired migratory capacity after telomerase inhibition, with the combined-treatment group showing markedly reduced wound closure compared with controls. At the molecular level, the combination regimen significantly reduced BCL-2 expression and elevated Bax expression, thereby modifying the Bax/BCL-2 ratio in comparison to control cells and signifying a transition towards a more pro-apoptotic phenotype.

Conclusion: hTERT-targeted telomerase inhibition enhances the radiation response of MDA-MB-231 breast cancer cells by increasing apoptosis and reducing proliferative capacity after 2 Gy irradiation. These in vitro findings support further translational evaluation of telomerase inhibition as a radiosensitizing strategy in radioresistant TNBC.

Keywords: Telomerase hTERT Radiosensitivity MDA-MB-231

How to Cite: Behbahani, R., Panoori, R., Danyaei, A., Rafat, A., & Zabihzadeh, M. (n.d.). (2026) Combined hTERT inhibition and ionizing radiation synergistically suppress the survival and aggressive phenotype of MDA-MB-231 breast cancer cells. (Abstract No. O-93). Asian Pacific Journal of Cancer Care, 11(S1):115-116. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-94

Title: The impact of palliative care on the quality of life of children with leukemia: A multifaceted approach

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Introduction: Leukemia, particularly acute lymphoblastic leukemia (ALL), is one of the most common types of cancer in children. Aggressive treatments such as chemotherapy and radiotherapy can cause serious side effects that adversely affect patients' quality of life. Palliative care, as an integral component of cancer management, aims to reduce pain and improve the quality of life of children with leukemia. This study was conducted with the aim of reviewing existing research in this field.

Materials and Methods: This study was conducted as a narrative review of articles published over the past five years in reputable databases such as PubMed, Scopus, and Google Scholar. The keywords "palliative care," "pediatric leukemia," and "quality of life" were used to identify relevant studies. The selection criteria included clinical studies, systematic reviews, and articles that examined the effects of palliative care on quality of life and treatment-related side effects.

Results: Palliative care significantly improves the quality of life of children with leukemia. Pain is managed through opioid and non-opioid analgesics, along with complementary methods such as massage, acupuncture, and physical therapy. Psychological support—including counseling and cognitive–behavioral interventions—helps reduce anxiety in both the child and family, while support groups enhance coping abilities. Nutritional assessment and individualized diet plans strengthen immunity and physical health. Symptoms like nausea, fatigue, and insomnia are controlled through medication and relaxation techniques. Social and financial support services also lessen the burden on families. Overall, these interventions reduce treatment-related complications and improve psychological well-being, emphasizing the importance of integrating palliative care into leukemia treatment.

Conclusion: Based on the findings, the need to incorporate palliative care into the treatment protocols for children with leukemia is increasingly evident. It is recommended that healthcare systems provide appropriate training for medical staff to facilitate the integration of palliative care into therapeutic programs. In addition, further research is essential to evaluate innovative and effective approaches for delivering palliative care.

Keywords: Leukemia, palliative care, children

How to Cite: Javadzadeh Movahed, M., & Babaei, M. (n.d.). (2026) The impact of palliative care on the quality of life of children with leukemia: A multifaceted approach. (Abstract No. O-94). Asian Pacific Journal of Cancer Care, 11(S1):117. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-95

Title: Machine Learning–Based Prediction of Gamma Passing Rates Using Dosiomics and Complexity Metrics in Helical Tomotherapy

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Introduction: Measurement based patient specific quality assurance (PSQA) in helical tomotherapy (HT) is labor intensive. Virtual PSQA (vPSQA) models offer an efficient alternative. Integrating dosiomics with plan complexity metrics may enhance predictive performance.

Materials and Methods: This retrospective study analyzed 250 HT patient datasets. Plan dosiomics (P_D), QA dosiomics (P_QA_D), and plan complexity metrics (P_C) were extracted, and LASSO was used for feature selection. Random Forest, XGBoost, and K Nearest Neighbors models were trained using a 70/30 split to predict gamma passing rates (GPR) under 2%/2 mm, 3%/2 mm, and 5%/1 mm criteria. Performance was evaluated using MAE, RMSE, and correlation coefficients.

Results: Hybrid models that combined P_D, P_QA_D, and P_C consistently outperformed single feature models. The best hybrid model achieved MAE values of 2.6%, 2.1%, and 3.4% across the three gamma criteria, with correlation coefficients up to 0.81. Among the evaluated algorithms, XGBoost demonstrated the strongest predictive capability and closest agreement with measured GPR values, outperforming Random Forest and KNN. These findings highlight the benefit of integrating complementary dosiomics and complexity based information for vPSQA.

Conclusion: Hybrid models that combined P_D, P_QA_D, and P_C consistently outperformed single feature models. The best hybrid model achieved MAE values of 2.6%, 2.1%, and 3.4% across the three gamma criteria, with correlation coefficients up to 0.81. Among the evaluated algorithms, XGBoost demonstrated the strongest predictive capability and closest agreement with measured GPR values, outperforming Random Forest and KNN. These findings highlight the benefit of integrating complementary dosiomics and complexity based information for vPSQA.

Keywords: Helical-tomotherapy dosiomics machine-learning Plan-Compelexity GPR

How to Cite: Esmailzadeh, A., Saadatmand, P., Mahdavi, S. R., Lamei Ramandi, F., & Najafzadeh, E. (n.d.). (2026) Machine learning–based prediction of gamma passing rates using dosiomics and complexity metrics in helical tomotherapy. (Abstract No. O-95). Asian Pacific Journal of Cancer Care, 11(S1):118. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-96

Title: Metformin-induced radio-sensitization of 4T1 breast cancer cells

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Introduction: This study investigated the effect of metformin (Met) on the radio-sensitization of the 4T1 murine breast cancer cell line.

Materials and Methods: The MTT assay was used to assess the viability of the cultivated 4T1 cell line. Group A (control), Group B (exposed to 2Gy irradiation), Group C (treated with 52 µM Met for 24 hours), and Group D (treated with 2Gy irradiation and 52 µM Met for 24 hours) were the four groups into which the cells were split. Crystal violet staining was used to evaluate colony formation. Reactive oxygen species (ROS) levels were determined

Results: Met exhibited a dose-dependent cytotoxic effect on 4T1 cells. Compared to the control group, cells treated with radiation and/or Met exhibited considerably lower colony formation and decreased adhesion. The group receiving both radiation and Met showed the greatest rise in ROS generation and apoptosis.

Conclusion: Metformin demonstrates a radio-sensitizing effect on 4T1 cells. However, further research on various breast cancer cell lines is needed to fully establish Metformin's dual role in the concurrent treatment of type 2 diabetes and breast cancer

Keywords: 4T1, metformin, radio-sensitization, Breast cancer.

How to Cite: Reshadatian, M., Radmehr, S., & Razmjoo, S. (n.d.). (2026) Metformin-induced radio-sensitization of 4T1 breast cancer cells. (Abstract No. O-96). Asian Pacific Journal of Cancer Care, 11(S1):119. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-97

Title: Dosimetric Comparison of Intensity Modulated Proton Therapy and Volumetric Modulated Arc Therapy Stereotactic Radiosurgery for Brain Metastases: Impact of Tumor Number

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Introduction: The aim of this study was to compare stereotactic radiosurgery (SRS) with intensity modulated proton therapy (IMPT) and photon volumetric modulated arc therapy (VMAT) for brain metastases in terms of dosimetric parameters, stratified by tumor number.

Materials and Methods: Twenty patients previously treated with VMAT SRS were replanned with IMPT in matRad using the identical prescription. Patients were categorized into single-lesion (n=6) and multiple-lesion (n=14) cohorts. Paddick conformity index (CI), Paddick gradient index (GI), homogeneity index (HI), and maximum dose (Dmax) to organs at risk (OARs) were evaluated and compared between modalities using paired statistical tests ($P < 0.050$).

Results: In the single lesion cohort, Paddick CI, Paddick GI, and HI did not differ significantly between IMPT and VMAT ($P > 0.340$). Optic nerves, spinal cord, and left cochlea, received significantly lower Dmax in IMPT plans ($P < 0.050$). In the multiple lesion cohort, IMPT significantly reduced HI (IMPT= 1.27 ± 0.15 vs. VMAT= 1.46 ± 0.17, $P = 0.030$), whereas Paddick CI and Paddick GI had no significant difference ($P > 0.070$). The optic nerves, cochleaes, and chiasm received substantially lower Dmax values in IMPT ($P \leq 0.016$), while only the reduction in brainstem Dmax (IMPT $=11.98 \pm 12.6$ Gy vs. VMAT $=13.84 \pm 9.2$ Gy) failed to reach statistical difference ($P = 0.084$).

Conclusion: IMPT plans provided better HI and OARs sparing, particularly for patients with multiple brain metastases. In patients with single brain metastases, IMPT had better OARs sparing, but did not have significantly better tumor coverage and HI.

