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Optimizing treatment strategies for pediatric Wilms Tumor with vascular thrombosis: A single-center experience

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Introduction

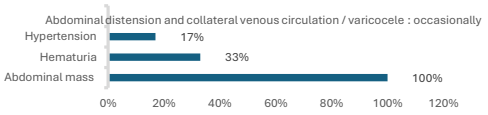
- Wilms tumor = most common malignant renal tumor in children (6% of pediatric cancers).
- Survival >90% with current multimodal therapy.
- Vascular thrombosis occurs in **25–35%** of cases, complicating diagnosis and management.
- We share our **8-year single-center experience** and highlight **therapeutic adaptations based on thrombus extent.**

Methods

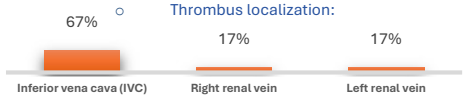
- **Study design:** Retrospective, single-center, descriptive.
- **Pediatric Surgery Department., Children's Hospital, Tunis.**
- **Period:** Jan 2015 – Dec 2022.
- **Population:** 12/50 Wilms tumor patients (24%) with venous thrombosis
- **Age** 0–14 years.
- **Data collected:** Demographics, imaging, pathology, treatment, outcomes.

Results

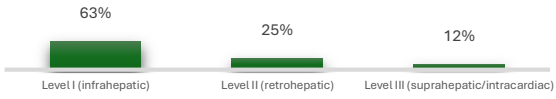
- **Total cases:** 12 children (24% of Wilms tumor cases **from 2015–2022**, n = 50).
- **Median age:** 5 years 2 months (range: 2.9 – 9.7 years).
- **Sex ratio:** 1:1 (6 boys / 6 girls).
- **Clinical Presentation:**



- **Abdominal Ultrasound** detected vascular thrombus in **50%,** with **extent definition in 33%.**
- **CT Scan :**
  - Thrombus localization:



  - Thrombus level (Hinman classification):



  - Metastatic sites:

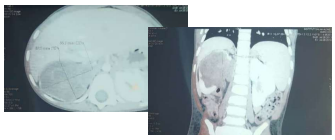


Fig 1.CT scan showing a right renal Wilms tumor with inferior vena cava (IVC) thrombosis.

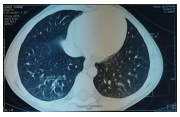
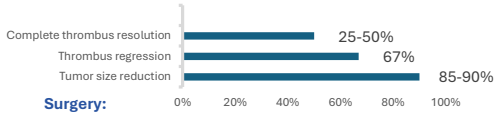
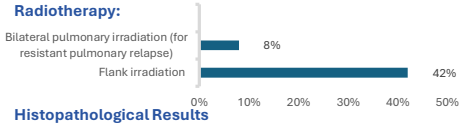


Fig 2. Chest CT scan showing pulmonary metastases in the form of bilateral micronodules.

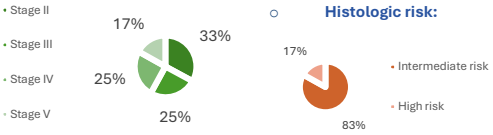
- **Neoadjuvant Chemotherapy**
  - Protocol: **GFAOP** (Franco-African Pediatric Oncology Group).
  - Indicated in **100% of cases** before surgery.
  - **Response to chemotherapy:**



- **Surgery:**
  - Radical nephroureterectomy.
  - **Thrombectomy:** Performed in **75%** (9/12)
  - No venous wall resection required.
  - Venous wall biopsy performed in all cases
- **Adjuvant Therapy**
  - **Chemotherapy** (postoperative): 100% of cases.
  - **Radiotherapy:**



- **Histopathological Results**



  - Venous wall invasion: Absent in all cases.
  - **Mean follow-up:** 6 years 3 months.
  - **Recurrence:** 1 case (local + pulmonary).
  - **Management of recurrence:** Intensified CT, surgical resection, adjuvant RT.
- **Survival rate**: 100% (2-year overall survival).

Discussion

- **Incidence** of vascular thrombosis (24%) consistent with literature **(20–35%).**
- **Age distribution** similar; patients with vascular involvement tend to be **older**.
- **Ultrasound:** Diagnostic in **60–100%** (literature), only 50% sensitivity in this study➔ **Reinforces need for experienced pediatric radiologists.**
- **CT scan:** Gold standard for detecting and staging thrombus. Perfect correlation with surgical findings in this cohort.
- **Chemotherapy:** Confirmed as effective in reducing tumor and thrombus bulk. Facilitates safer resection by decreasing vascular adherence.In infrahepatic or intracardiac thrombi, minimizes need for cardiopulmonary bypass.
- **Literature comparison:**

Parameter	Our study	Literature range
Tumor regression	85%	80–90%
Thrombus regression	50–67%	45–80%
Complete resolution	25–50%	11–47%

- **Surgery:**
  - **Complete thrombectomy in 75%,** comparable to published data (73–85%).
  - **Segmental venous resection not required** in any case.
- **Principle:** When thrombus adheres → perform intimal stripping rather than venous resection. In cases of wall invasion, postoperative RT ensures local control.
- **Anticoagulation:**
  - **Preoperative anticoagulation:** reserved for symptomatic or high-risk embolic cases.
  - **Postoperative prophylaxis:** rare; routine anticoagulation not recommended.
- **Follow-up imaging:** essential for early detection of thrombus recurrence.
- **Presence of thrombus not correlated with histologic type or stage severity.**
- **Favorable outcomes** when managed by standardized protocols.
- **Vascular thrombosis does not worsen long-term survival if managed within protocol.**

Conclusion

- **Vascular thrombosis** in Wilms tumor requires individualized, multidisciplinary care.
- Tailoring therapy to thrombus extent ensures safe surgery and excellent outcomes.
- **In resource-limited settings, adaptation of international protocols remains crucial.**

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