Q11 Supraventricular Tachycardia

Which *one* of the following statements about the management of supraventricular tachycardia in children is *false*?

- ❍ 1. Vagal maneuvers are considered non-invasive first-line treatment of children who are hemodynamically stable.
- ❍ 2. The vagal maneuver with the highest success rate is carotid sinus massage.
- ❍ 3. Primary pharmacological treatment often involves intravenous adenosine.
- ❍ 4. Adenosine is not advised in patients with asthma.

Educational Point: Supraventricular tachycardia (SVT) is a relatively common cardiac condition in the pediatric population with an incidence of 1/250 to 1/1000 in otherwise healthy children. SVT is a group of rhythmic disturbances in which electrical impulses originating from any point proximal to the atrioventricular (AV) bundle result in a narrow QRS complex tachycardia (normal QRS duration is variable during childhood and can be <80 milliseconds in the neonatal period to <120 milliseconds in adolescents) as observed on electrocardiography.

The presentation can vary based on the age of the patient. Signs and symptoms in infants include poor feeding, vomiting, irritability, increased sleepiness, fainting, and perspiration, as well as pallor, cough, and respiratory distress if congestive heart failure is present. Toddlers and school-aged children will present with palpitations, chest pain, dizziness, shortness of breath, or fainting. Adolescents frequently present with all of these symptoms and may also have perspiration, fatigue, and anxiety.

Vagal maneuvers are considered non-invasive first-line treatment of children with SVT who are hemodynamically stable. These maneuvers work by increasing parasympathetic tone, which can increase the refractory period of the AV node and terminate SVT. Some commonly used maneuvers include the Valsalva maneuver (e.g., squatting, forced expiration against a closed glottis), stimulating the diving reflex in infants (e.g., placing a bag of ice over the face), and carotid sinus massage (important to do it unilaterally only). **In one study, the Valsalva maneuver demonstrated the highest success rate at 47%, followed by diving reflex stimulation at 5%, while carotid sinus massage had the lowest success rate at 1.5%.** Furthermore, the Valsalva maneuver induced the longest prolongation of the R-R interval during sinus rhythm and paroxysmal SVT. Overall, these maneuvers were effective at terminating SVT up to 53% of the time.

Primary pharmacological treatment of SVT often involves intravenous (IV) adenosine, which has an extremely short half-life of 2 to 5 seconds and is known for its rapid onset and minimal side effects. Adenosine works by prolonging AV conduction, resulting in a transient block in myocardial conduction at the AV node, thus slowing down the heart rate. Effects of adenosine manifest within a few seconds for up to a maximum of 30 seconds. As adenosine can cause atrial fibrillation, it is preferable to have a defibrillator available when administering the medication. **There are certain situations where adenosine is not advised, such as in patients with asthma or non-AV-node-dependent SVT.**

Traditionally, caution has been exercised when administering adenosine to patients with asthma, patients with chronic obstructive pulmonary disease, or patients regularly taking methylxanthine, owing to adenosine's propensity to cause bronchospasm.

For patients with acute SVT, alternative medications include esmolol, a quick-acting b1-blocker (onset: 2 to 10 minutes via IV administration), and procainamide, a class IA antiarrhythmic (sodium-channel blocker; onset: 5 to 10 minutes via IV administration).

The correct answer is 2.

Reference: Abbasi E, Vijayashankar SS, Goldman RD. Management of acute supraventricular tachycardia in children. *Can Fam Physician*. 2023 Dec;69(12):839-841.

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