Keywords: IMPT- VMAT- SRS- Brain metastases

How to Cite: Montazeri, S., Yahyazadeh, H., Bakhshandeh, M., & Mahmoodi, M. (n.d.). (2026) Dosimetric comparison of intensity modulated proton therapy and volumetric modulated arc therapy stereotactic radiosurgery for brain metastases: Impact of tumor number. (Abstract No. O-97). Asian Pacific Journal of Cancer Care, 11(S1):120. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-98

Title: The Role of Spectral CT in Optimizing Stereotactic Body Radiotherapy (SBRT): A Review of Precision Enhancement and Toxicity Reduction

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Introduction: While SBRT accurately delivers high doses of radiation, achieving a balance between tumor control and toxicity is still a challenge. This systematic review will evaluate the role of spectral CT imaging as an adjunct to enhance the precision of SBRT and to minimize the adverse effects of its application in the clinical setting.

Materials and Methods: We performed a thorough literature search through the following databases: Scopus, PubMed, and the Web of Science and we utilized citation tracking to identify additional literature. All peer-reviewed studies published in English with original research were evaluated for quality and bias according to the standards set forth by the PRISMA 2020 guidelines.

Results: Dual-energy CT (DECT) quantitatively assesses treatment response. Bone metastases showed an average decrease in signal strength when using calcium suppressed images (0.99 to 0.95, $p<0.05$) in 10 patients. With regards to lung cancer, iodine density maps showed that perfusion negatively correlated with tumor size (≤2cm: 24.7 vs. >3cm: 16.0 mg/cm³, $p<0.05$). DECT was able to detect the presence of lung toxicity when evaluating patients who had received radiation therapy (-14.3% for doses >20 Gy). DECT-guided SBRT reduced ventricular arrhythmias (91% fewer VT episodes, 86% fewer shocks in 7 patients). In head/neck re-irradiation, DECT delineated tumors better than MRI. DECT improves target definition, functional assessment, and response evaluation.

Conclusion: Spectral CT enhances SBRT by improving tumor definition and characterizing perfusion. This integration enables personalized dose adjustments, increasing the likelihood of tumor control while minimizing normal tissue effects, thereby advancing treatment outcomes.

Keywords: CT_scan Dual-energy-CT SBRT spectral-CT-imaging Quantitative-imaging

How to Cite: Farhadi Rad, M., Naserpour, M., & Naseri, O. R. (n.d.). (2026) The role of spectral CT in optimizing stereotactic body radiotherapy (SBRT): A review of precision enhancement and toxicity reduction. (Abstract No. O-98). Asian Pacific Journal of Cancer Care, 11(S1):121. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-99

Title: Pre-versus Post-operative SRS for Brain Tumors: Comparative Dosimetry and Evidence Gaps

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Introduction: Background: Stereotactic radiosurgery (SRS) is a precise, non-invasive modality for treating brain tumors, delivering high-dose focused radiation while sparing surrounding healthy tissue. Compared to whole-brain radiotherapy, SRS provides better local tumor control and lower cognitive risk. While post-operative SRS is standard, few comparative studies have evaluated pre-operative SRS, despite its potential to reduce normal brain exposure.

Materials and Methods: Methods: To address the current knowledge gap regarding pre-operative SRS, relevant studies comparing pre- and post-operative approaches were reviewed. Key dosimetric parameters, treatment sequences, and reported outcomes were reviewed and summarized. Background information on SRS was supplemented from a comprehensive literature review.

Results: Results: Comparisons between pre- and post-operative SRS are limited, mostly based on small cohorts and dosimetric simulations. Pre-operative plans generally delivered lower doses to surrounding healthy brain (median 28 Gy volume 6.79 cc vs 10.79 cc; $p < 0.001$). They also showed improved target conformity with steeper dose gradients. Post- operative plans often had irregular cavities requiring larger margins, with 64% of brains receiving ≥12 Gy ($p = 0.008$). pre-operative SRS showed clearer target delineation, while post-operative plans were challenged by cavity changes.

Conclusion: Conclusion: These preliminary dosimetric observations provide insight, yet clinical evidence for pre-operative SRS in brain tumors remains limited. These gaps highlight the need for further studies to assess feasibility, safety, and clinical benefits of pre-operative SRS, particularly in comparative settings.

Keywords: Stereotactic Radiosurgery Brain Preoperative Dosimetry

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Code:O-100

Title: Pre-treatment Stimulus MRI (psMRI) and Oxygen-Sensitive (BOLD-MRI) Imaging: Towards Hypoxia-Targeted Radiotherapy

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Introduction: Tumor hypoxia renders radiotherapy less effective through radioresistance. This research examines a method for mapping hypoxic sub-volumes within tumors without needing to invade them with instruments using pre-treatment stimulus (psMRI) and blood oxygen level dependent magnetic resonance imaging (BOLD-MRI).

Materials and Methods: A systematic review of the literature was conducted without date restrictions, using Scopus, PubMed, and Web of Science, and citation tracking in PubMed and Google Scholar to ensure comprehensiveness. We only looked at primary, peer-reviewed studies that were published in English. We also looked at the quality of the articles and the risk of bias according to PRISMA 2020 standards.

Results: Oxygen-enhanced MRI and BOLD are useful, non-invasive biomarkers for tracking tumor oxygen levels during treatment. This validates their application in customizing hypoxia-guided radiation therapy. By monitoring particular changes in R2* values, BOLD-MRI effectively distinguished treatment responders from non-responders in studies of esophageal and nasopharyngeal cancer. In the meantime, OE-MRI consistently detected early therapeutic changes with consistent results across scanner platforms by accurately quantifying the hypoxic fraction of the tumor. Our knowledge of tumor hypoxia responses is improved by combined techniques like TOLD and sqBOLD. When combined, these integrated MRI techniques offer a useful basis for modifying radiation therapy within a precision medicine framework to improve patient outcomes.

Conclusion: Hypoxia-sensitive MRI techniques, specifically BOLD imaging and OE-MRI, show strong promise as non-invasive methods for evaluating tumor oxygenation and predicting radiotherapy response. MRI's high sensitivity, repeatability, and clinical utility support incorporating this technique into individualized, hypoxia-targeted treatment plans.

Keywords: BOLD-MRI tumor_hypoxia radiotherapy

How to Cite: Naseri, O. R., Naserpour, M., & Farhadi Rad, M. (n.d.). (2026) Pre-treatment stimulus MRI (psMRI) and oxygen-sensitive (BOLD-MRI) imaging: Towards hypoxia-targeted radiotherapy. (Abstract No. O-100). Asian Pacific Journal of Cancer Care, 11(S1):123.
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Code:O-101

Title: Machine Learning–Based Prediction of Gamma Passing Rates for Automated Radiotherapy Quality Assurance: A Systematic Review from 2023 to 2025

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Introduction: Radiotherapy (RT) is a complex process involving simulation, treatment planning, and dose delivery. Modern techniques like IMRT and VMAT allow highly conformal dose distributions but require rigorous patient-specific quality assurance (PSQA). The American Association of Physicists in Medicine (AAPM) Task Groups 119 and 218 recommend pre-treatment evaluation of all modulated plans. PSQA typically uses the Gamma Passing Rate (GPR) to compare planned and delivered doses, however this process is time-consuming and may delay treatment initiation. Machine learning (ML) has emerged as a promising tool to predict GPR and potentially streamline PSQA.

Materials and Methods: This review followed PRISMA guidelines, and PubMed was used to collect relevant scientific literature. Among 52 articles retrieved using the combined keywords “gamma passing rate” OR “gamma analysis” OR “gamma index" AND “machine learning” AND “radiotherapy”, 33 articles were excluded based on specified time frame. After screening, a total of 15 articles were included for further analysis.

Results: ML models—including Random Forest, XGBoost, SVMs, and neural networks—show consistent ability to predict GPR across radiotherapy techniques. Key predictors include plan complexity metrics (e.g., modulation complexity score, monitor units, beam irregularity) and radiomics features (e.g., first-order and texture descriptors). Ensemble methods consistently outperformed simpler models, demonstrating strong predictive capability suitable for clinical triage.

Conclusion: ML shows significant promise for improving PSQA efficiency by enabling early risk detection. However, limited generalizability due to single-institution data and equipment-specific dependencies remains a barrier. Future efforts should focus on multi-institutional collaborations, external validations across TPS/linac combinations, and real-time clinical integration.

Keywords: Radiotherapy Complexitymetrics, GammaPassingRate, MachineLearning

How to Cite: Mahmoudi, L., & Kanani, A. (n.d.). (2026) Machine learning–based prediction of gamma passing rates for automated radiotherapy quality assurance: A systematic review from 2023 to 2025. (Abstract No. O-101). Asian Pacific Journal of Cancer Care, 11(S1):124. https://doi.org/10.31557/APJCC.2026.11.S1.1

Asian Pacific Journal of Cancer Care | DOI: 10.31557/APJCC.2026.11. S1.1

Code:O-102

Title: Quantitative T2 relaxometry in Magnetic Resonance Imaging (MRI) for non-invasive classification of glioma tumors by grade and IDH1 mutation status in order to personalized treatment plans

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Introduction: Glioma is the most common primary brain tumor in adults, marked by biological heterogeneity that impacts prognosis and treatment outcomes. A key molecular feature, isocitrate dehydrogenase 1 (IDH1) mutation status, plays a crucial role in treatment management, with IDH1-mutant gliomas being less aggressive and more radiosensitive than IDH1-wildtype tumors. Accurately predicting IDH1 mutation status is essential for improving patient prognosis and personalized treatment plans, but traditional brain biopsies are invasive and not suitable for all patients. This study aimed to assess the value of transverse relaxation time from pre-operative T2 and T2* relaxometry MRI in predicting glioma grade and IDH1 mutation status.

