Background:

Only 15% of patients with susceptibility to supraventricular tachycardia are symptomatic. Therefore, when it occurs in an intraoperative setting, they are usually unexpected and sudden in onset. Immediate response by the anesthesiologist in these situations can prevent adverse outcomes such as cardiac arrest; long-term myocardial dysfunction, chronic disability, and even death. We are reporting a case of an 18 month old child who was admitted for an elective repair of congenital diaphragmatic hernia. She later developed ischemic bowel and a septice shock and needed bowel resection. Aggressive resuscitation was required during the patient's bowel resection. During the placement of a central venous catheter, the patient's cardiac rhythm converted from sinus tachycardia into supraventricular tachycardia with a rate of 240. This episode was successfully managed intra-operatively by vagal maneuvers like carotid massage, Valsalva maneuver and two doses of adenosine. During the remainder of her hospital stay, she had multiple episodes of SVT and was diagnosed with WPW syndrome. She underwent mid-modal interventions to manage her dysrhythmia.

Case Summary:

16 month old female presented to the pediatric OR emergently for exploratory laparotomy, bowel resection, colostomy, central line placement. Our patient was a 16month old female who was a full term born child. She was noted to have recurrent breathing problems at around the age of 6 months and was diagnosed of left sided diaphragmatic hernia with some right sided lung hypoplasia. She was an otherwise healthy baby with no known drug allergies. She underwent hernia repair during this admission. The course of hospitalization was complicated by bowel ischemia. She had already undergone emergent bowel resection 12hrs ago and had to be brought to the operating room emergently as she went in to septic shock, severe acidosis, coagulopathy, DIC. She was intubated, on multiple vasopressor support of dopamine @7.15mg/kg/min and dobutamine @ 15mg/kg/min through a femoral line and an unmedicated emergent bowel resection, colostomy and subcutaneous central vein line placement. Her lab results were significant for platelet count of 60, INR of 2.3, ptt of 48.7, 48.7 -13.97/97 with 8.8 -7.9. She had received 2u of prbcs, 1 unit of plts and PEP 6. We maintained her on the pressor drips of dopamine @2mg/kg/m and dobutamine @5mg/kg/m and carefully titrated small doses of fentanyl, sevoflurane at concentration of 1.8-1.9. Her BP and HR were around 110-121/57-1mmhg and 151-156 ST. Electrolytes, fluids were replaced appropriately and supplemented with sodium bicarbonate for the severe acidosis. Three hours into the surgery, when surgeons had closed the abdomen and were placing the central line patient went into SVT of a maximum rate of 270. Her BP and HR were 110-115/60-80 mmhg and 151-156. She responded promptly and brought some ice immediately, the surgeon withdrew the central line catheter and we were ready with the medications including adenosine, and the defibrillation device immediately. Aggressive measures to correct electrolytes, acidosis should be taken. The management is shown in the algorithm above. When encountered with an already diagnosed with WPW syndrome, SVT in the past, the anesthetic management will be to minimize sympathetic stimulation. Sevoflurane, isoflurane, propofol, vecuronium have been used safely in these patients before. Atropine should be avoided during induction and reversal. Postoperatively, the latest literature states that symptomatic or asymptomatic these patients should undergo electrophysiological study and catheter ablation of aberrant tracts.

Discussion:

SVT is the most common symptomatic dysrhythmia in pediatric patients. It is important to recognize SVT early in the neonate and infant population. It is commonly encountered suddenly in the OR. SVT is a narrow complex tachycardia with a heart usually above 180 bpm, with no identifiable p wave or a retrograde p wave. It is associated with a delta wave and short PR interval when associated with WPW syndrome. The most common causes and precipitating factors are mentioned in Table 1. When encountered intraoperatively the recognition is the most important step and the management depends on the hemodynamic stability. In our patient we took a number of steps at the same time. The OR team responded promptly and brought some ice immediately, the surgeon withdrew the central line catheter and we were ready with the medications including adenosine, and the defibrillation device immediately. Aggressive measures to correct electrolytes, acidosis should be taken. The management is shown in the algorithm above. When encountered with an already diagnosed with WPW syndrome, SVT in the past, the anesthetic management will be to minimize sympathetic stimulation. Sevoflurane, isoflurane, propofol, vecuronium have been used safely in these patients before. Atropine should be avoided during induction and reversal. Postoperatively, the latest literature states that symptomatic or asymptomatic these patients should undergo electrophysiological study and catheter ablation of aberrant tracts.

Objectives:

1) Definition of supraventricular tachycardia
2) Define risk factors for the onset of supraventricular tachycardia
3) Intra-operative differential diagnosis of supraventricular tachycardia
4) Intra-operative management of supraventricular tachycardia
5) Post-operative management and workup of supraventricular tachycardia

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Table 1:

<table>
<thead>
<tr>
<th>Common Causes of SVT in Pediatric Patients</th>
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<tbody>
<tr>
<td>Adenosine (0.5mg/kg synchronized)</td>
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<tr>
<td>Consider Amiodarone (5mg/kg over 15 min)</td>
</tr>
<tr>
<td>Procainamide (15mg/over 15 min)</td>
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</tbody>
</table>

Algorithm for the Management of Supraventricular Tachycardia in Pediatric Patients

1. Definition of supraventricular tachycardia
2. Define risk factors for the onset of supraventricular tachycardia
3. Intra-operative differential diagnosis of supraventricular tachycardia
4. Intra-operative management of supraventricular tachycardia
5. Post-operative management and workup of supraventricular tachycardia

Figure 1: This is the ekg of our patient done after surgery. Please note the delta waves and the narrow QRS interval.

References: