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Life-Threatening Haemorrhage after Chemotherapy for Wilms Tumor: Successful Transarterial Embolization

Saurabh Kumar, MD, DNB, FGIR[1*], Apoorva Batra, MD[2], Harshit Shrivastava, DNB[3] and Vikas Dua, MD[4]

[1]Department of Interventional Radiology Fortis Memorial Research Institute, Gurugram, Haryana

[2]Department of Interventional Radiology Fortis Memorial Research Institute, Gurugram, Haryana

[3]Department of Interventional Radiology Fortis Memorial Research Institute, Gurugram, Haryana

[4]Department of Hematology and Bone marrow Transplant Fortis Memorial Research Institute, Gurugram, Haryana

***Corresponding author:**

Saurabh Kumar, MD, DNB, FGIR,
Department of Interventional Radiology
Fortis Memorial Research Institute, Gurugram, Haryana

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1. Abstract

Chemotherapy-induced tumour necrosis is an important indicator of treatment response in paediatric malignancies; however, rapid tumour degeneration may rarely result in vascular disruption and life-threatening haemorrhage. Emergency management of tutor-related bleeding in children remains challenging, with limited literature regarding the role of endovascular intervention. We present a rare case of successful emergency trans arterial embolization for haemorrhage secondary to chemotherapy-induced cystic necrosis in a paediatric Wilms renal tumour.

2. Introduction

Tumour-associated haemorrhage is an uncommon but potentially fatal complication of malignant disease. While transcatheter arterial embolization is well established for trauma-related bleeding and selected adult malignancies, its role in paediatric oncological emergencies remains poorly defined. Tumour necrosis following chemotherapy is generally considered a favourable response; however, extensive and rapid necrotic transformation can alter tumour vascular architecture, leading to vessel erosion, exposure of fragile intratumoral vessels, and spontaneous haemorrhage.

Wilms tumour is the most common paediatric renal malignancy and is managed using multimodality treatment protocols incorporating chemotherapy and surgery. Neoadjuvant chemotherapy is routinely used to reduce tumour volume, decrease surgical complications, and improve resectability. Although tumour shrinkage and necrosis are expected treatment effects, massive haemorrhagic degeneration is a rare and potentially life-threatening complication.

We describe a rare case of acute haemorrhage secondary to chemotherapy-induced haemorrhagic cystic necrosis in a child with Wilms tumour successfully managed with emergency transarterial embolization, allowing subsequent definitive surgical management.

Case Report

A 5-year-old boy presented with progressive abdominal distension and intermittent abdominal pain. Contrast-enhanced computed tomography (CT) revealed a large heterogeneous left renal tumour measuring approximately 18 × 14 × 11 cm, replacing a significant portion of the renal parenchyma Figure 1A,1B. The lesion demonstrated heterogeneous enhancement with mass effect on adjacent structures. There was associated locoregional lymphadenopathy without evidence of distant metastatic disease. Histopathological confirmation following biopsy revealed Wilms tumour.

The patient was initiated on neoadjuvant chemotherapy with vincristine, and Dactinomycin (Institutional protocol). Following the first cycle of chemotherapy, the patient developed sudden worsening abdominal pain, rapidly increasing abdominal distension, haematuria, and signs of haemodynamic instability. Laboratory investigations revealed a significant haemoglobin reduction of more than 4 g/dL, requiring urgent fluid resuscitation and blood transfusion.

Emergency CT angiography demonstrated extensive intratumoral cystic necrosis with areas of high-density haemorrhage within the tumour and active contrast extravasation from branches of the left renal artery into the necrotic cystic spaces, consistent with active tumour-related haemorrhage Figure 2A,2B,2C.

Considering the unstable clinical condition and high risk associated with emergency surgery, the patient was referred for emergency endovascular management. Diagnostic renal angiography confirmed active bleeding from tumour-feeding segmental branches of the left renal artery Figure 3A, 3B.

Selective catheterization of the bleeding vessels was performed, followed by embolization using polyvinyl alcohol particles (300–500 microns) to reduce tumour vascularity. This was followed by proximal coil embolization of the involved segmental renal arterial branches to achieve definitive haemostasis. Completion angiography demonstrated cessation of active extravasation Figure 3C.

The patient showed rapid clinical improvement with stabilization of haemodynamic parameters and correction of anaemia. Following clinical stabilization, neoadjuvant chemotherapy was continued, and nephrectomy is planned after two months.

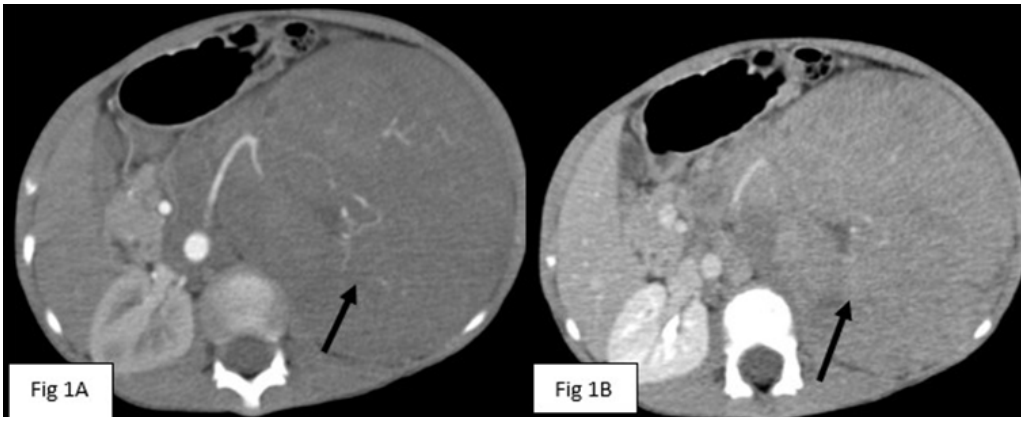


Figure 1: (A) Axial contrast-enhanced CT (CECT) image in the arterial phase and (B) axial CECT image in the venous phase demonstrating a heterogeneously enhancing left renal fossa mass (arrow) replacing the majority of the renal parenchyma.

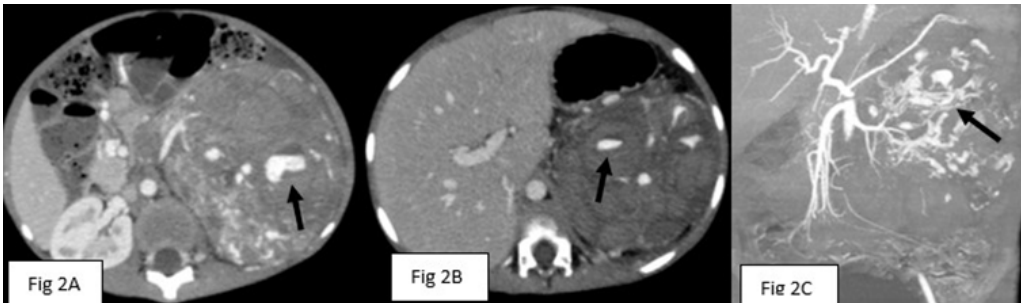


Figure 2: (A) Post-chemotherapy axial CECT image in the arterial phase and (B) axial CECT image in the venous phase demonstrating extensive cystic necrosis within the tumor with active contrast pooling into the cystic spaces (arrow).
(C) Coronal arterial-phase CECT maximum intensity projection (MIP) image showing irregular and tortuous renal segmental arteries with active contrast extravasation into the cystic components of the tumor (arrow).