Materials and Methods: Eighteen patients histopathologically confirmed glioma patients participated in the study, including 12 high-grade gliomas (HGGs) (5 IDH1-wildtype and 7 IDH1-mutant) and 6 low-grade gliomas (LGGs) (all IDH1-mutant). T2 and T2* maps were created by fitting non-linear least squares to the signal intensity decay acquired from multi-echo spin and gradient echo sequences MRI. Mean T2 and T2* values were calculated at enhancement regions of HGGs and LGGs. The T2 and T2* values in enhancing areas were compared between HGGs and LGGs, as well as IDH-mutant and IDH-wildtype gliomas.

Results: HGGs showed significantly lower mean T2 (145.051±23.78 vs 210.175±38.65, p-value=0.001) and T2* values (62.94±3.66 vs 116.56±17.18, p-value=0.000) than LGGs. The IDH-wildtype gliomas (59.362±14.58) also demonstrated meaningful lower mean T2* values than IDH-mutant gliomas (90.947±29.90, p-value= 0.01).

Conclusion: MRI relaxometry can aid in the pre-operative classification of glioma grade and epigenetic alterations, potentially enhancing personalized treatment plans for glioma patients.

Keywords: Glioma, Relaxometry, Magnetic Resonance Imaging

How to Cite: Shahedi, F., & Zare, H. (n.d.). (2026) Quantitative T2 relaxometry in magnetic resonance imaging (MRI) for non-invasive classification of glioma tumors by grade and IDH1 mutation status in order to personalized treatment plans. (Abstract No. O-102). Asian Pacific Journal of Cancer Care, 11(S1):125. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-103

Title: Evaluating the Reliability of Dosiomics Features Under Interfractional Variations in Breast Radiotherapy Using Daily MVCT

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Introduction: Dosiomics offers a transformative approach for quantifying dose distribution patterns; however, its clinical translation remains limited by uncertainties in feature stability under real-world treatment variations. This study provides one of the most detailed and systematic evaluations to date of dosiomic feature robustness using daily MVCT imaging in breast radiotherapy delivered with TomoTherapy.

Materials and Methods: Sixteen breast cancer patients treated with IMRT on a TomoTherapy system were retrospectively analyzed. High-frequency MVCT imaging across multiple fractions underwent optimized rigid and deformable registration in MIM Maestro, followed by dose recalculation and standardized 1×1×1 mm^3 voxel resampling. Using 3D Slicer's Radiomics module, a comprehensive set of shape, first-order, and texture features was extracted. Stability was quantified using complementary metrics—coefficient of variation (CV), intraclass correlation coefficient (ICC), and percent difference (PD)—to capture variability from multiple statistical and temporal perspectives.

Results: Shape and several first-order features demonstrated exceptional stability (ICC > 0.9, CV < 0.2), confirming their suitability for high-precision modeling. In contrast, advanced texture families—particularly GLSZM and NGTDM—showed pronounced instability across organs, most notably in the PTV and contralateral breast. Dose accumulation improved the reliability of select features but could not mitigate the inherent sensitivity of complex texture metrics. Features with PD > 50% revealed strong susceptibility to interfractional anatomical dynamics.

Conclusion: This study establishes a rigorous and powerful framework for dosiomics stability assessment. The findings clearly identify clinically reliable features while exposing categories that are unsuitable for predictive modeling. This work provides essential groundwork for developing trustworthy, reproducible dosiomics-based tools in adaptive radiotherapy.

Keywords: Dosiomics, MVCT, TomoTherapy, Feature stability

How to Cite: Razi, S., Saadatmand, P., Esmailzadeh, A., Najafzadeh, E., Mojiri, A., & Mahdavi, S. R. (n.d.). (2026) Evaluating the reliability of dosiomics features under interfractional variations in breast radiotherapy using daily MVCT. (Abstract No. O-103). Asian Pacific Journal of Cancer Care, 11(S1):126. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-104

Title: A Radiobiological Modeling Comparison of Dysphagia and Acute Xerostomia in Head and Neck Radiotherapy With and Without the Inclusion of Radiation-Induced Bystander Effects

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Introduction: For patients receiving head and neck radiotherapy, acute xerostomia and dysphagia are important problems affecting their quality of life. This research contrasts the traditional Lyman–Kutcher–Burman (LKB) model for forecasting treatment problems with a new method that incorporates bystander effects on radiation exposures. The aim is to determine whether this new model improves projections with an extended approach that incorporates bystander-adjusted biological doses.

Materials and Methods: This study included 37 patients with head and neck cancer treated using 3D-CRT. After treatment plans, DVH data for bilateral parotid glands, bilateral submandibular glands, and the cervical esophagus were extracted. NTCP values were calculated in BioSuite 12.2h using LKB parameters reported by Lee, Mavroidis, Belderbos, and Roers. To incorporate bystander effects, biologically corrected EUD (Bio-EUD) values were obtained through MATLAB-based modeling, which implemented a bystander-sensitive dose-response algorithm. Subsequently, clinical toxicities were prospectively assessed weekly using EORTC QLQ-H&N35 and QLQ-H&N43 questionnaires and graded with CTCAE v5.0. For analysis, statistical tests included correlation testing between NTCP and clinical severity, Wilcoxon signed-rank comparisons of EUD vs. Bio-EUD, and mixed-effects modeling to evaluate clinical–dosimetric associations under both modeling approaches.

Results: Bystander-adjusted Bio-EUD values were significantly higher than conventional EUD in parotid glands directly exposed to lateral fields, particularly the right parotid (ΔEUD +93.7 cGy, $p<0.001$). The left parotid also showed a smaller yet significant increase ($p= 0.018$). Contralateral parotids and submandibular glands displayed minimal changes. Under both modeling approaches, parotid NTCP showed a significant association with clinical xerostomia severity ($p<0.05$). For dysphagia, differences between modeling approaches remained modest, though Bio-EUD provided slightly stronger alignment with observed toxicity patterns. No contradictory or clinically implausible trends were observed.

Conclusion: Incorporating bystander-adjusted biological dose into radiobiological modeling enhanced sensitivity in organs receiving moderate to high doses, demonstrating added predictive value compared with conventional EUD-based LKB modeling, particularly for xerostomia.

Both approaches supported the clinical relevance of parotid dose metrics in predicting acute toxicity. For dysphagia, the bystander effect showed improved consistency, though further validation in larger cohorts is warranted. Overall, integrating bystander effect into NTCP estimation may facilitate more refined risk assessment and contribute to future treatment optimization in head and neck radiotherapy.

Keywords: Radiotherapy, NTCP, Bystander-effect, Xerostomia, Dysphagia

How to Cite: Sadr, M., & Amraee, A. (n.d.). (2026) A radiobiological modeling comparison of dysphagia and acute xerostomia in head and neck radiotherapy with and without the inclusion of radiation-induced bystander effects. (Abstract No. O-104). Asian Pacific Journal of Cancer Care, 11(S1):127. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-105

Title: The Value of PET/CT in Target Delineation for Optimizing Radiotherapy of Breast Cancer: A Systematic Review

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Introduction: Radiotherapy is a cornerstone of breast cancer management, contributing to improved survival and disease control. The effectiveness of radiotherapy depends on accurate delineation of target volumes and organs at risk, yet conventional CT-based planning often struggles to identify post-operative tumor beds and regional lymph nodes. (_^18)F-FDG positron emitted tomography/ computed tomography (PET/CT), integrating metabolic and anatomical data, offers advantages in enhancing planning precision. Despite growing clinical use, evidence on its quantitative impact remains limited. This systematic review and meta-analysis aim to evaluate the role of (_^18)F-FDG PET/CT in target volume definition and its implications for radiotherapy optimization in breast cancer.

Materials and Methods: We systematically searched PubMed, Science Direct, Web of Science, and Google Scholar up to November 2025 using keywords including "Breast cancer", "Radiotherapy", "PET/CT", and "^{18}F-FDG". Sixteen relevant studies were included.

Results: PET/CT altered disease staging in 20–65% of patients and influenced treatment decisions in 10–23%. It showed superior sensitivity in detecting distant metastases and extra-axillary nodal involvement compared with standard imaging. In inflammatory breast cancer, PET/CT revealed more extensive disease than contrast-enhanced CT in half of cases. It also improved localization of internal mammary nodes and tumor beds, directly affecting radiation field design.

