PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA MANAGED WITH ACUPRESSURE OF NEI-GUAN (PC6): THE REPORT OF A CASE IN THE EMERGENCY DEPARTMENT

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Abstract

Background: We described a 75-year-old man with a history of recurrent attacks of paroxysmal supraventricular tachycardia (PSVT). The patient presented to the emergency department (ED) with complaints of palpitations and chest tightness. Vagal stimulation maneuvers failed to convert the rhythm.

Materials and Methods: Acupressure was applied on Nei-Guan (PC6).

Results: Acupressure applied on PC6 immediately converted the tachycardia to a normal sinus rhythm, thus successfully terminated an episode of PSVT complicated with hypotension and chest pain in the patient reported.

Conclusion: Acupressure of PC6 is easy to perform and safe, and can be done when other resuscitative measures are ongoing the same time. It is harmless and appropriate for certain groups of patients such as the elderly, children and pregnant women and worth trying before the administration of medication.

Keywords: Paroxysmal supraventricular tachycardia (PSVT), Nei-guan (PC6)

We described a 75-year-old man with a history of recurrent attacks of paroxysmal supraventricular tachycardia (PSVT). The patient presented to the emergency department (ED) with complaints of palpitations. When vagal stimulation maneuvers failed to convert the rhythm in the ED, acupressure was applied on Nei-Guan (PC6) and immediately converted the tachycardia to a normal sinus rhythm. Termination of PSVT by acupressure has not heretofore been reported. The literature was reviewed and possible mechanisms along with associated theories were discussed.

Paroxysmal supraventricular tachycardia (PSVT) is one of the most common arrhythmias presenting at the emergency department (ED). Common symptoms include palpitations, light headedness, and chest pain in a small proportion of patients with PSVT may also experience confusion or loss of consciousness. Most narrow complex PSVTs are due to re-entry circuits within the AV node (60%–90%) or via a bypass tract with anterograde conduction through the AV node (Holdgate A et al, 2006). They can be sometimes treated with simple physical maneuvers such as forced breath holding or carotid sinus massage (Ornato JP, 1988; Wen ZC, 1998). When simple physical maneuvers fail, PSVT can be treated at the ED with a variety of drugs. The two most commonly used drug types are adenosine and calcium channel antagonists, such as verapamil. We reported the first case of PSVT successfully terminated by the use of acupressure applied on Nei-Guan (PC6).

Case Report

A 75-year-old man, weighing 90 kg and 183 cm in height, visited the outpatient clinic of cardiovascular medicine at the Tri-Service General Hospital in Taipei, Taiwan on July 14, 2008. His main complaint was intermittent palpitation with some chest tightness for the past few days. He had been experiencing intermittent palpitation; chest tightness with dizziness during sudden posture changes in recent three months. At the outpatient clinic, the physician also identified an unusual paleness of his face. With increase in severity and frequency of symptoms, he was transported to the ED. The patient had previously tried forced breath holding and carotid massage. However, none had made any difference in relieving his symptoms. He was asked to provide a history of past diseases that might be associated with the current condition. He had been
taking medications for diabetes mellitus and hypertension for more than 20 years and also had a coronary artery bypass graft (CABG) surgery about 12 years ago. Also, he had a stroke about three years ago but that left him with no neurological sequelae. He has a stent in his left internal carotid artery due to critical stenosis.

Physical examinations was conducted at the ED. Body temperature was 36.6°C centigrade, the blood pressure was 109/52 mmHg. On auscultation the cardiac examination revealed a tachycardia of 130–140 beats/min without murmurs. The jugular veins were engorged and there were visible carotid artery pulses. Breathing sounds were clear.

IV access was obtained with a 20-gauge catheter and 0.9 saline solution at 30 ml/hr was given to keep the vein open. Blood drawn at this time revealed the following laboratory data: sodium 140 mEq/L, potassium 3.5 mEq/L, chloride 104 mEq/L, BUN 20 mg/dl, creatinine 1.3 mg/dl, glucose 257 mg/dl, magnesium 2.2 mEq/L, and calcium 9.2 mg/dl. ECG demonstrated a PSVT of 130 beats per minute (Figure 1). Carotid massage was performed for ten seconds on the right side but failed. Acupressure applied on PC6 using an intermittent pressure with the index finger for about one minute was instituted immediately, resulting in abrupt cessation of the PSVT, and conversion to a relatively stable sinus rhythm at a rate of 85 beats/min (Figures 2 and 3). When acupressure was applied on PC6, he reported a sense of progressive relief in terms of chest tightness and palpitation. Dizziness improved with an easier breathing pattern. His face turned less pale. He could feel the pressure on his wrist but it was not very painful. Chest pain ceased and the blood pressure rose to 129/70 mmHg. Normal sinus rhythm was then maintained and the patient had no further symptoms. The patient was subsequently discharged from the ED. Admission was suggested but the family chose to visit the outpatient clinic of cardiovascular medicine for further evaluation and management, such as radiofrequency ablation.

