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# Anesthesia Considerations in Pediatrics with Wilms' Tumor: A Case Report

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**Abstract:** ***Introduction**: Wilms' tumor is the most common kidney malignancy in children and overall is the fourth most common malignancy in children. **Case report**: We reported acase of five years old male patient with a chief complaint of a lump in the right abdomen accompanied by bloating, and nausea and fever. Abdominal CT scan showed a large mass in the right kidney. Patients were planned to underwent radical nephrectomy with GA-OTT. He was given premedication such as Midazolam 1 mg IV, Ketamine 10 mg IV and Fentanyl 25 mcg. He was induced with Propofol titration. For maintenance, a combination of O2: Compressed air: sevoflurane was used. The operation lasted for one hour 45 minutes. During the operation, hemodynamic fluctuations occurred with HR 90-148 x/minute and BP 88-114/51-60mmHg. He was given analgesics such as Fentanyl 75 mcg in 24 hours with a syringe pump and Paracetamol 150 mg every 8 hours IV. He was then admitted to the PICU for four days and was discharged in stable condition. **Discussion**: The effect of the tumor on the patient's body can have a major impact on the pattern of anesthesia such as the duration of the operation, bleeding, thermoregulation disorders, fluid disorders, and even hemodynamics. Understanding and alertness to the potential occurrence of complications in surgery and after surgery is one of the factors in the successful management of Wilms' tumor. **Conclusion**: Anesthesia considerations in Wilms tumor surgery lie in the size of the abdominal mass because it can affect the duration of the operation, fluid disturbances, significant bleeding, thermoregulation disorders and suppression of the inferior vena cava.*

**Keywords:** oncology, tumorWilms', pediatrics, anesthesiology

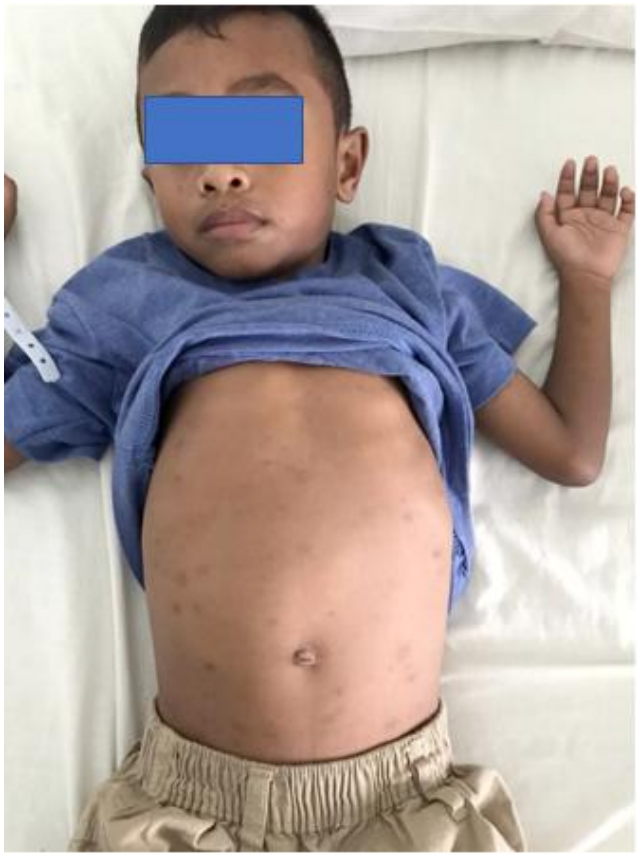
## 1. Introduction

Wilms' tumor or also known as nephroblastoma is the most common renal malignancy in children. Wilms' tumor is also the most common abdominal malignancy in children, and the fourth most common malignancy in children. The incidence of Wilms' tumor is 7.1 cases out of 1 million children under 15 years old, although it is said to be lower in Asia. The incidence of Wilms' tumor is higher in girls than in boys.1

The main cause of Wilms' tumor is still unknown, though it is thought to be a genetic disorder that affects fetal development, especially in the genitourinary tract. This tumor is usually asymptomatic. Other symptoms that can occur are abdominal pain, permanent hematuria, urinary tract infections, varicocele, hypertension or hypotension, fever and anemia. Of these symptoms, it was said that abdominal pain was the most common (40%) and hypertension (25%).1The literature review regarding Wilms' tumor, anesthetic management and drug selection according to the latest study will be discussed further in this case report.