Conclusion: (_^18)F-FDG PET/CT enhances breast cancer radiotherapy planning by improving staging accuracy and target definition. As a complement to conventional imaging, its integration into clinical practice may reduce toxicity and improve oncological outcomes.

Keywords: Breast cancer Radiotherapy TreatmentPlanning PET/CT

How to Cite: Sajjadi, S. H., Askari, M., Rostami, A. H., & Tahmasbi, M. (n.d.). (2026) The value of PET/CT in target delineation for optimizing radiotherapy of breast cancer: A systematic review. (Abstract No. O-105). Asian Pacific Journal of Cancer Care, 11(S1):128. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-106

Title: Automatic Hippocampus Segmentation Using a Dilated Attention-Gated 3D U-Net for Radiotherapy Planning

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Introduction: The hippocampus plays a central role in memory and cognitive function; therefore, its preservation during radiotherapy is essential. In Whole-Brain Radiation Therapy (WBRT), excessive dose to hippocampus can adversely affect neurocognitive outcomes. Hippocampus-avoidance WBRT (HA-WBRT) mitigates this risk, but current workflows rely on manual hippocampus delineation, which is labor-intensive, observer-dependent, and requires specialized expertise. Automated segmentation can improve consistency and reduce clinical workload.

Materials and Methods: We propose an enhanced 3D U-Net architecture for automatic hippocampus segmentation using 260 MRI scans from the Medical Segmentation Decathlon (Task04). The dataset was divided into training (70%), validation (15%), and testing (15%) subsets.To enlarge the receptive field without incurring the computational overhead of 5×5×5 convolutions, dilated convolutions were introduced into the second convolutional layer of each encoder and decoder block. Additionally, attention gates were added into skip connections to suppress irrelevant activations and emphasize anatomically meaningful features.

Results: On the held-out test set, the proposed model achieved a Dice coefficient of 0.902, outperforming the baseline 3D U-Net while requiring fewer computational resources. This design leverages evidence that stacked 3×3×3 dilated kernels approximate the receptive field of larger kernels while reducing parameters by nearly 57%.

Conclusion: The integration of dilated convolutions with attention-guided skip connections offers an efficient and accurate approach for hippocampal segmentation. This framework demonstrates strong potential for incorporation into clinical radiotherapy workflows, particularly those involoving HA-WBRT.

Keywords: Hippocampus AutomatedSegmentation Attention-Gated3D U-Net RadiotherapyPlanning

How to Cite: Abbasi, M., & Kanani, A. (n.d.). (2026) Automatic hippocampus segmentation using a dilated attention-gated 3D U-Net for radiotherapy planning. (Abstract No. O-106). Asian Pacific Journal of Cancer Care, 11(S1):129. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-107

Title: AI-Guided Margin Adaptation in Head and Neck Radiotherapy: Personalizing PTVs Based on Daily Anatomy

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Introduction:

In head and neck cancers, geometric uncertainties caused by complex, time-varying anatomy often call for generous planning target volume (PTV) margins, which can compromise normal tissue sparing. In spite of adaptive radiotherapy's mitigation of some of these limitations, current margin strategies are largely based on population data and are not sensitive to changes in anatomy that occur daily. In order to maintain target coverage and reduce doses to organs at risk (OARs), this study developed and evaluated an artificial intelligence framework to adjust PTV margins based on daily image guidance

Materials and Methods:

The retrospective study included 60 patients with locally advanced head and neck squamous cell carcinoma treated with definitive IMRT or VMAT (70 Gy in 35 fractions) and daily CBCT. All fraction CBCTs, planning CTs, structure sets, and dose distributions were collected using Eclipse TPS (Varian Medical Systems, Palo Alto, CA, USA). Deformable registration pipelines were used to generate daily voxel-wise deformation fields between planning CT and CBCT, which were then used to extract systematic and random setup and anatomical variation metrics for each patient. A two-stage AI model was trained using these features, along with baseline clinical and geometric parameters: (1) a convolutional neural network (CNN) for estimating daily 3D probability distributions of residual setup error beyond couch correction; and (2) a margin recommendation network recommending anisotropic PTV margins for each fraction, targeting a patient-specific cumulative CTV V_(95%)≥98% in at least 95% of fractions. The model was trained and validated with 5-fold cross-validation on 44 patients and tested on 16 patients. For each test patient, two margin techniques were simulated, including AI-guided adaptive anisotropic margins updated daily, and standard institutional margins (control). In order to assess clinical target volume (CTV) coverage and OAR doses (parotids and submandibular glands,), recomputed dose distributions on deformed CTs were accumulated using dose-warping. For evaluation, the primary goals considered cumulative CTV V_(95%) and mean parotid dose and secondary endpoints were considered CTV D_(98%) and submandibular dose. Statistical comparisons used paired t tests with a significance level of ≤ 0.05.

Results: Using a usual GPU, the proposed AI model generated daily anisotropic margin recommendations for all test patients in 30 seconds on average per fraction (range of 23-41 seconds), which represents its eligibility for near-online use. A comparison of AI guided adaptive margins and standard institutional margins showed that AI guided adaptive margins provided small, non-significant reductions of the percentage of CTVs receiving at least 95% of the prescription dose (CTV V 95%) (mean ± SD 98.1% ± 1.01% vs 99.3% ± 0.4% for AI and standard institutional margin, respectively, with $p = 0.34$), and with similar near minimum dose (D_(98%)) to the CTV (mean 94.5% ± 1.01% vs 96.7% ± 1.15%, $p = 0.21$ respectively). The mean parotid dose decreased by a mean of 2.75± 0.5 Gy with a range of 1.9–3.6 Gy ($p < 0.001$), and the mean submandibular dose decreased by 1.91 ±0.63 Gy (range of 1.1–2.7 Gy, $p < 0.001$), compared to standard margins.

Conclusion: Our study showed that our current AI-based framework could generate anisotropic PTV margins from daily CBCT images, providing adequate coverage of CTVs and significant reductions in dose to OARs in head and neck cancer radiotherapy. The results were achieved through AI margins that were able to adapt to individual geometric uncertainties, such as systemic setup shifts or anatomical changes (such as tumor shrinkage or weight loss). In the present network, margins were dynamically expanded near moving structures and shrunk elsewhere, which decreases the risk of geographical misses. On the basis of an average computation time of 30 seconds per fraction, near-online integration into CBCT-AI guided workflows was also shown to be technically feasible.

Keywords: Adaptive Radiotherapy, Artificial Intelligence

How to Cite: Shakeri, M., Hosseini, S. M., Sebzari, A., & Salahshour, F. (n.d.). (2026) AI-guided margin adaptation in head and neck radiotherapy: Personalizing PTVs based on daily anatomy. (Abstract No. O-107). Asian Pacific Journal of Cancer Care, 11(S1):130-131. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-108

Title: Feasibility and Safety of Ultra-Hypofractionated Whole-Breast Irradiation Compared with Hypofractionation in Iranian Women with Early-Stage Breast Cancer: A 6-Month Preliminary Analysis

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Introduction: Whole-breast irradiation (WBI) is the standard adjuvant treatment after breast-conserving surgery (BCS) in early breast cancer. Hypofractionated WBI (HF-WBI; 40 Gy in 15 fractions) is widely accepted as a modern standard. The UK FAST-Forward trial showed that ultra-hypofractionated WBI (UHF-WBI; 26 Gy in 5 fractions) is non-inferior to HF-WBI in tumor control and toxicity. UHF-WBI is not yet routinely used in Iran, and its safety in Iranian women—who may differ from Western patients in breast size and susceptibility to radiation effects—remains unclear. To address this gap, we conducted a prospective two-arm study at Shohada Tajrish Hospital to assess the feasibility and safety of UHF-WBI compared with HF-WBI in early-stage breast cancer. This report presents the initial six-month outcomes, representing, to the best of our knowledge, the first clinical experience with UHF-WBI in Iran.

Materials and Methods: Thirty women aged ≥50 years with invasive breast cancer (T1–T2, N0), regardless of hormone receptor or HER2 status, with negative surgical margins, ECOG performance status 0–1, and no prior thoracic radiotherapy were enrolled. Patients were randomized to receive either UHF-WBI (26 Gy in 5 daily fractions; n = 15) or HF-WBI (40 Gy in 15 fractions; n = 15), which was considered the control arm. Treatment planning and organ-at-risk (OAR) constraints adhered to RTOG guidelines and FAST-Forward protocol criteria. In the HF-WBI control group, administration of a tumor-bed boost was based on the treating physician's discretion, whereas no boost was delivered in the UHF-WBI arm. All treatments were performed on a Varian linear accelerator using 6-MV photons with a 3D conformal technique. Electronic portal imaging (EPID) was used for daily setup verification. Toxicities were graded according to CTCAE v5.0. Patient-reported outcomes were evaluated using the EORTC QLQ-C30, BR23, Cancer Fatigue Scale (CFS), and Body Image Scale (BIS). Follow-up assessments were conducted during radiotherapy and at 1, 2, 3, and 6 months after treatment completion. The primary objective of the analysis was to assess the feasibility and safety of UHF-WBI, with treatment-related complications and clinical outcomes directly compared with the standard HF-WBI control group.

Results: Of the 15 patients initially assigned to UHF-WBI, 11 met dosimetric criteria; all proceeded to treatment and completed therapy. In the HF-WBI group, 15 patients were enrolled, and 13 met the dosimetric requirements; all 13 finished their prescribed course. Radiotherapy was delivered without interruption in both groups, demonstrating 100% feasibility. No grade 3–4 acute or subacute toxicities occurred. Grade 2 dermatitis was observed in 1 of 11 patients (6.3%) in the UHF-WBI group and in 2 of 15 patients (13.3%) in the HF-WBI group, with no statistically significant difference between groups. No symptomatic radiation pneumonitis was reported. Breast pain, breast induration, and skin pigmentation changes were predominantly grade 0–1 across both groups. Patient-reported outcomes assessed using the EORTC QLQ-C30, BR23, Cancer Fatigue Scale (CFS), and Body Image Scale (BIS) were comparable between groups at 6 months, with no clinically meaningful differences observed.

Conclusion: UHF-WBI is feasible, safe, and well-tolerated, with 6-month adverse effects similar to HF-WBI. These early findings support UHF-WBI as a time-efficient alternative for appropriately selected Iranian patients. Long-term follow-up continues to assess late toxicity and oncologic outcomes.

Keywords: breast cancer- Whole Breast Irradiation-UltraHypofractionation

How to Cite: Kalantari Khandani, M., Mirzaei, H. R., & Nouri, M. (n.d.). (2026) Feasibility and safety of ultra-hypofractionated whole-breast irradiation compared with hypofractionation in Iranian women with early-stage breast cancer: A 6-month preliminary analysis. (Abstract No. O-108). Asian Pacific Journal of Cancer Care, 11(S1):132-133. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-109

Title: The Role of EPID Dosimetry in Patient-Specific Quality Assurance for IMRT and VMAT

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Introduction: The advancement of complex radiotherapy techniques such as IMRT and VMAT necessitates accurate and efficient Patient-Specific Quality Assurance (PSQA). Electronic Portal Imaging Device (EPID) dosimetry, owing to its integrated nature and capability for both pretreatment and in vivo capability, is being evaluated as a superior alternative to conventional detector arrays.

Materials and Methods: This review summarizes findings from original research and clinical dosimetry studies evaluating EPID performance in IMRT and VMAT verification. Relevant literature was examined to outline commonly reported methodologies and to highlight trends in EPID-based dose assessment. The review focuses on key outcomes such as Gamma Pass Rates (GPR) and observed dose deviations in the Planning Target Volume and Organs at Risks.

Results: EPID dosimetry performs comparably to conventional detector arrays. Several studies report average GPR around 96% using EPID under the 3%/3 mm criteria, closely matching the performance of widely used detector arrays. Clinical experience has demonstrated its role in identifying treatment delivery errors that would otherwise remain undetected by pre-treatment QA alone. Notably, reports include cases of workflow-related discrepancies—such as plan transfer issues—leading to clinically significant reductions in target dose. Evidence also highlights that employing stricter gamma criteria enhances the sensitivity of EPID-based verification, particularly for detecting algorithmic inaccuracies within Treatment Planning Systems.

Conclusion: EPID dosimetry not only provides acceptable dosimetric accuracy in pre-treatment PSQA, but its in vivo capability offers a critical advantage in identifying treatment-chain errors that impact patient safety.

Keywords: EPID Dosimetry PSQA IMRT In-Vivo

How to Cite: Najafi Sarvestani, S., & Kanani, A. (n.d.). (2026) The role of EPID dosimetry in patient-specific quality assurance for IMRT and VMAT. (Abstract No. O-109). Asian Pacific Journal of Cancer Care, 11(S1):134. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-110

Title: Ultrahigh-Dose Rate FLASH Radiotherapy: Advancing from Preclinical Insights to Clinical Applications

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Introduction: FLASH radiotherapy (FLASH-RT) delivers radiation at ultra-high dose rates (≥40 Gy/s), demonstrating a unique capacity to spare normal tissues while maintaining antitumor efficacy—the "FLASH effect." This review synthesizes current evidence from preclinical and early clinical studies to evaluate its translational potential and identify key challenges for clinical adoption.

Materials and Methods: A systematic literature search was conducted in PubMed, Scopus, and Web of Science (2019–2024). Keywords included "FLASH radiotherapy," "ultra-high dose rate," and "normal tissue sparing." Citation tracking ensured comprehensive inclusion of pivotal studies.

Results: Preclinical studies across multiple models (mice, zebrafish, pigs, cats) consistently confirm significant reductions in normal tissue toxicity (e.g., pulmonary, dermatological, and cognitive damage) compared to conventional radiotherapy. First-in-human trials for cutaneous lymphoma and bone metastases report promising feasibility and tolerability. The primary proposed mechanism involves rapid transient oxygen depletion in normal tissues, reducing radiochemical damage mediated by reactive oxygen species. Additional findings point to modulations in immune response (e.g., TGF-β signaling) and inflammatory pathways, which may differentially affect tumors and healthy tissues.

Conclusion: FLASH-RT holds transformative potential to enhance the therapeutic index of radiotherapy. However, clinical implementation requires overcoming significant barriers, including the development of clinical-grade delivery devices, validated dosimetry for ultra-high dose rates, and a deeper understanding of radiobiological mechanisms in humans. Future efforts must prioritize controlled clinical trials to establish efficacy and safety, alongside mechanistic research focused on immunological and cellular responses. Collaborative innovation across disciplines is essential to integrate FLASH-RT into routine oncologic care.

Keywords: Preclinical Clinical FLASH Radiotherapy

How to Cite: Sajjadi, S. H., Heydarheydari, S., Rezaeijo, S. M., & Rezaeijo, S. M. (n.d.). (2026) Ultrahigh-dose rate FLASH radiotherapy: Advancing from preclinical insights to clinical applications. (Abstract No. O-110). Asian Pacific Journal of Cancer Care, 11(S1):135. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-111

Title: Radiobiological Mechanisms and Clinical Benefits of Low-Dose Radiotherapy in Non-Malignant Diseases

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Introduction: Low-dose radiotherapy (LDRT, 0.5–1.5 Gy per fraction) is increasingly applied in benign inflammatory and degenerative disorders, including osteoarthritis, plantar fasciitis, bursitis, and tendinopathies. Unlike high-dose cytotoxic radiotherapy, LDRT exerts anti-inflammatory, immunomodulatory, and tissue-protective effects by modulating cytokine signaling, immune cell recruitment, and oxidative stress pathways. Evidence indicates LDRT influences adaptive immunity and endothelial repair, providing long-term benefits beyond symptom relief.

Materials and Methods: A narrative synthesis of recent studies (2022–2025) evaluating LDRT in non-malignant conditions was conducted. Key assessed endpoints included pro-inflammatory cytokines, NF-κB activity, immune cell infiltration (including M1/M2 macrophage balance), endothelial activation, oxidative stress markers, pain reduction, functional improvement, tissue remodeling, and adaptive immune components changes.

Results: LDRT consistently decreased pro-inflammatory cytokine expression (TNF-α, IL-6, IL-1β) and inhibited NF-κB signaling pathway, dampening inflammatory cascades. It diminished recruitment of inflammatory cells and induced macrophage polarization toward the anti-inflammatory M2 phenotype. Clinical benefits were observed in osteoarthritis and plantar fasciitis via significant pain score reductions, improved mobility, and enhanced tissue function. Fractionation was a very critical determinant herein: Low-dose fractions resulted in more durable immunomodulatory effects than single sessions. Mechanistically, LDRT modulated adaptive immunity by intervention in T-cell subsets, potentially aiding long-term resolution of chronic inflammation.

Conclusion: LDRT is considered a safe and non-invasive treatment for benign inflammatory and degenerative diseases. By modulating inflammatory signaling, immune cell function, endothelial repair, and tissue remodeling, it offers a mechanistically informed strategy for patient care. Future trials will need to optimize dose and fractionation in patients to bring out the full clinical potential of this modality.

Keywords: LDRT Radiobiology Immunomodulation

How to Cite: Khakshour, E., Javadinia, S. A., & Shahram, M. A. (n.d.). (2026) Radiobiological mechanisms and clinical benefits of low-dose radiotherapy in non-malignant diseases. (Abstract No. O-111). Asian Pacific Journal of Cancer Care, 11(S1):136. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-112

Title: Effects of Continuous care model in Oncology care

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Introduction: Cancer poses a major healthcare challenge due to its extensive physical, psychological, and social burdens. This study examines the impact of the Continues Care Model in Oncology, which utilizes integrated services to mitigate these complications and sustainably enhance patients' quality of life. The model is recognized as an effective approach for holistic patient support, and this research aims to evaluate its effectiveness in improving comprehensive patient outcomes within cancer care.

Materials and Methods: This study searched PubMed, Web of Science, Scopus, and Google Scholar (2012-2025) using keywords: "Continues care model," "oncology," "cancer," and synonyms. From 200 initially identified articles, 8 met the inclusion criteria (full-text, English, relevance to oncology care).

