ORIGINAL ARTICLE

Comparison of Treatment of Paroxysmal Supraventricular Tachycardia by Valsalva Manoeuver and Carotid Sinus Massage

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ABSTRACT

Background: Paroxysmal supraventricular tachycardia (PSVT) is a rapid rhythm disturbance originating from the atria or atrioventricular node. This is the most common paroxysmal tachycardia presenting to emergency department and often seenwithout heart disease.
Aim: To compare the efficacy of Valsalva maneuver (VM) with that of carotid sinus massage (CSM) in terminating PSVT in patients coming to emergency department.
Methods: This randomized controlled trial was carried out in Emergency Department of Cardiac Complex, Gulab Devi Hospital, Lahore. One hundred patients who fulfilled the inclusion criteria were randomly divided into two groups by lottery method. Electocardiography (ECG) monitoring was done, intravenous line was secured and resuscitation tray was arranged. Group-A patients were treated with VM and Group-B patients with CSM. Procedure was considered effective if it converted PSVT to normal sinus rhythm in 10 minutes.
Results: The mean age of the patients in group A was 40.1±13.1 years and in group B was 38.6±11.8 years. In Group-A, 30(60%) patients had efficacy of procedure and in group B, 18 (36%) patients had efficacy of procedure.
Conclusion: VM achieved better clinical efficacy as compared to CSM in terminating PSVT.
Key words: Paroxysmal supraventricluar tachycardia, valsalva maneuver, carotid sinus massage, efficacy.

INTRODUCTION

Paroxysmal supraventricular tachycardia (PSVT) is a rapid rhythm disturbance originating from the atria or atrioventricular (AV) node.[1] This is the most common paroxysmal tachycardia presenting to emergency department and often seen in patients without organic heart diseases.[2,3] The prevalence of PSVT in general population is 2.25 / 1000 and incidence is 35/ 100000.[4]

The most common mechanism of PSVT is either a reentry circuit involving dual pathways within the AV node called atrioventricular nodal reentrant tachycardia (AVNRT) or an accessory pathway connecting the atria with the ventricles called atrioventricular reentrant tachycardia (AVRT)[2,5].

Electrocardiogram (ECG) of PSVT shows heart rate of 140-250 beats/min with a QRS complex of supraventricular origin and no visible P-wave in most cases[1,5].

Manual augmentation of vagal tone by manual carotid sinus massage (CSM) or valsalva maneuver (VM) is the 1st line treatment for re-storing normal sinus rhythm in patients with PSVT[2,6] and VM is superior in efficacy with conversion rate of 54% compared with carotid sinus massage which has conversion rate of 22%[7,8].

If these maneuver prove unsuccessful, drug treatment or DC cardioversion is considered depending upon the hemodynamics of patients[1,2,5].

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VM is performed by forcible exhalations against a closed airway, usually done by closing one's mouth and pinching one's nose shut, maintaining intrathoracic pressure upto 40 mmHg for 15 second in spine position[2,7].

CSM is performed by physician applying a solid but gentle pressure and massaging the right carotid sinus for 10-20 sec. If unsuccessful, the procedure is repeated over the left carotid sinus. Never apply pressure simultaneously on both sides and avoid the procedure if the patient has carotid bruit or history of cardiovascular accidents[2].

The rationale of this study was to analyze efficacy of vagal maneuvers like VM in our population as these maneuvers have been studied internationally but no local data is available here and also these maneuvers are over looked by most of the emergency physicians due to drug reliance for conversion of PSVT. If the efficacy of vagal maneuver especially of VM is proved in our population, it will have potential or reducing morbidity in our emergency departments.

MATERIAL AND METHODS

This randomized controlled trial was carried out in Emergency Department of Cardiac Complex, Gulab Devi Hospital, Lahore. The study was done from October 2010 to April 2011. One hundred patients with PSVT as per operational definition, age 15-60 years and both sexes were part of this study. Patients with previous stroke / transient ischemic attack (TIA), carotid artery bruit, and heart transplanted patients were excluded from this study. Patients were randomly divided into Group-A and Group-B by lottery method. ECG monitoring was done, intravenous line was secured and resuscitation tray was arranged. Group-A patients were allotted VM. Group-B patients were allotted CSM. Procedure was considered effective if it converted PSVT to normal sinus rhythm within 10 minutes.

ECG was repeated 10 minutes after termination of

PSVT. ECG analysis was done by the researcher. If these maneuvers (VM & CSM) were proved unsuccessful then the patient was treated on usual line of drug treatment or DC cardioversion as per hospital protocol.

Data Analysis: The data were entered into SPSS version 11 and analyzed through the same. Age was presented as mean and standard deviation. Gender and efficacy were presented as frequency and percentage. Chi-square test was used to compare efficacy in both groups taken p-value ≤0.05 as significant.