## 2. Case Report

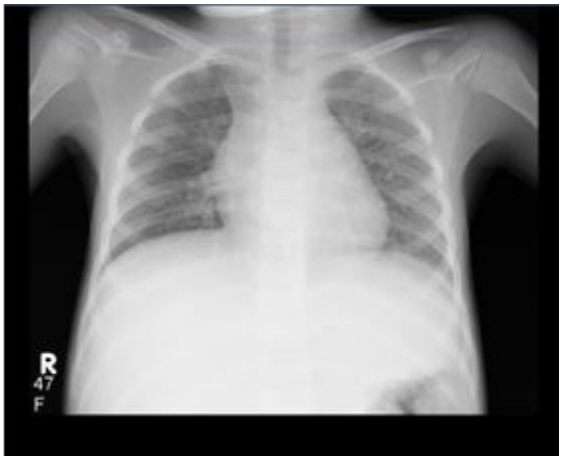
We report the case of a 5-year-old boy who complained of a lump in the right abdomen. The lump began to be felt seven months before he was admitted to the hospital. Initially, the lump was small and gradually got bigger, accompanied by complaints of abdominal pain, bloating, nausea, vomiting and fever. Severe abdominal pain was often felt when he plays or is too tired, while the fever has been up and down in the last week before being admitted to the hospital. His appetite was also said to have decreased.



**Picture 1:** Patient's condition which showed enlarged abdomen

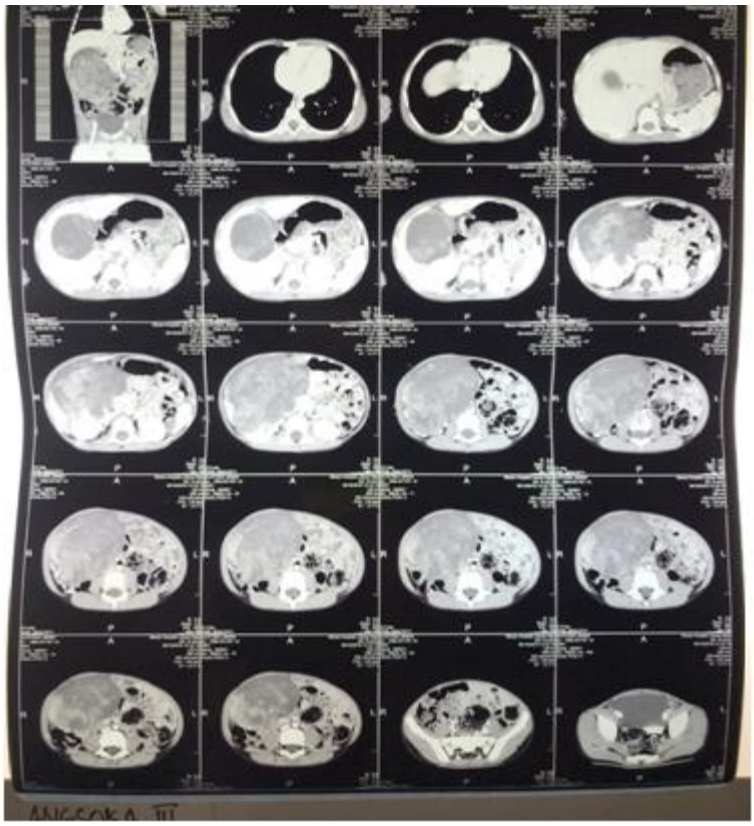
He weighed 13 kg, height 101 cm and BMI 18 kg/m2. Examination of vital signs were within normal limits with pulse of 120-125x/minute, axillary temperature 36.4$^{o}$C, respiratory rate 18 times per minute and peripheral oxygen saturation 98% with room air. On abdominal examination,

there was a mass in the right hypochondrium with a diameter of approximately 10 cm. Other physical examinations were within normal limits.

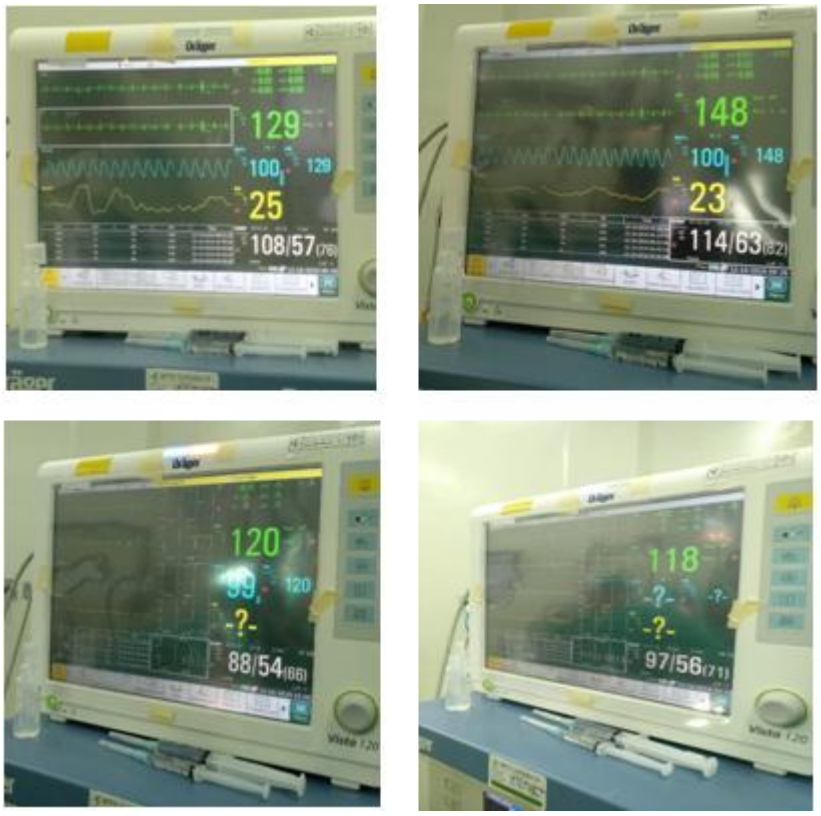



**Picture 2:** Patient's chest X-ray which showed no metastatic disease

On laboratory examination, complete blood count was within normal limits with WBC 8.47 $x10^3$/µL (4.1-11), HGB 13.10 g/dL (13.5-17.5), HCT 39.85 % (41-53) and PLT 401.80 $x10^3$µL (150-440). Hemostasis examination was also within normal limits with PT 13.0 (10.8-14.4) seconds, aPTT 32.8 (24-36) seconds and INR 0.93. Examination of kidney and liver function were within normal limits with BUN 12.8 mg/dL (8-23); SC 0.36 mg/dL (0.7-1.2), SGOT 26.7 U/L (11.00-33.00); SGPT 13.00 U/L (11.00-33.00), Albumin 4.60 g/dL (3.50-5.20). Electrolyte examination was also within normal limits with Na 145 mmol/L (136-145); K 4.59 mmol/L (3.50-5.10).



**Picture 3:** Patient's abdominal CT-scan which showed large mass in right kidney




**Picture 4:** Hemodynamic fluctuation during operation

Chest X-ray showed no abnormalities. Abdominal CT-Scan was suggestive of right kidney mass (Wilms' tumor). There was a large mass, lobulated, well-defined, flat margins, isodense with prominent vascular markings, size (8.15x9.61x11.61) cm at the bottom of the right kidney. He was diagnosed with Wilms' tumor on the right kidney and was scheduled for a right nephrectomy.

Patients with ASA II physical status and planned to undergo surgery with GA-OTT. He was placed in a lumbotomy position, and was given premedication such as Midazolam 1 mg IV, Ketamine 10 mg IV and Fentanyl 25 mcg. Hewas induced with Propofol titration until hypnotized. For maintenance, he was given a combination of O2: Compressed air: sevoflurane. The operation lasted one hour 45 minutes. During the operation, hemodynamic fluctuations occurred with HR 90-148 x/minute and BP 88-114/51-60mmHg. He had 200 ml of bleeding with a urine output of 500 ml.
In the post-operative period, he was given analgesics such as Fentanyl 75 mcg in 24 hours with a syringe pump and Paracetamol 150 mg every 8 hours IV. He was then admitted to the PICU for four days and was discharged in stable condition.

## 3. Discussion

Wilms' tumor is still relatively rare. These tumors usually found in children in the age between 3 and 5 years. Ninety percent of patients with Wilms' tumor are diagnosed before the age of six, with a median diagnosis of 3.5 years. With the rapid advances in chemotherapy, most pediatric patients survive. Majority of patients first come to a pediatrician or primary health facility. Doctors must be cautious in dealing with pediatric patients, especially those with complaints of abdominal pain or lumps in the abdomen because they are potentially Wilms' tumor.2

The most common symptom of Wilms' tumor is an asymptomatic abdominal mass. The mass is usually soft and fixed and rarely crosses the midline. Approximately 50% of patients complain of abdominal pain and vomiting. In 5-30% of patients, hypertension, gross hematuria, and fever may be found. Symptoms of hypotension, anemia, and fever can be found in a minority of patients who experience bleeding. Patients with advanced disease may present with respiratory symptoms, which are associated with pulmonary metastases. Physical examination revealed a palpable abdominal mass. Laboratory tests which may support the diagnosis of Wilms' tumor include a complete blood count, routine kidney function and electrolyte, urinalysis, coagulation function examination, and cytogenic examination. Ultrasound examination is the radiological examination of choice in diagnosing a mass in the kidney or abdomen which can also detects the possibility of a thrombus in the renal vein or inferior vena cava and can provide information about the condition of the contralateral liver and kidney. In Wilms' tumor, ultrasound examination of the kidney revealed a large inhomogeneous mass and there were multiple areas of decreased echogenicity suggestive of necrosis. A CT scan of the abdomen can help determine the origin of the tumor, the presence of spreading into the lymph nodes, bilateral kidney conditions, invasion of large blood vessels (eg inferior vena cava) and metastases to other organs (eg liver).3, 4

Pre-anesthesia evaluation should be carried out carefully, especially in looking for signs of complications caused by the presence of tumor suppression in the abdominal cavity. This will greatly affect the pre-anaesthesia preparation and preparation during surgery. Radiographic examination is

very important to see the extent of tumor compression. The compression of the tumor in the abdominal cavity can slow gastric emptying or interfere with ventilation. Tumor compression will also increase IVC pressure and may have an impact on hemodynamics during surgery, especially at the time of tumor removal. Central venous pressure monitoring, in addition to using standard monitors, is very useful in monitoring fluid adequacy during the perioperative period. Hypertension occurs in 50% of patients with Wilms tumor because of renin production due to tumor compression. Prolonged hypertension can cause intravascular contractions and hypertrophic cardiomyopathy. Angiotensin-converting enzyme (ACE) inhibitors are said to be effective against hypertension. Blood pressure instability during the manipulation period during surgery should be monitored using an invasive blood pressure monitor.3, 6