Results: This review synthesizes evidence showing that structured continues care models in oncology significantly empower patients and improve a wide range of outcomes. Benefits appear in two areas:

1. Psychosocial and Self-Management Outcomes: Enhanced self-care, personal responsibility, spiritual growth, relationships, and key behaviors (activity, nutrition, stress), which reduce anxiety and improve body image.

2. Physical and Symptom Outcomes: Direct alleviation of fatigue, pain, nausea, and sleep disturbances. A prominent finding is improved sexual function and satisfaction, especially among male patients.

Conclusion: continues care models in oncology are a powerful intervention that effectively empowers patients and delivers holistic benefits. By enhancing self-management, psychological well-being, and interpersonal support, while directly alleviating debilitating physical symptoms, these models address the multifaceted needs of cancer patients. The consistent improvement across psychosocial, behavioral, and physical domains confirms their essential role in comprehensive cancer care and sustainable quality-of-life enhancement.

Keywords: Continuous care model-Oncology-Cancer

How to Cite: Pirmohammadi, Z., & Rajabzadeh, A. (n.d.). (2026) Effects of continuous care model in oncology care. (Abstract No. O-112). Asian Pacific Journal of Cancer Care, 11(S1):137. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-113

Title: Effects of Tandem Insertion Depth and Organ Volumes on OAR Doses in Cervical HDR Brachytherapy

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Introduction: Optimizing tandem insertion depth in High-Dose-Rate (HDR) brachytherapy involves balancing target coverage against Organ-at-Risk (OAR) toxicity. This study evaluates the dosimetric impact of shallow (1-3 cm) versus deep (3-5 cm) insertions and investigates volume-dose correlation.

Materials and Methods: A retrospective analysis was conducted on 96 HDR fractions stratified into Group A (Deep: 3-5 cm, n=65) and Group B (Shallow: 1-3 cm, n=31). Dosimetric parameters (CTV D90, Bladder/Rectum D2cc) and organ volumes were analyzed using independent t-tests. Pearson's correlation assessed the relationship between organ filling and D2cc.

Results: Group A demonstrated superior target coverage with a mean CTV D90 of 6.64 Gy, significantly higher than Group B's 6.30 Gy ($p=0.02$). However, this coverage came at a dosimetric cost to the bladder; mean Bladder D2cc was significantly higher in Group A (4.61 Gy) compared to Group B (3.56 Gy, $p<0.001$). Notably, rectal doses remained statistically comparable (Group A: 3.25 Gy vs. Group B: 2.97 Gy, $p=0.22$). Correlation analysis revealed a moderate negative correlation between bladder volume and D2cc in Group A ($r=-0.30$), indicating that increased filling effectively reduces dose in deep insertions. Conversely, Group B showed negligible correlation ($r\approx-0.02$), suggesting volume has minimal impact in shallow insertion.

Conclusion: Deep insertion enhances target coverage with stable rectal doses. While bladder exposure increases, volume-dose correlations indicate this is manageable via optimized filling, supporting deep insertion as the superior strategy under strict bladder preparation.

Keywords: Cervical Cancer Brachytherapy Tandem insertion

How to Cite: Bastanipour, Y., Enferadi Aliabad, M. J., Eskandari, A., Mohammadi, A., Hosseini, S., Homayi, F., & Gholamhosseinian, H. (n.d.). (2026) Effects of tandem insertion depth and organ volumes on OAR doses in cervical HDR brachytherapy. (Abstract No. O-113). Asian Pacific Journal of Cancer Care, 11(S1):138. https://doi.org/10.31557/APJCC.2026.11.S1.1

Asian Pacific Journal of Cancer Care | DOI: 10.31557/APJCC.2026.11. S1.1

Code:O-114

Title: Psilocybin-Assisted Therapy for Anxiety and Depression in Advanced Cancer: A Systematic Review

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Introduction: Psychedelic medicine is experiencing a renaissance, marked by a increase of clinical interest following decades of limited research. Psilocybin—a naturally occurring psychedelic compound found in "magic mushrooms"—has shown notable potential for alleviating anxiety and depression. This has generated increasing focus on its use in palliative care, particularly for reducing psychological distress, anxiety and depression in patients with advanced cancer. This systematic review and meta-analysis evaluate the effects of psilocybin therapy in patients with advanced cancer.

Materials and Methods: A systematic search was conducted across major medical databases (PUBMED, Science Direct, Scopus, Google scholar) from 2021-2025. The review was based on PRISMA guidelines and utilized keywords such as: “psilocybin”, ”anxiety” , “depression” AND “cancer”

Results: From an initial 263 papers, 24 were selected based on the inclusion criteria. According to the results, psilocybin-assisted therapy holds significant therapeutic potential for alleviating psychological and existential distress in patients with advanced cancer. Key studies consistently report rapid, substantial, and durable reductions in core symptoms of anxiety, depression, despair, and death anxiety. Notably, some researches demonstrates that these clinical benefits can persist for several years, suggesting the potential for long-term relief. Beyond symptom reduction, studies document concurrent enhancements in quality of life, spiritual well-being, and attitudes toward death, with participants often describing the psilocybin experience as among the most meaningful of their lives.

Conclusion: To conclude, while the psilocybin improves psychological cancer related problems, minor discrepancies exist, such as variability in the long-term durability of response noted between studies. These variations are likely attributable to methodological differences, including psilocybin dosage (e.g., high versus moderate), the structure and integration of supportive psychotherapy, and heterogeneity within patient populations. Nonetheless, the overarching conclusion across all research is one of significant promise. To solidify its clinical application, future rigorous research must establish optimal dosing, patient selection, and long-term outcomes, informing both practice and policy.

Keywords: Psilocybin anxiety depression cancer

How to Cite: Jalilian, P., & Tamimi, A. (n.d.). (2026) Psilocybin-assisted therapy for anxiety and depression in advanced cancer: A systematic review. (Abstract No. O-114). Asian Pacific Journal of Cancer Care, 11(S1):139. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-115

Title: Adaptive Radiotherapy in Head and Neck Cancer: Dosimetric Benefits, Clinical Evidence, and Emerging Imaging-Based Approaches

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Introduction: Adaptive Radiotherapy (ART) in Head and Neck Cancer (HNC) addresses significant anatomical changes, including tumor shrinkage and weight loss, that occur during treatment. While Image Guided RT (IGRT) corrects setup errors, internal variations compromise target coverage and elevate OAR dose. Despite clear dosimetric benefits, consistent, cost effective ART implementation remains difficult.

Materials and Methods: Methods: This narrative review synthesizes clinical and dosimetric studies on ART in HNC by examining published evidence retrieved from PubMed and Web of Science that included literature comprises both retrospective and prospective studies.

Results: Adaptive Radiotherapy (ART) improves Planning Target Volume (PTV) coverage and lowers mean doses to organs at risk, including parotid glands and pharyngeal constrictors, with reductions of 0.4–7.1 Gy. Patients receiving concurrent chemoradiotherapy show greater anatomical changes, making them prime ART candidates. Implementation is limited by heterogeneous protocols and heavy offline/online replanning workload. Efforts like B ART aim to standardize criteria, while advanced MRI- and PET-derived biomarkers offer promising triggers, though adoption is hindered by absent unified framework

Conclusion: ART helps correct dosimetric deviations caused by anatomical changes in HNC and improves OAR sparing. However, because standardized quantitative criteria for initiating replanning are still lacking, its clinical use remains inconsistent. Larger prospective studies and automated, real-time ART systems are needed for standardizing adaptation practices.

Keywords: Adaptive Radiothrapy, B-ART Protocol, Replaning

How to Cite: Beigzade, M. (n.d.). (2026) Adaptive radiotherapy in head and neck cancer: Dosimetric benefits, clinical evidence, and emerging imaging-based approaches. (Abstract No. O-115). Asian Pacific Journal of Cancer Care, 11(S1):140. https://doi.org/10.31557/APJCC.2026.11.S1.1

Asian Pacific Journal of Cancer Care | DOI: 10.31557/APJCC.2026.11. S1.1

Code:O-116

Title: Nanoparticles as nanosensitizers in enhancing proton therapy biological efficacy: mechanisms and quantitative outcomes

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Introduction: Proton therapy (PT) offers a distinct clinical advantage due to its precise dose distribution characterized by the Bragg peak; however, its relative biological effectiveness (RBE) remains limited compared to heavy ions. This review investigates the role of nanoparticles (NPs) as nanosensitizers to augment PT efficacy.

Materials and Methods: We analyzed recent studies focusing on high-Z metal NPs (Au), ceramic oxides (Ta2O5, CeO2), boron-based agents (B, LaB6), and hybrid systems (Zn-doped Iron Oxide). The review evaluates quantitative dose enhancement and biological mechanisms including Coulomb interactions and oxidative stress.