RESULTS

The mean age of the patients in Group-A was 40.1±13.1 years and 38.6±11.8 years in group B. (Table 1). Fifteen (30%) male patients and 35 (70%) female patients comprised Group-A. Twenty(40%) male patients and 30 (60%) female patients comprised Group-B. Efficacy of procedure was seen in 30 (60%) patients of Group-A and 18 (36%) patients of Group-B with significant p value of 0.001 (Table 2).

Table 1: Distribution of study subjects by age group

Age (Years)	Group A	Group B
Upto 20	2$)	4(8%)
21-30	14(28%)	9(18%)
31-40	10(20%)	17(34%)
41-50	15(30%)	15(30%)
51-60	9(18%)	5(10%)
Mean±SD	40.1±13.1	38.6±11.2

Table 2: Distribution of study subjects by efficacy of procedure

Efficacy	Group A	Group B
Yes	30(60%)	18(36%)
No	20(40%)	32(64%)
Total	50(100%)	50(100%)

p = 0.001

DISCUSSION

The most common mechanism of PSVT is either a reentry circuit involving dual pathways within the AV node called atrioventricular nodal reentrant tachycardia (AVNRT) or an accessory pathway connecting the atria with the ventricles called atrioventricular reentrant tachycardia (AVRT)[2,5]

Electrocardiogram (ECG) of PSVT shows heart rate of 140-250 beats/min with a QRS complex of supraventricular origin and no visible P-wave in most cases[1,5].

Augmentation of vagal tone by manual CSM or VM is the 1st line treatment for re-storing normal sinus rhythm in patients with PSVT[2,6] and VM is superior in efficacy with conversion rate of 54% compared with carotid sinus massage which has conversion rate of 22%[7,8].

In study by Mehta et al, 63% patients had efficacy of VM and 17% efficacy of CSM[10]. In a study conducted by Taylor et al[11] the efficacy of VM was found in 16.7% patients and efficacy of CSM was not found in any patient.

According to the study of Lim et al[12] the efficacy of VM was found in 18% patients and efficacy of CSM was found in 11.8% patients.

On the above discussion, it is concluded that efficacy achieved in more patients with VM as compared to CSM in terminating PSVT. The VM should be applied during spontaneous supraventricular tachycardia before other means of termination are attempted.

CONCLUSION

We concluded from our study that efficacy achieved in more patients with VM (Group-A) as compared to CSM (Group-B) in terminating PSVT.

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Conflict of Interest: None

Running Title: Manual therapy for supraventricular tachycardia

REFERENCES

1. Byron K. Lee, Peter R. Kowey. Supraventricular tachycardias. In: current diagnosis and treatment cardiology. 3rd Ed. Mc Graw Hill Lange; 2009: 233 – 258.
2. Thomas M. Bashore, Christopher B. Granger, Patrick hranitzky, Manesh R. Patel. Paroxysmal supraventricular tachycardia. In: current medical diagnosis and treatment. 48th Ed. Mc Graw Hill; 2009 : 532 – 535.
3. Walker S, Cutting P. Impact of a modified Valsalva manoeuvre in the termination of paroxysmal supraventricular tachycardia. Emerg Med J 2010; 27: 287-91.
4. Delacretaz E. Superaventricular tachycardia. New Eng J Med 2006; 354: 1039-51.
5. Olgin JE, Zipes DP. Specific arrhythmias diagnosis and treatment. In: Olgin JE, Zipes DP, editors. Braunwald's Heart Diseases: a textbook of Cardiovascular Medicine. 8th Ed; Philadelphia: Elsevier Saunders; 2008: 863–931.
6. Smith G, Boyle MJ. The 10 mL syringe is useful in generating the recommended standard of 40 mmHg intrathoracic pressure for the Valsalva manoeuvre. Emerg Med Australas 2009; 21: 449-54.
7. Smith G, Boyle MJ. A cross sectional study of Victorian mobile intensive care ambulance paramedics knowledge of the valsalva maneuver. BMC Emergency Med 2009, 9: 23.
8. Singh A, Carnell, J. An evidence based approach to supraventricular tachydysrhythmias. Emerg Med Prac 2008;10: 48-51.
9. Wen ZC, Chen SA, Tai CT, Chiang CE, Chiou CW, Chang MS. Electrophysiological mechanisms and determinants of vagal maneuvres for termination of paroxysmal supraventricular tachycardia Circulation1998; 98:2716-23.
10. Mehta D, Wafa S, Ward DE, Camm AJ. Relative efficacy of various physical manoeuvres in the termination of junctional tachycardia. Lancet1988; 1:1181-5.
11. Taylor DMcD, Auble TF, Yealy DM. First-line management of paroxysmal supraventricular tachycardia. Am J Emerg Med 1999; 17: 326-8.
12. Lim SH, Anantharaman V, Teo WS, Goh PP, Tan AT. Comparison of treatment of supraventricular tachycardia by Valsalva maneuver and carotid sinus massage. Ann Emerg Med 1998; 31: 30–5.