

## Intraoperative cardiac arrest in patient with Wilms' tumor successfully resuscitated

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### Key points

Adequate pre-anesthetic preparation of the patient, with vigilant clinical monitoring and high index of suspicion for complications is most important while managing Wilms' tumor surgery. Adequately planned and executed resuscitation if needed perioperatively can save the life of the patient.

### Abstract

Anaesthesiologists should know the pathophysiological changes that occur during Wilms' tumor since their expert help may be needed during various stages of disease diagnosis and management. We present to you a case of patient who underwent nephrectomy for Wilms' tumor, and had massive intraoperative hemorrhage which led to cardiac arrest. The child was successfully resuscitated and discharged from the hospital without any new morbidity.

Adequately planned and executed perioperative management of this tumor is one of the success factors for its high cure rate seen recently.

**Keywords:** Wilms' tumour; haemorrhage; cardiac arrest; resuscitation; anaesthesia; perioperative care.

### Introduction

Intraoperative cardiac arrest has been reported in only one case in (national Wilms' tumor study group) NWTS III trial out of nine deaths attributable to surgical complications<sup>[1]</sup>. We did not come across any case where severe intraoperative bleeding led to cardiac arrest intraoperatively and which was successfully

resuscitated. One case report of successful resuscitation of cardiac arrest due to pulmonary embolism intraoperatively has been described<sup>[2]</sup>.

### Case report

A four year 14 kg female Child with no significant past medical or surgical history was diagnosed as Wilms' tumor and planned for primary resection of the tumor mass. Her blood pressure was 96/54mmhg. The child's examination was unremarkable except for pallor present.

Investigations revealed hemoglobin of 10.2 gm %, whereas rests of the blood investigations were normal. CT scan of the abdomen showed large 9.4 \* 6.7 cm mass arising from the upper pole of right kidney possibly Wilms' tumor without any evidence of hepatic vein or inferior vena caval (IVC) thrombus. In operation theatre, two IV lines (20 and 18 Gauge) were secured in both the hands and standard monitors attached. Arterial line with 22 Gauge Wygon arterial canula was inserted after anesthesia induction in right brachial artery. The child was induced with glycopyrolate 0.08 mg, propofol 30 mg and vecuronium 2 mg, fentanyl 50 microgram.

Patient was Intubated with 5.0 number uncuffed tube and positive pressure ventilation started. Balanced anesthesia used with O<sub>2</sub> N<sub>2</sub>O Isoflurane & fentanyl at a rate of 1ug/kg/hr infusion. Patient was positioned in right lateral kidney position for the surgery .Patient was also receiving intravenous fluids adequately as per her body weight and surgical condition. Allowable blood loss was calculated to be around 200 ml with a nadir allowable hematocrit of 27. During resection of the tumor, one of the pedicles started to bleed profusely and therefore to control bleeding retractors were applied by the surgical assistants. This caused pressure on inferior vena cava and venous return to cease. Severe intraoperative bleeding coupled with IVC compression caused sudden onset of bradycardia, hypotension which rapidly progressed to cardiac arrest. This was immediately detected and cardiopulmonary resuscitation was started in the lateral kidney position with anteroposterior chest compressions. Patient was given inj atropine and later inj adrenaline (0.2 mg) and ventilation continued with 100% oxygen. At the same time adequately cross matched blood was rapidly infused. Simultaneously compression of IVC was released as surgeons repositioned the retractors. Adequate surgical hemostasis was also achieved. Patient's heart rate was restored immediately within a minute or so and adequate peripheral perfusion was achieved. The total blood loss was around 450 ml (approximately 32 ml/kg) and child received around 350 ml of compatible blood transfusion intraoperatively. Child did not require any vasopressor support. Surgery was completed successfully and the child was extubated successfully at the end of surgery. Postoperative analgesia achieved with fentanyl 0.5 ug/kg/hr infusion along with local infiltration of the surgical incision with diluted 0.25% Bupivacaine. Child had regained complete consciousness, was oriented to time, place and person. There was no neurological deficit present.

## Discussion

Wilms' tumor is the commonest renal neoplasm affecting the pediatric age group [3]. The overall incidence is around 0.8 per 100 000, and thus it represents 6% of all pediatric oncological disease.

The anesthetic considerations during this surgery are : lengthy surgery, intra-abdominal retroperitoneal surgery with a scope of losing lot of fluid into third compartment, perioperative fluid and electrolyte balance, anticipation of major hemorrhage, intermittent IVC compression, thermoregulation and of course difficulty in ventilation with increased intra-abdominal pressure. Also in some cases hypertension [4,5], thrombus in IVC or right atrium and coagulopathy [6] may be concomitant problems.

Prevention of tumor spillage should be of prime concern as this has a bearing in upstaging the tumor, hence gentle handling and careful removal is mandatory. [7]. Therefore one more important factor important during these types of surgery is the fact that the surgeons are always in a try to avoid spillage of tumor mass with aim to have a complete removal of tumor mass. This may sometimes lead to intraoperative hemodynamic instability by the virtue that there is always chance of intermittent compression of IVC by the surgeons during resection of the tumor mass and kidney for proper exposure and dissection of the tumor mass. Hemorrhage, hypovolemia may only compound this problem as happened in this particular case.

Under the III NWTS, surgical complications occurred in 379 children of total 1910 patients enrolled. The most common complication was intestinal obstruction, which occurred in 132 patients. This was followed by extensive Intraoperative hemorrhage (112 patients), defined as blood loss exceeding 50 milliliters per kilogram of body weight. Intraoperative injuries to other visceral organs (including intestine, liver and spleen) occurred in 21 children and extensive vascular injuries were reported in 27 patients. There were nine deaths attributed to surgical complications (0.5 percent), only one of which was intraoperative. Survival of patients

with complications was similar to patients without complications when stratified by histological study and stage<sup>[1]</sup>. The incidence of surgical complications in NWTS-4 was significantly lower than NWTS-3 (12.7% versus 19.8%,  $p < 0.001$ ). There has been a marked decrease in the risk of extensive intraoperative bleeding and major intraoperative complications. But they still do occur.<sup>[8]</sup> Postoperative surgical complications occur in 20% of all resections<sup>[8]</sup>, but the rate rises to 40% in those with tumor thrombus that extends up the IVC to or beyond the hepatic veins<sup>[9]</sup>. Wilms' tumor is one of the successes of pediatric oncology, with an overall cure rate of over 85%. The results that have been achieved in children with Wilms' tumor support the strong value of the multidisciplinary team approach to cancer. Thus adequate Pre-anesthetic preparation of the patient, with vigilant clinical monitoring and high index of suspicion for complications is most important while managing such cases. Adequately planned and executed resuscitation can save the life of the patient.

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