Results: Simulations demonstrated that Au, Ta2O5, and CeO2 NPs yield local dose enhancements of approximately 26%, 16%, and 14%, respectively. In Neutron Capture Enhanced Particle Therapy (NCEPT), 10B and 157Gd agents reduced the physical dose required for 10% glioblastoma cell survival from 5–7 Gy to less than 2 Gy. Furthermore, laser-synthesized Boron NPs (80–100 ppm) under 3 Gy irradiation decreased osteosarcoma colony formation by 2.7-fold. The primary mechanism identified extends beyond nuclear reactions to include intense reactive oxygen species (ROS) generation, mitochondrial depolarization, and the overexpression of 52 genes linked to oxidative stress. Additionally, PAA-coated LaB6 NPs exhibited synergistic cell death effects (CDI < 0.5). Zn-doped iron oxide NPs showed potential for proton range verification via prompt gamma detection, though clinical toxicity requires further assessment.

Conclusion: Nanoparticles significantly expand the therapeutic window of PT through combined physical and biochemical mechanisms, shifting the paradigm from purely nuclear interactions to ROS-mediated radiosensitization.

Keywords: Protontherapy Nanoparticles Radiosensitization ROS RB

How to Cite: Mohammadian, K., & Najafi, S. (n.d.). (2026) Nanoparticles as nanosensitizers in enhancing proton therapy biological efficacy: Mechanisms and quantitative outcomes. (Abstract No. O-116). Asian Pacific Journal of Cancer Care, 11(S1):141. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-117

Title: Death Anxiety in elderly with cancer: A Descriptive Study

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Introduction: A large part of cancer patients is the elderly population. Aging is usually associated with feelings of inadequacy and helplessness, and death anxiety is one of the common issues of this period. The first step to reduce the symptoms related to death anxiety, in all stages of cancer, is to identify the condition of this phenomenon in the elderly so that it can be better managed.

Materials and Methods: This descriptive study was performed on 322 Iranian elderly cancer patients referred to a teaching hospital in Tehran, eligible patients, selected by convenience sampling, completed Death Anxiety Questionnaire. The data was analyzed by the SPSS 20 software.

Results: The overall mean score of (DAQ) among the patients was 12.81 (9.11). Also, the results of the study demonstrated a significant positive correlation between DAQ and age ($r = 0.2$, $P= 0.37$)

Conclusion: This study showed that the level of death anxiety in the elderly is moderately high and increases with age. Therefore, health workers should pay attention to this psychological consequence of cancer in oncology care and consider strategies to reduce it.

Keywords: 'Death Anxiety' 'elderly' 'cancer'

How to Cite: Khanali Mojen, L., & Bahrami, S. (n.d.). (2026) Death anxiety in elderly with cancer: A descriptive study. (Abstract No. O-117). Asian Pacific Journal of Cancer Care, 11(S1):142. https://doi.org/10.31557/APJCC.2026.11.S1.1

Asian Pacific Journal of Cancer Care | DOI: 10.31557/APJCC.2026.11. S1.1

Code:O-118

Title: Investigating predictors of spiritual needs in cancer patients using path analysis

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Introduction:

The present study aimed to simultaneously examine the predictors of spiritual needs in patients with cancer using path analysis. By considering demographic, clinical, and psychological variables, this research sought to identify factors influencing the spiritual needs of cancer patients.

Materials and Methods:

This cross-sectional descriptive-analytical study was conducted in 2024 in Imam Hassan Mojtaba Hospital (Dezful), Shahid Mostafa Khomeini Hospital (Oncology Department, Ilam), and the Cancer Referral Center of Tehran (Shohada-e Tajrish Hospital). The study sample consisted of 346 patients with cancer aged 18 to 70 years, selected through convenience sampling based on inclusion and exclusion criteria. Data were collected using a demographic and clinical characteristics questionnaire, the Spiritual Needs Questionnaire for Patients with Cancer (PSNAS), Spiritual Well-Being Scale, Satisfaction with Life Scale, Gratitude Questionnaire, Social Support Questionnaire, and Hope Scale. Data analysis was performed using SPSS version 11 and AMOS version 8.6. Descriptive statistics, univariate regression, Kolmogorov–Smirnov test, bivariate correlation, and path analysis were applied. Model fit indices including CFI, TLI, RMSEA, and SRMR were calculated.

Results:

Most participants were married Muslim women living with their families. The majority had a diploma or high school level of education, were unemployed or self-employed, and reported insufficient income. Breast cancer was the most common cancer type, followed by gastrointestinal cancers, and chemotherapy was the most frequently reported treatment modality. The mean score of spiritual needs was 67.93 (SD = 20.59). Mean scores for spiritual well-being, life satisfaction, gratitude, social support, and hope were 54.71, 65.92, 58.41, 67.36, and 42.30, respectively. Normality testing revealed that social support and hope variables deviated from a normal distribution ($p < 0.05$).

Conclusion:

The findings indicate that patients with cancer experience moderate to desirable levels of spiritual needs, spiritual well-being, life satisfaction, and gratitude. Demographic and clinical factors, including gender, marital status, type of cancer, economic status, and social support, played significant roles in predicting patients' spiritual needs. These results highlight the importance of addressing spiritual dimensions, enhancing social support, and fostering hope as integral components of comprehensive cancer care. Therefore, incorporating psychological and spiritual interventions into routine oncology care is strongly recommended to improve patients' quality of life.

Keywords: Spiritual needs, cancer patients, hope

How to Cite: Hasani, A. (n.d.). (2026) Investigating predictors of spiritual needs in cancer patients using path analysis. (Abstract No. O-118). Asian Pacific Journal of Cancer Care, 11(S1):143. https://doi.org/10.31557/APJCC.2026.11.S1.1

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Code:O-119

Title: The Role of Self-Care and Resilience in Mitigating Occupational Stress and Burnout Among Oncology Nurses in Iran

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Introduction: Oncology nurses face continuous emotional pressure, high workload, and exposure to patient suffering and death, increasing their risk of occupational stress and burnout. Prior studies have mainly focused on prevalence; however, few have examined the direct impact of stress and resilience on patient care outcomes. This study aims to analyze occupational stress and burnout among oncology nurses, investigate the role of individual and organizational resilience, and evaluate its effects on patient care quality in Iranian oncology centers.

Materials and Methods: A systematic analytical review was conducted on studies published between 2015–2025 in reputable international databases. Inclusion criteria focused on oncology nursing, occupational stress, burnout, resilience, and patient care outcomes. Selected studies were analyzed qualitatively to identify the relationships between occupational stress, burnout, resilience strategies, and their impact on patient care quality. Special attention was given to studies evaluating both nurse well-being and measurable patient care outcomes, including symptom monitoring, pain management, and patient satisfaction.

Results: Findings indicate that individual and organizational resilience mediates the relationship between occupational stress and patient care quality. Nurses employing self-care strategies and receiving organizational support experienced lower burnout levels and demonstrated improved patient monitoring, symptom management, and higher patient satisfaction. Effective resilience programs also enhanced nurses' professional functioning and psychological well-being.

Conclusion: Integrating individual and organizational resilience strategies into oncology nursing policies is a practical and managerial necessity. Evidence-based educational programs, supportive infrastructures, and structured guidelines can reduce burnout, enhance nurse mental health, and improve patient care outcomes in oncology settings.

Keywords: Oncology Nursing Burnout Resilience Self-care

How to Cite: Almasi Ghaleh, E. (n.d.). (2026) The role of self-care and resilience in mitigating occupational stress and burnout among oncology nurses in Iran. (Abstract No. O-119). Asian Pacific Journal of Cancer Care, 11(S1):144. https://doi.org/10.31557/APJCC.2026.11.S1.1

Asian Pacific Journal of Cancer Care | DOI: 10.31557/APJCC.2026.11. S1.1

Code:O-120

Title: The importance of the role of the oncology nurse in providing care

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Introduction: Oncology nursing is one of the most important components of cancer care, addressing the complex and multidimensional needs of cancer patients. With advances in cancer diagnosis and treatment, the role of oncology nurses has expanded significantly. The aim of this review is to examine the importance of the role of oncology nursing in providing comprehensive and quality care.

Materials and Methods: This review article was conducted using a narrative literature review approach. Relevant studies, articles, and international guidelines were identified through databases including PubMed and Scopus. Articles that focused on oncology nursing roles and patient outcomes were included. Data were analyzed and synthesized descriptively to identify key themes related to the contribution of oncology nursing to cancer care.

Results: The reviewed literature demonstrates that oncology nursing plays a vital role in symptom management, patient education, psychosocial support, and care coordination. Oncology nurses contribute to improved treatment adherence, enhanced patient safety, and better quality of life. Evidence also highlights their role in managing advanced therapies, supporting survivorship care, and delivering palliative and end-of-life care. Furthermore, oncology nursing leadership and research were identified as key factors in translating evidence into practice and improving healthcare systems.

Conclusion: Oncology nursing is essential to delivering safe, effective, and patient-centered cancer care. Evidence from the reviewed literature underscores the significant contribution of oncology nurses to improving clinical outcomes, quality of life, and continuity of care. Strengthening education, research, and professional support for oncology nurses is crucial to meeting the growing demands of global cancer care.

