Iced towel – a novel method to revert supraventricular tachycardia in a paediatric patient

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SUMMARY

Supraventricular tachycardia (SVT) is the commonest tachyarrhythmia among paediatric age group. Modified Valsalva manoeuvre can be attempted in a stable child. We discuss here a case of a 6-year-old boy who presented with stable SVT and iced towel was applied to his face to revert the tachyarrhythmia. This method was well tolerated by the child without any complications. The SVT was successfully reverted, and pictures were taken to capture the simple but effective method.

INTRODUCTION

Supraventricular tachycardia (SVT) is the commonest tachyarrhythmia among paediatric cases, where it occurs about one case in every 250-1000 children.[1,2] Non-pharmacological methods like carotid massage and Valsalva manoeuvre (VM) can be applied to revert the stable SVT. We discuss in this report a case of a child who presented with SVT and the application of a non-pharmacological method was used successfully to revert his tachyarrhythmia. We share our method that is quick, safe, well tolerated, and less watery while still having good results and outcomes.

CASE REPORT

A 6-year-old boy was referred from a private hospital to the Emergency Department (ED) of the Hospital Universiti Sains Malaysia (Hospital USM), Kelantan, Malaysia, with acute onset of palpitation while studying. It was associated with

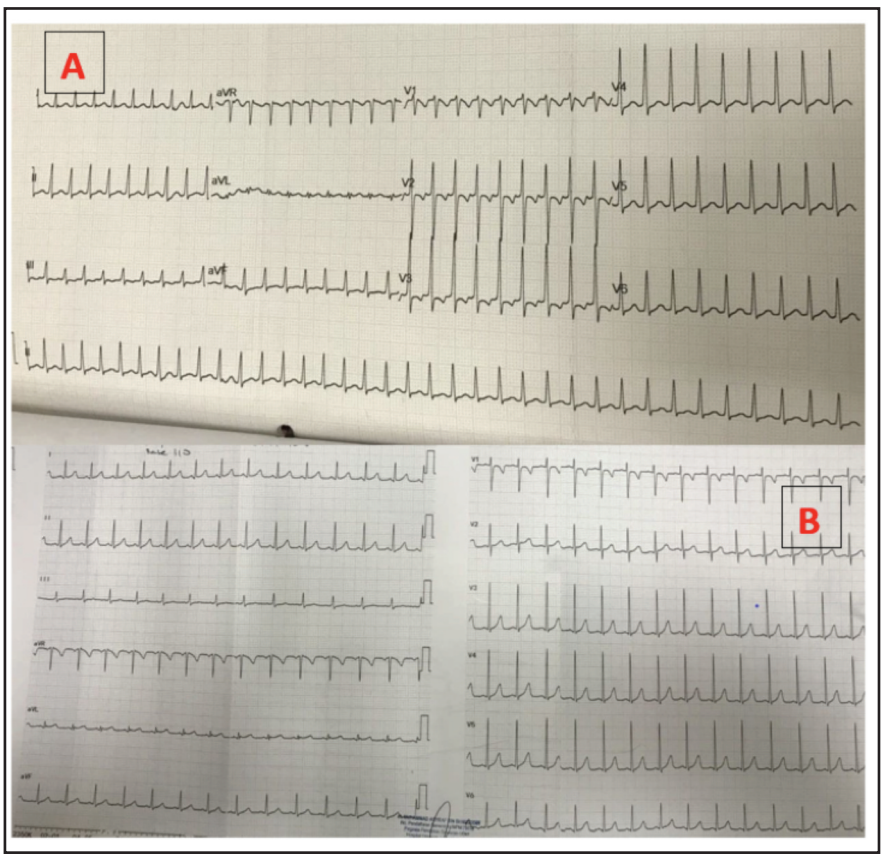

Fig. 1: A) Pre ECG: Regular narrow complex tachycardia with no P wave seen and a heart rate of 220 bpm. B) ECG post Valsalva manoeuvre showed sinus tachycardia with a heart rate of 110 bpm.

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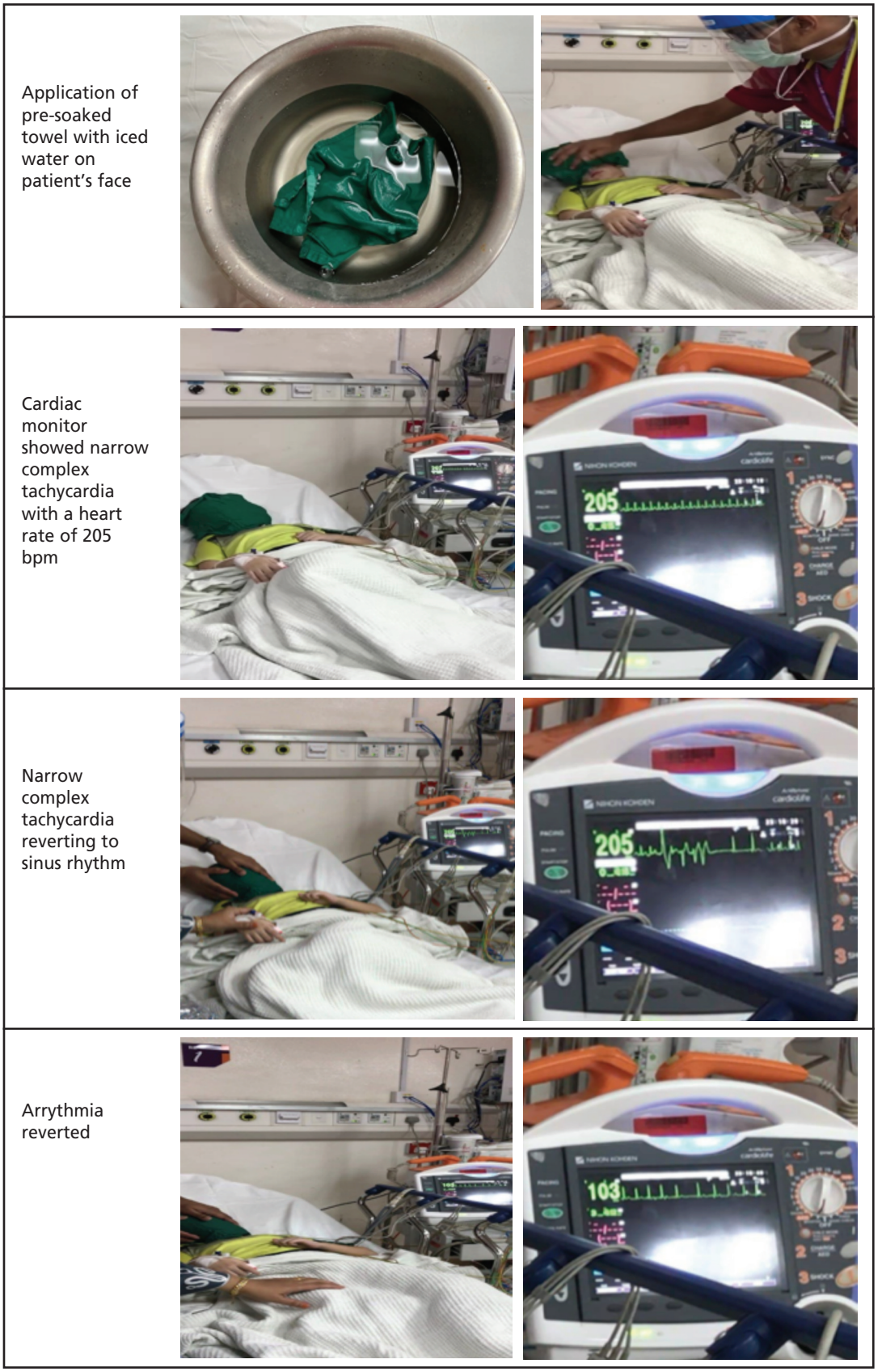
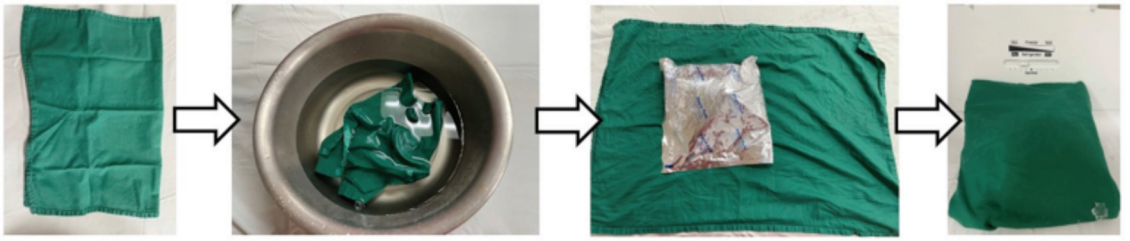


Fig. 2: Method of applying iced towel with cardiac monitoring at each stage.



A: A plain green towel
B: Green towel soaked in pipe water
C: Ice pack placed on the wet green towel
D: Wet green towel wrapped over ice pack was placed in freezer for 5 minutes (the iced pack was removed prior to application on patient's face)

Fig. 3: Step by step preparation of the iced towel.

mild central chest discomfort, profuse sweating and dizziness. He denied history of fever, abdominal pain, vomiting, diarrhoea or dysuria. He was born full-term without any complications. He did not have any significant medical or surgical history. There were no documented allergies, and he was not on any medication. All of his immunisations were up to date. His family history was not significant for any chronic illnesses.

On arrival, he was conscious and appeared comfortable. His blood pressure (BP) was 98/63mmHg with a regular heart rate (HR) of 228 beats per minute (bpm). His respiratory rate (RR) was 20 breaths/minute with oxygen saturation of 100% on room air. There was no documented fever. His extremities were warm and well perfused with normal capillary refill time and his capillary blood sugar was 5.9mmol/L. His heart sounds were normal without any murmur. Examination of other systems were unremarkable.
All of his laboratory results, i.e., renal function test, electrolytes, liver function test, full blood count, were within normal limits. His chest X-ray was normal. Bedside echocardiography showed a hyperdynamic heart with no gross structural abnormalities. An electrocardiogram (ECG) revealed regular narrow complex tachycardia with no P wave seen and a heart rate of 220bpm (Figure 1).

In view of the child's stable condition and appearing comfortable, we attempted a modified Valsalva manoeuvre by placing an iced towel over his face (Figure 2). Prior to that, supplemental oxygen was given to the child to avoid him from feeling suffocated. After about five seconds of application, the arrhythmia spontaneously reverted, and the child returned to sinus rhythm with a heart rate of 110 bpm (Figure 3). The child was then admitted to paediatric ward for observation. He was discharged well home with follow-up under the Cardiology Unit.

DISCUSSION

The management of SVT depends on the condition of the child on presentation. Advance Paediatric Life Support (APLS) guideline advocates the use of a non-pharmacological method for stable condition, in contrast to pharmacological and electrical (synchronised) cardioversion in hemodynamically unstable children.[1] VM with diving reflex is a known non-pharmacological method for a stable SVT.

This technique was first reported in 1979 when a 2-week-old infant with SVT was treated by placing the newborn's face in a basin of ice water for 5 seconds.[3] However, the ice-immersion method is not without its complication. Few case reports had been published where ice-immersion had caused subcutaneous fat necrosis and cold panniculitis. However, the complications are self-limiting and resolved over time.[4]

Another method with ice was tried by Grahame, where he applied ice cubes to the infant's lip and cheek.[5] The method was done mostly among newborns and infants. The cold temperature will stimulate afferent branch of a trigeminal cranial nerve which then causes efferent stimuli on the vagal nerve. In response to it, conduction through atrioventricular nodal is reduced.[2] A review by Marion showed that applying ice water to the face is an effective and non-invasive method in reverting SVT, compared to carotid sinus massage and VM.[6]

Applying an iced towel to treat stable SVT is a novel and modified diving reflex method. The aims are to be more tolerable to paediatric patients and minimising any potential complications. It also eludes the need to create the artificial environment of suffocating or being apnoeic to stimulate the afferent pathway and subsequently the vagal response. In our method, we used a green towel, soaked in pipe water then wrapped over an ice pack before being placed for about 5 minutes in a freezer. The iced towel was then applied gently to the face of the child covering his forehead and cheek. The child was asked to breathe as usual with oxygen supply through a nasal prong. This method reduces the possibility of the worst complication associated with suffocating or apnoeic conditions. Another complication, like cold panniculitis was also avoided as there was no direct contact of ice to the face while creating a comfortable situation for the patient. In addition, the process was less watery and yet, producing a similarly good results.

CONCLUSION

The use of an iced towel is a novel method that can safely be attempted in the ED or even in outpatient clinics. It is a quick, comfortable, safe and less watery technique while still achieving the intended results. This provides the treating doctors with another non-pharmacological intervention in stable SVT patient, thus potentially avoiding the use of medications.

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