DOI:10.31557/APJCC.2026.11.3.399

RESEARCH ARTICLE

Prognostic Determinants in Children with Wilms' tumor Treated with Neoadjuvant Chemotherapy: A Single-center Prospective Cohort from Vietnam

Nhan Truong Vu[1], Hoang Viet Tran[2]*

[1]Faculty of Medicine, Nam Can Tho University, CanTho city, Viet Nam. [2]Department of General Surgery, Can Tho University of Medicine and Pharmacy, Can Tho City. PhD Candidate of Department of Pediatric Surgery, University of Medicine and Pharmacy at Ho Chi Minh City, Viet Nam.

Abstract

Introduction: Evidence on prognostic determinants in Vietnamese children with Wilms' tumor presenting with imaging-defined risk features remains limited despite internationally standardized use of neoadjuvant chemotherapy. To describe treatment outcomes and explore factors associated with event-free survival (EFS) in children with unilateral stage II–IV Wilms' tumor treated with SIOP-2001–based neoadjuvant chemotherapy followed by delayed nephrectomy at a single tertiary center in Vietnam. **Materials and Methods:** We conducted a prospective cohort study of 64 consecutive children managed at Children's Hospital 2 (Ho Chi Minh City) between April 2013 and June 2016, with follow-up through June 2019. Eligibility required ≥1 imaging-defined risk feature on baseline computed tomography. Patients received SIOP-2001–based neoadjuvant chemotherapy (vincristine and actinomycin D with risk-adapted addition of doxorubicin), followed by delayed nephrectomy and postoperative risk-adapted therapy. Tumor volume was calculated by the ellipsoid formula, and relative volumetric response was recorded. Chemotherapy response was assessed using RECIST 1.1. EFS was estimated by Kaplan–Meier analysis. Given the small number of events (n = 4), Cox regression was prespecified as exploratory, with parsimonious multivariable models and emphasis on effect sizes and confidence intervals. **Results:** Median tumor volume decreased from 487.9 cm^3 to 206.8 cm^3 ($p < 0.001$). Imaging-defined risk features declined substantially (e.g. perirenal fat invasion 85.9%→43.8%, renal/IVC thrombus 20.3%→6.3%, suspicious hilar nodes 20.3%→4.7%, tumor rupture 9.4%→3.2%). Overall response rate was 89.1% (complete or partial response); 10.9% had stable or progressive disease. At a mean follow-up of 46.9 months, 4 events (2 relapses, 2 deaths) occurred, corresponding to a 4-year EFS of 92.2%. In exploratory multivariable Cox models limited to two predictors, high histopathologic risk and poor chemotherapy response were associated with higher hazards of relapse or death, but with wide confidence intervals reflecting limited precision. **Conclusions:** In this exploratory analysis, postoperative histopathologic risk grouping and preoperative chemotherapy response appeared more informative for prognosis than baseline imaging extent. These findings are hypothesis-generating and should be validated in larger multicenter cohorts.

Keywords: Wilms' tumor- neoadjuvant chemotherapy- pediatric oncology- imaging- Vietnam

Asian Pac J Cancer Care, **11 (3)**, 399-405

Submission Date: 01/13/2026 Acceptance Date: 03/04/2026

Introduction

Wilms' tumor is an embryonal renal malignancy arising from aberrant proliferation of nephrogenic blastemal cells. It accounts for approximately 80–90% of malignant renal tumors in children and ranks as the fourth most common pediatric solid malignancy after primary brain tumors, lymphomas, and neuroblastoma. Two evidence-based therapeutic paradigms are widely implemented worldwide: the National Wilms' Tumor Study (NWTS-5) approach, which prioritizes upfront nephrectomy followed by adjuvant therapy, and the International Society of Paediatric Oncology (SIOP-2001) strategy, which favors neoadjuvant chemotherapy followed by delayed

Corresponding Author:
Dr. Hoang Viet Tran
Department of General Surgery, Can Tho University of Medicine and Pharmacy, Can Tho City. PhD candidate of Department of Pediatric Surgery, University of Medicine and Pharmacy at Ho Chi Minh City, Viet Nam.
Email: tvhoang@ctump.edu.vn.

nephrectomy. Both strategies achieve 5-year survival rates exceeding 90% in contemporary series [1-3]. In cases presenting with large primary tumors, invasion of adjacent organs or major vessels, or distant metastases, neoadjuvant chemotherapy can reduce tumor bulk and attenuate adverse local and occult distant disease features, thereby facilitating safer nephrectomy with lower rates of intraoperative rupture, tumor spillage, and subsequent recurrence [4]. Vietnam, a lower–middle-income setting in Southeast Asia, shares the epidemiologic pattern observed across many low- and middle-income countries, where most children with Wilms' tumor present late, often with bulky, locally invasive, or metastatic disease [5-8]. Historically, management at Vietnamese pediatric surgical centers has relied predominantly on upfront tumor resection or biopsy followed by adjuvant therapy, with suboptimal outcomes (approximately 78% three-year survival). In 2013, the Department of Pediatric Surgery at Children's Hospital 2 adopted neoadjuvant chemotherapy for Wilms' tumor. The present study evaluates the effectiveness of this approach and identifies prognostic factors associated with treatment outcomes in children managed at this center.

Materials and Methods

We conducted a prospective cohort study of 64 children with Wilms' tumor who received neoadjuvant chemotherapy followed by delayed nephrectomy at the Department of Pediatric Surgery, Children's Hospital 2 (Ho Chi Minh City) from April 2013 to June 2016, with follow-up through June 2019. All patients received preoperative chemotherapy according to the SIOP-2001 protocol. In brief, children with non-metastatic, standard-risk disease were treated with a two-drug regimen consisting of vincristine and actinomycin D for 4–6 weeks, with doses adjusted for age and body surface area. Patients who presented with metastatic disease or other high-risk features received a three-drug regimen including vincristine, actinomycin D, and doxorubicin for 6 weeks. The number of preoperative cycles was determined by radiologic response and multidisciplinary team consensus, to achieve maximal safe tumor downsizing before nephrectomy while avoiding unnecessary delay to surgery. Chest–abdominal computed tomography (CT) was performed at diagnosis and repeated after completion of neoadjuvant therapy. Based on paired CT studies, we assessed pre- to post-treatment changes in tumor characteristics, tumor volume, and the radiologic extent/stage of disease. Tumor volume was calculated using the ellipsoid formula: VVV (cm^3) = a×b×c×0.523a \times b \times c \times 0.523a×b×c×0.523, where aaa, bbb, and ccc denote the largest right–left, anteroposterior, and craniocaudal dimensions, respectively. Surgery and perioperative outcomes: delayed nephrectomy was scheduled after completion of neoadjuvant chemotherapy once imaging suggested maximal response or plateau. All procedures were performed via an open transabdominal approach. Radical nephrectomy with regional lymph node sampling was intended in all cases. Intraoperative variables recorded included operative time, estimated blood loss, tumor rupture or spillage, vascular control of the renal vein and inferior vena cava, additional organ resection, and requirement for blood transfusion. Postoperative risk-adapted therapy: Postoperative treatment was tailored according to SIOP-2001 risk-adapted recommendations, integrating pathologic stage, histopathologic risk group, and response to neoadjuvant chemotherapy. Children with low-risk or intermediate-risk histology and favorable pathologic features predominantly received two-drug regimens (vincristine and actinomycin D) for a total treatment. Patients with high-risk histology, positive lymph nodes, residual disease, or intraoperative tumor spillage received intensified three-drug regimens including doxorubicin and, where indicated, radiotherapy. Radiotherapy was delivered to the flank or whole abdomen depending on the extent of disease, with doses prescribed according to SIOP-2001 guidelines. Chemotherapy response was evaluated according to RECIST 1.1.Data were analyzed in SPSS version 20.0. Proportions were compared using the chi-square test; two-group means with the t test or Wilcoxon test, and multiple means with ANOVA or the Kruskal–Wallis test as appropriate. Event-free survival (EFS) was estimated by the Kaplan–Meier method, with between-group comparisons by the log-rank test and Cox proportional hazards modeling. We restricted multivariable models to a parsimonious set of predictors and interpreted effect sizes and 95% confidence intervals rather than p values as the primary measure of association. Statistical significance was set at $p < 0.05$. The study was approved by the Institutional Review Board of Children's Hospital 2 on 16 April 2013; written parental consent was obtained.

Results

The median age at diagnosis was 23.8 months (range, 1.5–115 months). Children aged 6 months to 5 years comprised 85.7% of the cohort, whereas those <6 months and >5 years accounted for 7.8% and 4.7%, respectively. Males represented 54.7% (35/64). Laterality was right in 53.1% (34/64) and left in 46.9% (30/64). At presentation, 78.1% had radiologic stage II disease, and the mean baseline tumor volume was 487.9 ± 365.3 cm^3 (range, 124.9–2757 cm^3).

Following neoadjuvant chemotherapy, adverse imaging features declined substantially: perirenal fat invasion decreased from 85.9% to 43.8%; suspicious hilar

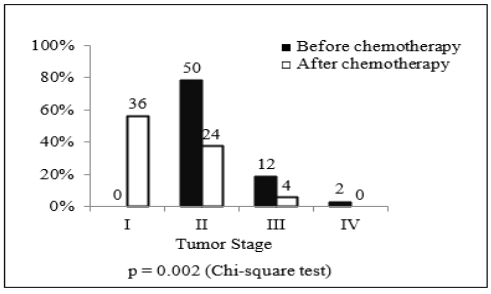


Figure 1. Shift in Radiologic Extent based on Imaging Risk Features before and after Neoadjuvant

Table 1. Univariable (log-rank) Analysis of Factors Associated with Event-free Survival

Factor	The event-free survival rate (%)	X^2; p*
Vascular invasion		
None	96.1	5.85; 0.054
Renal vein invasion	80	
IVC invasion	66.7	
Tumor rupture status		
No rupture	95.8	6.52; 0.038
Intratumoral hemorrhage	90	
Overt rupture	66.7	
Radiologic extent at presentation		
Stage I–II	96	4.36; 0.037
Stage III–IV	78.6	
Histopathologic risk group		
Low–intermediate	94.5	3.59; 0.058
High	77.8	
Chemotherapy response (RECIST 1.1)		
Complete response	97.6	16.87; <0.001
Partial response	93.8	
Stable or progressive disease	57.1	

*Notes: p values between 0.05 and 0.10 (e.g., 0.054 and 0.058) indicate a trend and were not considered statistically significant. "Radiologic extent" reflects imaging-defined extent at baseline and is not equivalent to postoperative SIOP pathologic stage.

lymph nodes from 20.3% to 4.7%; vascular invasion from 20.3% to 6.3% (IVC thrombus from 4.7% to 1.6%); and tumor rupture amenable to conservative management from 9.4% to 3.2%. Mean tumor volume fell from 487.9 ± 365.3 cm^3 to 206.8 ± 135.0 cm^3 ($p < 0.001$). The distribution of radiologic stage also shifted after therapy stage I increased from 0% to 56.3%, stage II decreased from 78.1% to 37.5%, stage III from 18.8% to 6.3%, and stage IV from 3.1% to 0% ($p = 0.002$) (Figure 1).

Preoperative chemotherapy response: the overall response rate (ORR; complete or partial response) was 89.1%, whereas stable disease (SD) or progressive disease (PD) occurred in 10.9% (Figure 2). Histopathologic risk groups (post-neoadjuvant specimens): low 10.9%, intermediate 75.0%, and high 14.1%. Treatment outcomes: relapse occurred in 6.7% and death in 6.7%. The event-free survival rate at a mean follow-up of 46.9 months was 92.2% (Figure 3).

Prognostic factors: In univariable analyses using the log-rank test, event-free survival was lower in children with vascular invasion ($p = 0.054$), tumor rupture ($p = 0.038$), more advanced radiologic extent at presentation ($p = 0.037$), high histopathologic risk group ($p = 0.058$), and poor chemotherapy response ($p < 0.0001$) (Table 1). We examined five candidate factors without formal adjustment for multiple comparisons, and all p-values are therefore reported as descriptive measures of association rather than strict thresholds of statistical significance.