Keywords: Oncology nursing; Patient outcomes

How to Cite: Shirinabadi Farahani, A. (n.d.). (2026) The importance of the role of the oncology nurse in providing care. (Abstract No. O-120). Asian Pacific Journal of Cancer Care, 11(S1):145. https://doi.org/10.31557/APJCC.2026.11.S1.1

Asian Pacific Journal of Cancer Care | DOI: 10.31557/APJCC.2026.11. S1.1

Code:O-121

Title: Investigating the effect of a coaching program based on Integrated Nurse Coaching Theory (TINC) on the level of respect for the dignity of cancer patients

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Introduction: High workload and stress among nurses threaten their health and may compromise patients' dignity in care. Self-care interventions can enhance nurses' well-being and care quality. This study aimed to evaluate the effect of a coaching program based on the Theory of Integrated Nurse Coaching (TINC) on respect for the dignity of patients with cancer.

Materials and Methods: This randomized controlled trial was conducted on 60 nurses working in oncology departments of hospitals affiliated with MUMS. Participants were selected using stratified sampling proportional to population size and randomly assigned to intervention and control groups. The intervention group received an eight-week, eight-session individual coaching program based on the Theory of Integrated Nurse Coaching (TINC). Data were collected using the Integrated Health and Wellness Assessment (IHWA) and the Nurses' Respect for Patient Dignity questionnaire before and after the intervention.

Results: No significant differences were observed between the two groups regarding demographic variables ($p>0.05$). The integrated coaching-based educational program significantly increased nurses' integrated health and well-being scores in the intervention group (ANCOVA: $F=28.01$, $p<0.001$, $\eta^2=0.33$), with sustained effects at follow-up ($F=36.71$, $p<0.001$). Patient dignity observance also improved significantly at post-test and follow-up ($p<0.001$).

Conclusion: Implementing self-care programs for nurses can improve their health, as well as the quality of their nursing care and respect for patients' dignity.

Keywords: Coaching , Nurse, Dignity, Cancer

How to Cite: Pardehshenas, F., Ramezanzade Tabriz, E., Alizadeh, B., & Khosravi, F. (n.d.). (2026) Investigating the effect of a coaching program based on Integrated Nurse Coaching Theory (TINC) on the level of respect for the dignity of cancer patients. (Abstract No. O-121). Asian Pacific Journal of Cancer Care, 11(S1):146. https://doi.org/10.31557/APJCC.2026.11.S1.1

Asian Pacific Journal of Cancer Care | DOI: 10.31557/APJCC.2026.11. S1.1

Code:O-122

Title: Determinants of Safe Chemotherapy Handling Performance Among Oncology Nurses: The Role of Psychological and Organizational Factors

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Introduction: Chemotherapy drugs pose serious occupational risks to oncology nurses, yet compliance with safety guidelines is often inadequate, highlighting the need to understand factors influencing nurses' safety performance to improve occupational health outcomes.

Materials and Methods: This multicenter cross-sectional descriptive study was conducted between May and December 2024 among 252 oncology nurses working in six hospitals in Mashhad, Iran. Participants were selected using proportional stratified and random sampling methods. Data were collected using structured questionnaires assessing demographic characteristics, occupational safety performance, knowledge, self-efficacy, workplace safety, and work-related barriers. Statistical analyses were performed using SPSS version 25, including t-tests, ANOVA, Pearson correlation, and multivariate regression analyses.

Results: The findings showed that 81.7% of nurses had experienced skin contact with chemotherapy drugs, while only 23% demonstrated optimal safety performance. Safety performance was significantly and positively correlated with self-efficacy ($r=0.516$, $p<0.001$) and workplace safety perception ($r=0.493$, $p<0.001$). In contrast, work-related barriers showed a significant negative association with all dimensions of safety performance. Knowledge had a weak but significant relationship with safety performance, limited to drug preparation room safety and cytotoxic waste management.

Conclusion: There is a substantial gap in the safe handling of chemotherapy drugs among oncology nurses. Educational interventions alone are insufficient; integrated strategies that enhance self-efficacy, improve workplace safety conditions, and reduce organizational barriers are necessary to promote safer chemotherapy handling practices.

Keywords: Chemotherapy-Occupational Safety-Nurse-Self-Efficacy

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Title: Fear of Cancer Recurrence and Demographic and Clinical Factors Associated with It in Patients with Cancer

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Introduction: Fear of cancer recurrence is a common and persistent psychological concern among cancer survivors that can negatively impact emotional well-being, daily functioning, and quality of life, highlighting the importance of identifying demographic and clinical risk factors for early detection and supportive care.

Materials and Methods: This multicenter cross-sectional study was conducted on 275 patients with cancer referred to five hospitals in Mashhad, Iran, in 2024. Participants were selected using simple random sampling. Data were collected using a demographic and clinical questionnaire and the Fear of Cancer Recurrence Inventory (FCRI). Data were analyzed using descriptive statistics, independent tests, and multiple linear regression analysis.

Results: The mean total FCR score was 103.72±28.19, indicating a relatively high level of fear among participants. Female patients reported higher FCR scores than males ($p=0.002$). Patients aged≤50 years had significantly higher FCR compared with those over 50 years ($p<0.001$). Higher FCR scores were also observed in patients with academic education compared to non-academic education ($p<0.001$). In the adjusted regression model, younger age and higher education level remained significant predictors of increased FCR ($p<0.05$).

Conclusion: Fear of cancer recurrence is highly prevalent among patients with cancer and is significantly associated with demographic and clinical factors. Identifying patients at higher risk of elevated FCR can help guide targeted psychological screening and supportive interventions in oncology care.

Keywords: Fear- recurrence – Cancer– Psychological distress

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Title: Exploring Oncology Patients & Nurses' Perceptions regarding Challenges of Quality Nursing Care: A qualitative Study in Oman

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Introduction: Cancer care in Oman faces growing demand and complex needs that interfere with quality nursing care delivery. Understanding both patient and nurse perspectives is essential to improve care quality and staff wellbeing. To explore oncology patients' and nurses' perceptions of facilitators and barriers affecting the quality of nursing care in oncology wards in Oman.

Materials and Methods: A qualitative study using in depth, semi structured interviews was conducted at the Royal Hospital Oncology Department in Muscat. Purposive sampling recruited 31 participants (19 patients, 12 nurses) until data saturation. Transcripts were analyzed using the Graneheim and Lundman content analysis approach.

Results: Analysis produced two overarching themes and 21 subthemes. Facilitators included effective communication (patient education, active listening, family involvement, compassionate care), a positive work environment (adequate resources, teamwork, professional collaboration), and alignment with patient expectations (timely responses, integrated care, dignity). Barriers comprised communication challenges (time constraints, language gaps, poor information exchange), organizational constraints (staff shortages, limited training, resource scarcity), and emotional strain (insufficient psychological support, compassion fatigue, work–life imbalance, impact of patient loss). Patients' and nurses' accounts showed substantial concordance regarding key issues.

Conclusion: Quality nursing care in Omani oncology settings is supported by strong communication, teamwork, and resources but is undermined by staffing, training, and psychosocial stressors. Targeted interventions including continuing education, workforce strengthening, psychological support services, and improved communication strategies, are recommended to enhance patient outcomes and nurse wellbeing.

Keywords: Oncology nursing; quality of care

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Title: Convolutional Neural Network-Based Automated Detection of Response Patterns in Uveal Melanoma Following Ruthenium-106 Plaque Therapy

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Introduction: Brachytherapy with ruthenium-106 plaques represents the standard treatment approach for patients with uveal melanoma (UM). After therapy, changes in tumor thickness typically fall into four main categories: decrease (regression), increase (recurrence), stable (no change), or other patterns, which are evaluated during follow-up using A-mode and B-mode ultrasonography. These post-treatment patterns serve as key indicators of therapeutic response. The present study examines the application of deep learning (DL) models in predicting tumor response patterns following brachytherapy.

Material & Methods: This study included 192 UM patients with a minimum follow-up period of two years. B-mode images acquired at diagnosis were retrospectively analyzed and categorized by ophthalmologists into four response pattern classes according to post-treatment outcomes. Two DL architectures, DenseNet121 and ResNet34, were trained and tested using various performance metrics. An ablation study was also conducted to examine the influence of model parameters and configurations on performance.

Results: DenseNet121 consistently outperformed ResNet34 across most evaluation metrics, particularly in accurately classifying all four categories. The DenseNet121 model achieved a macro-average AUC of 0.933, whereas ResNet34 obtained 0.916. Per-class analysis further confirmed the superior predictive accuracy of DenseNet121. The ablation study indicated that optimal results were achieved when models were trained without pretrained weights, included dropout layers, and used a batch size of 32. Both architectures showed strong classification performance, with DenseNet121 demonstrating the highest overall accuracy.

Conclusion: The findings emphasize the promise of DL-based approaches for predicting post-brachytherapy regression patterns in UM patients. Further validation and integration of such models into clinical workflows could enhance personalized treatment assessment and decision-making.

Keywords: Uveal Melanoma; Brachytherapy; CNN

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