General anesthesia with or without neuraxial blockade is the anesthetic of choice for intra-abdominal procedures in pediatric patients. Neuraxial anesthesia and general anesthesia are said to be equally good but neuraxial anesthesia cannot be used as a sole anesthetic in pediatric patients. General anesthesia with inhalational or intravenous anesthesia is required for the surgical management of Wilms' tumor. Muscle relaxation is required to facilitate positioning and also for surgical manipulation. A balance between amnesic agents (volatile agents or intravenous agents), intravenous narcotic or epidural analgesia, and muscle relaxants should be used.7

The compression of the tumor in the abdominal cavity can cause nausea and vomiting and affect gastric motility. If these signs are present, endotracheal intubation should be performed using the Rapid Sequence Induction technique to avoid the potential for gastric regurgitation.8

Blood pressure instability during the manipulation period during surgery should be monitored using an invasive blood pressure monitor. Tidal volume and end-expiratory positive pressure should also be administered with caution. Physical examination and radiographic evaluation should be performed to determine the extent of metastases because it's associated with neuraxial analgesia. Coagulopathy can sometimes be seen as von Willibrand disease.6, 7 In this patient, we did not use vasoactive drugs because the hemodynamic instability did not last long and with adequate fluid management.

In the pre-anaesthesia evaluation of the patients we treated, there were signs of complications that occurred due to the suppression of natural tumors in the abdominal cavity, such as decreased appetite due to nausea that occurs after every meal. However, the patient's respiratory and hemodynamic functions were still within normal limits. The results of the laboratory examination of the patient were also within normal limits. We did not do echocardiography in this patient because the patient had not received chemotherapy before.

## 4. Conclusion

Wilms' tumor is one of the most challenging resection tumors. Anesthesia considerations in Wilms tumor surgery lie in the size of the abdominal mass because it can affect the duration of the operation, the potential for fluid disturbances, significant bleeding, thermoregulation disorders, suppression of the inferior vena cava, then a history of chemotherapy and also paraneoplastic tumor phenomena such as hypertension and blood clotting disorders.

## References

[1] Gommersall LM, Arya M, Mushtaq I, et al. Currentchallenges in Wilm's' tumor management. Nat Clin Pract Oncol.2005; 2: 298–304.
[2] Kim S, Chung DH. Pediatric solid malignancies: neuroblastoma and Wilms'tumor. Surg Clin North Am.2006 Apr; 86 (2): 469-87, xi. doi: 10.1016/j. suc.2005.12.008. PMID: 16580935.
[3] Caldwell BT, Wilcox DT, Cost NG. Current Management for Pediatric Urologic Oncology. Adv Pediatr.2017 Aug; 64 (1): 191-223. doi: 10.1016/j. yapd.2017.04.001. PMID: 28688589.
[4] Leslie SW, Sajjad H, Murphy PB. Wilms Tumor.2022 May 27. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan–. PMID: 28723033.
[5] Whyte SD, Mark Ansermino J. Anesthetic considerations in the management of Wilms'tumor. PaediatrAnaesth.2006 May; 16 (5): 504-13. doi: 10.1111/j.1460-9592.2006.01866. x. PMID: 16677259.
[6] GGommersall LM, Arya M, Mushtaq I, Duffy P. Current challenges in Wilms'tumor management. Nat Clin Pract Oncol.2005 Jun; 2 (6): 298-304; quiz 1 p following 324. doi: 10.1038/ncponc0196. PMID: 16264987.
[7] Prasad M, Vora T, Agarwala S, Laskar S, Arora B, Bansal D, Kapoor G, Chinnaswamy G, Radhakrishnan V, Kaur T, Rath GK, Bakhshi S. Management of Wilms Tumor: ICMR Consensus Document. Indian J Pediatr.2017 Jun; 84 (6): 437-445. doi: 10.1007/s12098-017-2305-5. Epub 2017 Apr 3. PMID: 28367612.