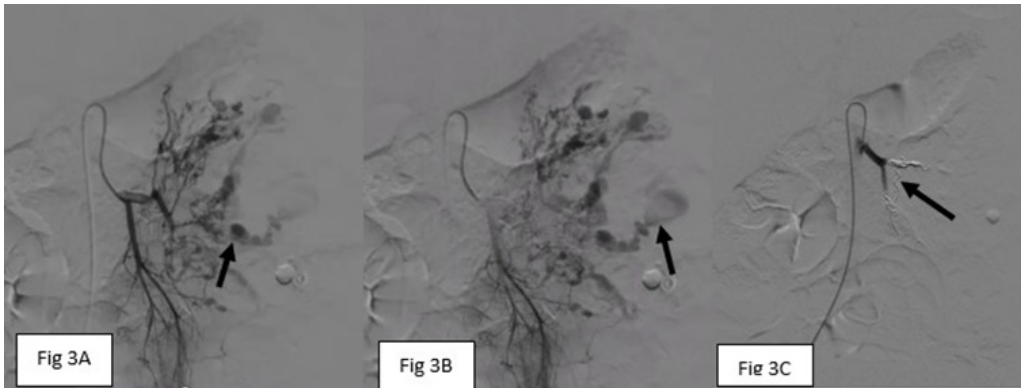


Figure 3: (A, B) Digital subtraction angiography (DSA) images demonstrating tumor hypervascularity with irregular, beaded renal segmental arteries and active contrast extravasation into the cystic spaces of the tumor (arrow).
(C) Post-embolization DSA image demonstrating successful coil embolization with contrast stasis (arrow) and complete absence of tumoral blush.

3. Discussion

Spontaneous haemorrhage within malignant tumours is rare but may occur due to rapid tumour expansion, necrosis, vascular invasion, abnormal tumour angiogenesis, or treatment-related vascular changes [1]. In this case, chemotherapy-induced rapid tumour necrosis resulted in extensive cystic degeneration with disruption of intratumoral vessels, leading to life-threatening haemorrhage.

The management of bleeding renal tumours in children presents unique challenges [2]. Emergency surgery in a haemodynamically unstable patient with a large renal mass may be associated with significant morbidity due to distorted anatomy, tumour adherence to adjacent structures, increased operative blood loss, and limited physiological reserve. In such situations, rapid minimally invasive haemorrhage control becomes essential.

Transarterial embolization provides an effective method for achieving haemostasis by directly targeting the arterial source of bleeding [3]. In addition to controlling acute haemorrhage, embolization may provide time for patient stabilization, correction of physiological abnormalities, and multidisciplinary planning for definitive treatment. The combination of particulate embolization and coil embolization allowed both reduction of tumour vascularity and durable occlusion of the bleeding arterial branches.

Another important aspect is the concept of embolization as a bridge therapy. Rather than proceeding directly to high-risk emergency surgery, embolization allowed stabilization of the patient and subsequent planned oncological resection under optimized conditions. This approach may improve surgical safety and overall outcomes.

Previous reports of renal tumour embolization in children have mainly focused on preoperative devascularization, management of haematuria, or traumatic vascular complications. Reports describing emergency embolization for chemotherapy-induced haemorrhagic tumour necrosis are extremely limited [4]. This case highlights a rare but important complication occurring during effective tumour response and expands the potential role of interventional radiology in paediatric oncology [5].

Early recognition of clinical deterioration following chemotherapy is crucial. Sudden abdominal pain, distension, haemoglobin decline, or haemodynamic instability in a patient with a large necrotic tumour should raise suspicion of tumour haemorrhage. Prompt imaging with CT angiography and early angioembolization can be lifesaving.

4. Conclusion

Chemotherapy-induced cystic necrosis can rarely result in catastrophic tumour haemorrhage in paediatric Wilms tumour. Emergency transarterial embolization provides rapid and effective haemostasis, avoids emergency high-risk surgery in unstable patients, and serves as a valuable bridge to definitive oncological treatment. This case demonstrates the expanding role of interventional radiology in managing complex paediatric oncology emergencies.

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