SVT refractory to adenosine following craniectomy for sagittal synostosis

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Introduction:
Supraventricular Tachycardia (SVT) is the most common arrhythmia in children, with an estimated incidence of 1 in 250-2500. Pediatric anesthesiologist should be able to manage acute and chronic SVT in the perioperative setting.

Case Description:
A 3 month old male presented for a strip craniectomy for sagittal synostosis. General anesthesia was induced by face-mask with inhaled Sevoflurane and the patient was intubated easily after paralysis with vecuronium. The patient received 190cc’s of packed red blood cells for intraoperative bleeding. At the end of the procedure, atropine and neostigmine were given for reversal of paralysis. Shortly thereafter SVT was observed on the EKG with heart rates in the 200’s.

A stable blood pressure was present with palpable pulses. Vagal maneuvers transiently terminated the SVT. Adenosine 0.1mg/kg followed by 2 doses of 0.2mg/kg failed to terminate the SVT.

The patient was extubated awake. The Cardiology service was consulted because of refractory SVT. They recommended a trial of Esmolol. The SVT terminated after bolus administration of Esmolol and an infusion was started. There was no recurrence of SVT. The patient was admitted to the ICU where the Esmolol was titrated off and propranolol started. Follow up echo showed no structural heart abnormality.

Discussion:
SVT is a rapid heart rhythm originating above the ventricle. There are 3 main etiologies of SVT:
1) Atrioventricular reciprocating tachycardia (AVRT)
2) Atrioventricular nodal reentry tachycardia (AVNRT)
3) Atrial ectopic beats

AVRT is most common in children with structurally normal hearts(1). Management depends on the hemodynamic status of the patient. Hemodynamically unstable patients in SVT should undergo synchronous cardioversion starting at 0.5 J/kg up to 2 J/kg. Vagal maneuvers are recommended in stable patients, followed by medical therapy if refractory. Adenosine 0.1 mg/kg is the drug of choice for acute medical conversion. The initial dose is doubled if SVT remains refractory after 2 minutes. The maximum recommended dose is 0.25 – 0.35 mg/kg or 12 mg (2).

In our case, the patient’s SVT was refractory to adenosine but was successfully terminated after initiation of Esmolol therapy. Beta-1 blockers, specifically propranolol, are commonly used to treat children with SVT (4). Esmolol has a rapid onset, short distribution half life (6.9min) and rapid terminal elimination half life (6.9min). Esmolol is a viable option to treat acute refractory hemodynamically stable SVT in children with structurally normal hearts.

References: