

## Case Report

### Obstructive shock as presentation of an abdominal mass - Case Report

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#### Abstract

##### Introduction

Obstructive shock is the least common type of pediatric shock. It results from obstruction of cardiac output, with intra-abdominal masses being a rare cause.

##### Description of the case

We report a case of a healthy 2-month-old infant who developed obstructive shock secondary to compression of the abdominal aorta, resulting in impairment of cardiac function due to an abdominal mass.

##### Discussion

Wilms tumor represents 7% of neoplasms in infants. The most common presentation is an abdominal mass, and it is extremely rare to present with obstructive shock. In this case, the age and form of presentation were atypical, but recognition and rapid medical and surgical intervention allowed for clinical stabilization and recovery

of cardiac function. This case highlights the importance of recognition and proper management in cases of obstructive shock. Although rare, abdominal masses should be considered in the differential diagnosis.

**Keywords:** Abdominal mass; Emergent surgery; Infant; Obstructive shock; Wilms tumor

##### Key-messages

Obstructive shock is the least common type of pediatric shock.

Wilms tumor is the second most common pediatric intra-abdominal tumor.

This case demonstrates a rare presentation (obstructive shock) of one of the most common pediatric intra-abdominal tumors.

#### Introduction

Shock is a life-threatening condition caused by the systemic failure of the circulatory system. Obstructive shock is the least common cause of shock in pediatrics [1], and an abdominal mass is a rare cause of this type of shock. Only a few reported cases of pediatric Wilms tumor have presented during the first months of life, and none have presented with obstructive shock [2]. Our case is interesting and challenging, as it features obstructive shock due to an abdominal mass that was later diagnosed as a Wilms tumor.

#### Description of the case

A healthy 2-month-old infant boy with regular follow-up, no relevant prenatal, neonatal, or familial history, was taken to the Emergency Department of a secondary hospital due to respiratory distress, groaning, and food refusal within one day of evolution. On physical examination, he was afebrile, with marbled skin, tachypnea, tachycardia, hypotension, and marked abdominal distension with palpation of a hard abdominal mass throughout the left abdomen extending beyond the abdominal midline. It was decided to start sedoanalgesia and intubation. hemodynamic improvement was observed after fluid resuscitation with 20mL/kg bolus of normal saline. Analytically, there was metabolic acidosis (pH 7.234, pCO<sub>2</sub> 39.9 mmHg, HCO<sub>3</sub><sup>-</sup> 16.9 mmol/L) and hyperlactacidemia (9.3 mmol/L), LDH 788 U/L and D-dimers 2570 ng/mL. Thoraco-abdomino-pelvic tomography revealed a bulky abdominal mass (8.5 x 9 x 10 cm) without calcifications, poor individualization of the left kidney and adrenal gland on the same side. This mass extends medially, becoming inseparable from the retroperitoneal structures, including the great vessels, and inferiorly extends to the left iliac fossa (Figure 1). He was transferred to the Pediatric Intensive Care Unit (PICU).

On admission in the PICU, he had cold extremities, tachycardia, P5 blood pressure, grade II/VI murmur, and filiform pedal and femoral pulses. The echocardiogram showed left chamber dilatation, left ventricular dysfunction, left ventricular ejection fraction (LVEF) 30%, and fractional shortening (Fenc) 19%, mild mitral, tricuspid, and aortic regurgitation. Due to obstructive shock due to compression

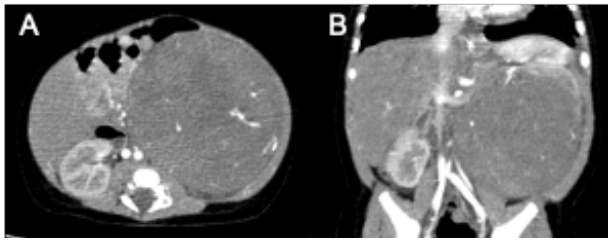
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**Figure 1:** Non-contrast abdominal CT; A - Axial cut showing a large abdominal mass on the left with soft tissue density, measuring 8.5x9 cm in maximum axial diameters, extending medially and becoming inseparable from retroperitoneal structures, including large vessels; B- Coronal cut showing the mass extending to the left iliac fossa, measuring 10cm in length.”

of abdominal aorta for the abdominal mass, an exploratory laparotomy was decided with excision of the abdominal mass, and left nephrectomy (after obtaining parents' consent). Intraoperative findings demonstrated a left retroperitoneal mass attached to the left kidney. After surgical removal, the mass was sent for histopathological evaluation. Less than twenty-four hours after the surgery, an echocardiogram showed improvement in cardiac function with LVEF 50% and Fenc 25%, hemodynamically stable without aminergic support. He was extubated the day after the surgery.

The histological exam revealed a Wilms Tumor (TW) and the infant was transferred to the oncology pediatric center. He completed a cycle of chemotherapy with vincristine, without complications. Currently, about 6 months after diagnosis, the infant is asymptomatic and has slight dilation of the left ventricle, LVEF 55% and Fenc 28%. He maintains clinical and imaging surveillance at a pediatric oncology center, with no significant problems.

## Discussion

Wilms tumor, also known as nephroblastoma [2], is the most common primary renal [1] tumor in children, accounting for 95% of all renal malignancies in children [3]. It is the fourth most common pediatric cancer overall [4]. After neuroblastoma, it is the second most common pediatric intra-abdominal tumor, accounting for 6% of overall childhood malignancies. About 95% of cases of Wilms tumors are sporadic, and in some cases may occur in association with other congenital malformations. The average age at diagnosis of Wilms tumor is 4 years, with most cases appearing between ages 2 and 5 years. In patients with unilateral involvement, the median age at diagnosis is 43 months in girls and 37 months in boys [5].

Most children with Wilms tumor present with an abdominal mass or swelling, without other signs or symptoms. A silent abdominal mass, typically brought to medical attention by the caregiver while bathing the child or changing clothes, is the most common mode of presentation [1].

Common differential diagnoses of abdominal masses include tumors such as neuroblastoma, Wilms tumor, rhabdoid tumor, mesoblastic nephroma, and clear cell sarcoma. Other causes include polycystic kidney disease and pyelonephritis [6].

Obstructive shock as a presentation of Wilms tumor is extremely rare. To the best of our knowledge, we were unable to find any documented cases in the published literature. Presentation at this age is also unusual. Despite regular follow-up and no previously described abdominal mass, a prenatal tumor may be considered. Obstructive shock is a less common, but important cause of shock in critically ill infants and children. The most common causes generally include tension pneumothorax [7], cardiac tamponade, and pulmonary embolism [8]. Also included in this category physiologically, and more specific to pediatrics, are congenital heart lesions characterized by left ventricular outflow tract obstruction, including critical aortic stenosis, coarctation of the aorta, interrupted aortic arch, and hypoplastic left heart syndrome [7]. In this case, we report an abdominal tumor as the cause of this shock. Compression of the abdominal aorta caused obstruction of the left ventricular outflow tract. Despite the research carried out by the authors, no report of an abdominal mass causing obstructive shock in pediatric age was found.

In conclusion, we present a case of a rare presentation of Wilms Tumor (abdominal mass causing obstructive shock) in an unusual age.

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