In an exploratory multivariable Cox proportional hazards model restricted to two clinically selected predictors, histopathologic risk group and chemotherapy response showed the strongest associations with outcome. High histopathologic risk was associated with a higher hazard of relapse or death compared with low/intermediate risk (HR 17.3; $p = 0.046$), and stable or progressive disease after neoadjuvant chemotherapy was associated with a higher hazard relative to complete or partial response (HR 12.7; $p = 0.01$) (Table 2). However, both estimates were accompanied by very wide 95% confidence intervals, reflecting the small number of events ($n = 4$) and limited statistical power; these findings should therefore be interpreted as hypothesis-generating rather than confirmatory.

Discussion

Most children in our cohort presented late, with radiologic extent consistent with advanced local disease at diagnosis: 78.1% had features corresponding to stage II–type extent and 18.8% to stage III–type extent on imaging, whereas no cases met stage I–type criteria at presentation; the mean tumor volume was large (487.9 cm^3; maximum 2757 cm^3). It is important to emphasize that the "radiologic stage" used in this study refers to imaging-defined extent of disease at

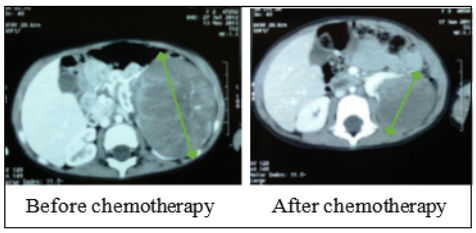
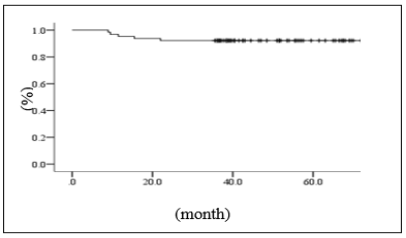


Figure 2. Distribution of RECIST 1.1 Response Categories after Neoadjuvant Chemotherapy in Wilms Tumor

Table 2. Multivariable Cox Regression Identifying Independent Predictors of Event-free Survival

Factor	Hazard ratio (HR)*	95% CI	p
Vascular invasion	5.9	0.2 - 219.7	0.3
Tumor rupture status	2.5	0.04 - 165.3	0.7
Radiologic extent at presentation	0.5	0.01 - 3779.3	0.9
Histopathologic risk group (high vs low/intermediate)	17.3	1.1 - 285.1	0.046
Chemotherapy response (stable/progressive vs complete/partial)	12.7	1.8 - 88.6	0.01

*Notes: HR > 1 indicates higher hazard of relapse or death. Wide confidence intervals reflect limited sample size and event counts.