**Discussion**

The treatment of PSVT by using acupressure was not found in literature when we searched MEDLINE/PubMed, EMBASE, Ovid, MD consult and Cochrane library. However, there were several studies reporting the clinical observations of the effect of acupuncture on PC6 for PSVT when we searched by hand. Lee reported that 83.33% of the subjects receiving bilateral PC6 acupuncture were responsive to the treatment as compared to 70.83% in the control group (Lee YH and Guo RS, 2009). Lee (2004) reported 80.39% of responsiveness using acupuncture on points including PC6. Gi and Liou (2005) reported 90% of the subjects experienced the effect and it was still effective for recurrence. Don (2006) compared the effect of acupuncture on PC6 and intravenous propafenone and found no significant difference. Tsao (2002) injected 5 mg of phenylephedrine in the PC6 to treat PSVT and concluded that it was more effective than acupuncture alone.

PSVT is a common tachyarrhythmia which occurs in all age groups including healthy young adults as well as associated with rheumatic, atherosclerotic, hypertensive and thyrotoxic heart disease (Hillis LD et al., 1980). The causes of our patients PSVT may be the underlying
According to traditional Chinese medicine theory, the heart and pericardium are associated with the brain and thought processes. 

An inhibitory effect on cardiovascular sympathetic reflexes, induced by stimulation of PC6, may be related to a stimulation of opioid receptors associated with pain modification (Imai and Kitakoji, 2001). The mechanism for acupuncture induced heart rate change is via stimulation of cardiac cholinergic vagal efferents and/or depression of cardiac sympathetic neural activity. The pericardium is also considered to protect and regulate the cardiac function. Points of the pericardium channel, such as PC6, have a strong effect on the circulation and are therefore indicated in cardiac disorders including arrhythmias.

The above descriptions may explain why it was effective dealing with PSVT using acupressure of PC6 from a Chinese medicine perspective. However, the termination of PSVT using PC6 acupressure has never been reported before. The possible underlying mechanism still remains unclear and lacks solid evidence. We understand that acupressure is different from acupuncture or transcutaneous nerve stimulation (TENS), but studies results regarding the heart rate reducing effect of acupuncture/TENS applied at PC6 should be helpful when exploring the possible mechanisms. The ANS provides the primary control of heart rate. The decreased response in heart rate following acupuncture could be attenuated by administration of atropine and propranolol. Therefore, the acupuncture-induced response of a decrease in heart rate has been suggested to be the result of a reciprocal coordination of an increase in parasympathetic nerve activity and a decrease in sympathetic nerve activity (Li Z et al., 2005).

Many physical maneuvers including carotid sinus massage, the Valsalva maneuver, coughing, gagging, pulling on the tongue, the diving reflex, bilateral ocular compression are reported to have some effects on PSVT, but some of them may be dangerous. However, lower success rates may be related to variability in instructions given to patients on the correct technique for performing them, such as a Valsalva maneuver (Taylor DM and Wong LF, 2004). Thoughts must also be given when the subjects are the elderly, children or pregnant women with specific conditions such as cerebrovascular disease. Compared to those physical maneuvers, acupressure applied to the wrist is relatively safe and requires less technique. The wrists are easy to approach and the effect is more prompt as well. The limitations of this report include single case study, lack of complete 12 lead ECG record and loss of follow up of the condition of the patient.
The acupressure applied on PC6 was efficacious in terminating an episode of PSVT complicated with hypotension and chest pain in our patient. It was successful when other physical maneuvers had failed. Acupressure of PC6 is easy to perform and safe, and can be done when other resuscitative measures are ongoing the same time. It is harmless and appropriate for certain groups of patients such as the elderly, children and pregnant women and worth trying before the administration of medication. The underlying mechanism still warrants further research.

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References