Figue 3. Kaplan–Meier Curve of Event-free Survival

diagnosis, whereas definitive SIOP staging is assigned postoperatively based on surgical and histopathologic findings. Our comparison of pre- and post-treatment radiologic stages, therefore, reflects changes in imaging-defined risk features rather than reclassification of formal SIOP pathologic stage. These findings mirror reports from lower- and middle-income settings, where delayed presentation is common and early detection programs for pediatric cancers particularly renal tumors are limited [5-10]. Neoadjuvant chemotherapy was effective in children presenting with advanced Wilms' tumor. In our cohort, post-treatment imaging demonstrated consistent tumor downsizing with reductions in adverse local features, vascular involvement, and metastatic findings. Notably, suspicious hilar lymphadenopathy decreased from 20.3% at baseline to 4.7% after therapy. This pattern aligns with prior series for example, Ng YY et al. reported a decline in nodal metastases from 44% to 11% following neoadjuvant treatment supporting the observation that hilar nodes in Wilms' tumor are highly chemosensitive and frequently regress with preoperative chemotherapy [11]. Distant metastatic lesions in the lung, liver, and peritoneum resolved completely after neoadjuvant chemotherapy in all three affected cases in our cohort. Consistent with these observations, Dix and colleagues reported that most distant metastases in Wilms' tumor respond robustly to preoperative chemotherapy, rendering surgical resection of metastatic deposits generally unnecessary [12]. In our series, inferior vena cava involvement decreased from 4.7% to 1.6% after neoadjuvant chemotherapy. This is concordant with Lall et al., who reported that approximately 80% of intravascular and atrial tumor thrombi regressed or resolved following initial chemotherapy [13]. In our cohort, Wilms' tumor rupture was stabilized with conservative management and remained highly chemosensitive to neoadjuvant chemotherapy: the proportion with clinically evident rupture decreased from 9.4% to 3.2% after initial treatment. Consistent with this, Brisse et al. reported that 54.2% of patients initially considered stage III due to tumor rupture were subsequently classified as stage I–II after preoperative chemotherapy and delayed surgery, reflecting substantial mitigation of rupture-related risk before nephrectomy [14]. Tumor volume decreased markedly after neoadjuvant chemotherapy: the mean volume fell from 487.9 cm^3 at diagnosis to 206.8 cm^3 post-treatment ($p < 0.001$). This magnitude of shrinkage is consistent with prior reports for example, Irtan et al. [15] documented a reduction from 374.5 cm^3 to 137.1 cm^3 following preoperative chemotherapy [16]. Neoadjuvant chemotherapy favorably modifies disease extent, with marked reductions in imaging-defined risk features that facilitate complete resection and lower the risk of intraoperative spillage. In the pathologic staging literature, cohorts treated with preoperative chemotherapy show a higher proportion of stage I and fewer stage III tumors at postoperative assessment compared with immediate surgery, which can translate into fewer indications for intensified adjuvant therapy (e.g., doxorubicin and radiotherapy). In our setting, these shifts are consistent with a potential reduction in the number of children requiring escalation of postoperative treatment, acknowledging that definitive SIOP staging is assigned only after surgery [16-18]. Most children in this cohort presented late, with substantial tumor burden at diagnosis (mean volume 487.9 cm^3; maximum 2757 cm^3) and imaging-defined features consistent with advanced local extent; none met imaging criteria consistent with limited (I-type) extent at baseline. After neoadjuvant chemotherapy and delayed surgery, postoperative assessment showed a favorable redistribution of SIOP pathologic stages, with stage I comprising 56.3% and stage III decreasing from 18.8% (at baseline by imaging extent) to 6.2% postoperatively patterns that mirror international series in which preoperative chemotherapy increases the proportion of pathologic stage I and reduces stage III disease [15, 17]. The overall response rate was 89.1% (complete 25.0%, partial 64.1%), whereas 10.9% had stable or progressive disease (7.8% SD; 3.1% PD), consistent with Graf et al., who reported tumor enlargement in ~11% after preoperative chemotherapy [16]. Histopathologic risk distribution in neoadjuvant-treated specimens also paralleled prior literature: high-risk (blastemal-predominant/anaplasia) histology accounted for 5–14% in neoadjuvant cohorts far lower than the 38–40% reported in immediate-surgery series supporting a chemotherapy-related shift away from the poorest-prognosis subtype [4, 16]. The distribution of histopathologic risk groups in our cohort, with a predominance of intermediate-risk tumors and a relatively

low proportion of high-risk histology, is consistent with published SIOP series using preoperative chemotherapy, in which high-risk subtypes (predominantly blastemal or anaplastic) typically account for around 5–14% of cases, compared with about one-third of tumors in the immediate-surgery arm of the UKW3 randomized trial [3, 17]. Our findings suggest that a similar pattern can be achieved in a resource-limited Vietnamese setting, in line with SIOP PODC and Wilms' Africa data demonstrating the feasibility of SIOP-based neoadjuvant protocols in low-income environments where children frequently present with advanced disease [19].

Four-year event-free survival (EFS) was 92.2%, comparable to neoadjuvant reports from high-income settings (e.g., Pritchard-Jones: 2-year survival 92.6%; Graf: 5-year survival 90%) [16, 20]. In univariable analyses, EFS related to vascular invasion, tumor rupture status, radiologic extent at presentation, histopathologic risk group, and chemotherapy response. However, in multivariable Cox regression, only two factors remained independently prognostic: high histopathologic risk (hazard ratio [HR] 17.3; $p = 0.046$) and poor chemotherapy response (stable/progressive disease vs complete/partial response; HR 12.7; $p = 0.01$), because of the low event count and wide confidence intervals, the present analysis does not provide definitive effect size estimates but rather generates hypotheses that warrant validation in larger multicenter cohorts. Poor responders were over-represented among children with adverse histopathologic features and accounted for a disproportionate number of events, although the absolute numbers were small. These observations support the hypothesis that limited volumetric and radiologic response may be an early clinical marker of aggressive tumor biology. When poor response is identified, it may warrant closer multidisciplinary review and consideration of intensified postoperative therapy or, in future protocols, early response-adapted treatment modifications. Vascular invasion at diagnosis did not retain significance (4-year EFS 96.1% with no invasion vs 80.0% renal-vein vs 66.7% IVC; $p > 0.05$), aligning with Lall et al., who found no significant 5-year EFS difference between children without and with venous invasion managed with preoperative chemotherapy (82.6% vs 74.3%; $p > 0.05$); notably, perioperative mortality from hemorrhage with IVC thrombus was much lower after neoadjuvant therapy than with immediate surgery (5.1% vs 43% in NWTS-3) [13]. Tumor rupture at presentation influenced EFS on univariable testing (95.8% no rupture; 90.0% intratumoral hemorrhage; 66.7% overt rupture; $p < 0.05$) but not in multivariable models; similarly, Brisse et al. reported excellent 5-year overall survival (94.4%) among conservatively stabilized ruptures treated with preoperative chemotherapy [14]. Radiologic extent groups (I–II vs III–IV) also separated on univariable analysis (4-year EFS 96.0% vs 78.6%; $p < 0.05$) but were not independently predictive; prior neoadjuvant cohorts likewise show small survival differences between postoperative stages II and III (e.g., Graf 96.7% vs 91.5%; Tournade 88% vs 85%) [16, 21].

By contrast, histopathologic risk grouping and preoperative chemotherapy response consistently stratified outcomes. In our data, low/intermediate-risk tumors had a 4-year EFS of 94.5% versus 77.8% for high-risk ($p < 0.05$), concordant with Graf (97.7%/96.8% vs 77.2%) and Rancelyte (100%/91.9% vs 25%) [16, 22]. Likewise, complete or partial responders achieved superior 4-year EFS (97.6% and 93.8%) compared with stable/progressive disease (57.1%; $p < 0.05$). External validation comes from volumetric response analyses: Reinhard noted worse survival when post-NACT tumor volume remained >500 cm^3 (70% vs 93%), [23] and Weirich reported higher 5-year overall survival when volume shrank >40% versus <40% (95% vs 80.4%) [18]. Together, these findings emphasize that inadequate tumor regression after neoadjuvant chemotherapy and high-risk histopathology at definitive surgery are the principal drivers of relapse and death. In contrast, baseline anatomic extent and rupture lose prognostic weight once response and histology are accounted for.

In conclusion, in our single-center cohort from a lower–middle-income country, most children with Wilms' tumor presented with large, locally advanced disease, yet SIOP-2001–based neoadjuvant chemotherapy was feasible and achieved marked tumor downsizing and excellent short-to mid-term event-free survival. Postoperative histopathologic risk grouping and preoperative chemotherapy response appeared more informative for prognosis than baseline imaging extent and should be integrated into postoperative, risk-adapted therapy. Given the very small number of events, these prognostic findings are exploratory and require confirmation in larger, multicenter studies.

Declaration of competing interest

The authors have no conflicts of interest to declare.

Originality Declaration for Figures

All figures included in this manuscript are original and have been created by the authors specifically for the purposes of this study. No previously published or copyrighted images have been used. The authors confirm that all graphical elements, illustrations, and visual materials were generated from the data obtained in the course of this research or designed uniquely for this manuscript.

Ethical statement

The institutional Human Research Bioethics Committee of Children's Hospital 2 approved the study (The authors will provide it upon the Editorial Board's request). The parents had already discussed the risks and management with counsel before the operation started.

Consent to participate

All participants provided written informed consent prior to inclusion in the study. The study protocol was reviewed and approved by the appropriate institutional ethics committee, and all procedures were conducted in accordance with the ethical standards of the Declaration

of Helsinki and relevant national regulations.

Acknowledgments

The authors thank all participants, the Surgery Department of Children's Hospital 2, DNC Health Science Institute, University of Medicine and Pharmacy at Ho Chi Minh City, and Can Tho University of Medicine and Pharmacy.

References

1. Chiou S. Malignant renal tumors in childhood. Pediatrics and Neonatology. 2014 06;55(3):159-160. https://doi.org/10.1016/j.pedneo.2014.01.003
2. Dome JS, Cotton CA, Perlman EJ, Breslow NE, Kalapurakal JA, Ritchey ML, Grundy PE, et al. Treatment of anaplastic histology Wilms' tumor: results from the fifth National Wilms' Tumor Study. Journal of Clinical Oncology: Official Journal of the American Society of Clinical Oncology. 2006 05 20;24(15):2352-2358. https://doi.org/10.1200/JCO.2005.04.7852
3. Mitchell C, Pritchard-Jones K, Shannon R, Hutton C, Stevens S, Machin D, Imeson J, et al. Immediate nephrectomy versus preoperative chemotherapy in the management of non-metastatic Wilms' tumour: results of a randomised trial (UKW3) by the UK Children's Cancer Study Group. European Journal of Cancer (Oxford, England: 1990). 2006 Oct;42(15):2554-2562. https://doi.org/10.1016/j.ejca.2006.05.026
4. Powis M, Messahel B, Hobson R, Gornall P, Walker J, Pritchard-Jones K. Surgical complications after immediate nephrectomy versus preoperative chemotherapy in non-metastatic Wilms' tumour: findings from the 1991-2001 United Kingdom Children's Cancer Study Group UKW3 Trial. Journal of Pediatric Surgery. 2013 Nov;48(11):2181-2186. https://doi.org/10.1016/j.jpedsurg.2013.07.001
5. Vu MT, Shalkow J, Naik-Mathuria B, et al. Wilms' tumor in low- and middle-income countries: survey of current practices, challenges, and priorities. Annals of Pediatric Surgery.2022;18:28. https://doi.org/10.1186/s43159-022-00163-6
6. Njuguna F, Martijn HA, Kuremu RT, Saula P, Kirtika P, Olbara G, Langat S, et al. Wilms Tumor Treatment Outcomes: Perspectives From a Low-Income Setting. Journal of Global Oncology. 2017 Oct;3(5):555-562. https://doi.org/10.1200/JGO.2016.005389
7. Al-Jumaily U, Habeeb Rjeib HD, Alqanbar MF, Faraj S, Al-Khateeb DA. Improved outcomes of children with Wilms' tumor in a low-middle-income nation: The contribution of a pediatric oncologist to successful management. Asian Journal of Urology. 2025 01;12(1):93-99. https://doi.org/10.1016/j.ajur.2024.04.008
8. Yao AJ, Moreira C, Traoré F, Kaboret S, Pondy A, Rakotomahefa Narison ML, Guedenon KM, Mallon B, Patte C. Treatment of Wilms Tumor in Sub-Saharan Africa: Results of the Second French African Pediatric Oncology Group Study. Journal of Global Oncology. 2019 09;5:1-8. https://doi.org/10.1200/JGO.18.00204
9. Mistry R, Manikandan R, Williams P, Philip J, Littler P, Foster CS, Parsons KF. Implications of computer tomography measurement in the management of renal tumours. BMC urology. 2008 Nov 04;8:13. https://doi.org/10.1186/1471-2490-8-13
10. Kang H, Lee HY, Lee KS, Kim J. Imaging-based tumor treatment response evaluation: review of conventional, new, and emerging concepts. Korean Journal of Radiology. 2012;13(4):371-390. https://doi.org/10.3348/kjr.2012.13.4.371
11. Ng YY, Hall-Craggs MA, Dicks-Mireaux C, Pritchard J. Wilms' tumour: pre- and post-chemotherapy CT appearances. Clinical Radiology. 1991 04;43(4):255-259. https://doi.org/10.1016/s0009-9260(05)80250-8
12. Dix DB, Seibel NL, Chi Y, Khanna G, Gratias E, Anderson JR, Mullen EA, et al. Treatment of Stage IV Favorable Histology Wilms Tumor With Lung Metastases: A Report From the Children's Oncology Group AREN0533 Study. Journal of Clinical Oncology: Official Journal of the American Society of Clinical Oncology. 2018 06 01;36(16):1564-1570. https://doi.org/10.1200/JCO.2017.77.1931
13. Lall A, Pritchard-Jones K, Walker J, Hutton C, Stevens S, Azmy A, Carachi R. Wilms' tumor with intracaval thrombus in the UK Children's Cancer Study Group UKW3 trial. Journal of Pediatric Surgery. 2006 02;41(2):382-387. https://doi.org/10.1016/j.jpedsurg.2005.11.016
14. Brisse HJ, Schleiermacher G, Sarnacki S, Helfre S, Philippe-Chomette P, Boccon-Gibod L, Peuchmaur M, et al. Preoperative Wilms tumor rupture: a retrospective study of 57 patients. Cancer. 2008 07 01;113(1):202-213. https://doi.org/10.1002/cncr.23535
15. Irtan S, Van Tinteren H, Graf N, Heuvel-Eibrink MM, Heij H, Bergeron C, Camargo B, et al. Evaluation of needle biopsy as a potential risk factor for local recurrence of Wilms tumour in the SIOP WT 2001 trial. European Journal of Cancer (Oxford, England: 1990). 2019 07;116:13-20. https://doi.org/10.1016/j.ejca.2019.04.027
16. Graf N, Tinteren H, Bergeron C, Pein F, Heuvel-Eibrink MM, Sandstedt B, Schenk J, et al. Characteristics and outcome of stage II and III non-anaplastic Wilms' tumour treated according to the SIOP trial and study 93-01. European Journal of Cancer (Oxford, England: 1990). 2012 Nov;48(17):3240-3248. https://doi.org/10.1016/j.ejca.2012.06.007
17. Vujanić GM, D'Hooghe E, Popov SD, Sebire NJ, Kelsey A. The effect of preoperative chemotherapy on histological subtyping and staging of Wilms tumors: The United Kingdom Children's Cancer Study Group (UKCCSG) Wilms tumor trial 3 (UKW3) experience. Pediatric Blood & Cancer. 2019 03;66(3):e27549. https://doi.org/10.1002/pbc.27549
18. Weirich A, Ludwig R, Graf N, Abel U, Leuschner I, Vujanic GM, Mehls O, et al. Survival in nephroblastoma treated according to the trial and study SIOP-9/GPOH with respect to relapse and morbidity. Annals of Oncology: Official Journal of the European Society for Medical Oncology. 2004 05;15(5):808-820. https://doi.org/10.1093/annonc/mdh171
19. Israels T, Moreira C, Scanlan T, Molyneux L, Kampondeni S, Hesseling P, Heij H, et al. SIOP PODC: clinical guidelines for the management of children with Wilms tumour in a low income setting. Pediatric Blood & Cancer. 2013 01;60(1):5-11. https://doi.org/10.1002/pbc.24321
20. Pritchard-Jones K, Bergeron C, Camargo B, Heuvel-Eibrink MM, Acha T, Godzinski J, Oldenburger F, et al. Omission of doxorubicin from the treatment of stage II-III, intermediate-risk Wilms' tumour (SIOP WT 2001): an open-label, non-inferiority, randomised controlled trial. Lancet (London, England). 2015 09 19;386(9999):1156-1164. https://doi.org/10.1016/S0140-6736(14)62395-3
21. Tournade MF, Com-Nougué C, Kraker J, Ludwig R, Rey A, Burgers JM, Sandstedt B, et al. Optimal duration of preoperative therapy in unilateral and nonmetastatic Wilms' tumor in children older than 6 months: results of the Ninth International Society of Pediatric Oncology Wilms' Tumor

Trial and Study. Journal of Clinical Oncology: Official Journal of the American Society of Clinical Oncology. 2001 01 15;19(2):488-500. https://doi.org/10.1200/JCO.2001.19.2.488

22. Rančelytė M, Nemanienė R, Ragelienė L, Rascon J. Wilms tumour in children: 18 years of experience at Vilnius University Hospital Santaros Klinikos, Lithuania. Acta Medica Lituanic. 2019;26(2):125-133. https://doi.org/10.6001/actamedica.v26i2.4033
23. Reinhard H, Semler O, Bürger D, Bode U, Flentje M, Göbel U, Gutjahr P, et al. Results of the SIOP 93-01/GPOH Trial and Study for the Treatment of Patients with Unilateral Nonmetastatic Wilms Tumor. Klinische Pädiatrie. 2004 05;216(3):132-140. https://doi.org/10.1055/s-2004-822625