

Response of Supraventricular Tachycardia Patients to Modified Valsalva Maneuver in Rozhalat Emergency Hospital/Erbil City – Kurdistan Region of Iraq

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Abstract

Background: Supraventricular tachycardia (SVT) is one of the common presentations in accident and emergency department. **Objective:** The aim of the study was to measure out the number of the SVT patients that will respond to modified Valsalva maneuver (MVM). **Materials and Methods:** A cross-sectional study among done for 60 patients presented with SVT to Rozhalat Emergency Hospital in Erbil between June 15, 2018, and January 15, 2019, a questionnaire form designed to collect data and use MVM properly as the first line of treatment with care to keep the information private. **Results:** The study results revealed that majority of our sample are middle-aged (40–65 years) and female by 50% and 65%, respectively. Male gender patients were a better responder to modified Valsalva comparing to female gender 53.3% and 46.7%, respectively (though it is statistically not significant). As early patient presented with onset of symptoms, is better responded to modified Valsalva, those patients are divided into patients who come within 1st h (53.3%), within 1–3 h (46.7%), and after 3 h (0%). This was statistically significant. In general, modified Valsalva technique was successful to invert 25% of patients to sinus rhythm nonpharmacologically, and 8.33% of total patients that responded to modified Valsalva needed more than one trial. **Conclusions:** We can conclude from the study that males are better responders to modified Valsalva than females, As long as patients come early to the emergency room, the better they respond to modified Valsalva. We can also conclude that modified Valsalva was a very good technique for treating SVT patients.

Keywords: Emergency room, modified Valsalva maneuver, supraventricular tachycardia

INTRODUCTION

Supraventricular tachycardia (SVT) is one of the common presentations in emergency room (ER).^[1] There are approximately 89,000 new cases/year and 570,000 persons with SVT in the United States.^[2] The term SVT is commonly used to describe regular tachycardia that has a similar appearance on electrocardiography.^[3] Narrow-complex tachycardias are always supraventricular, as a normal QRS width indicates that conduction is down the bundle of His in the normal antegrade manner. Sometimes, SVT can present as a broad complex tachycardia if ventricular depolarization is triggered by antegrade conduction down as an accessory pathway or in the presence of preexisting bundle branch block.^[4] Narrow-complex tachycardias are always supraventricular, but not all SVTs are narrow complex.^[5]

Vagal maneuvers heighten parasympathetic tone and may slow electrical conduction in the heart to a degree that abolishes

sustained reentry. If applied early, vagal maneuvers can convert about 20% of patients presenting with re-entrant tachycardias, such as SVT and narrow-complex tachycardia associated with Wolff-Parkinson-White syndrome.^[6]

With only limited experience of emergency medicine, one could be forgiven for thinking that SVT is a no brainer a harmless condition of the young simply requiring a bolus of adenosine

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then discharge home, this is untrue, and several pitfalls await those doctors who combine inexperience with overconfidence.^[4]

The clinical presentation of patients with SVT is variable and depends on confounding factors such as age and preexisting cardiovascular state.^[4] Typically, patients present with palpitations, cardiac chest pain or tightness, presyncopal symptoms such as dizziness, or shortness of breath. Often the onset is abrupt, may terminate spontaneously, and episodes are recurrent (paroxysmal). Patients sometimes do not seek medical help, particularly younger patients.^[1,3,4]

The treatment is not always necessary; however, an episode may be terminated by carotid sinus pressure or Valsalva maneuver.^[3] The use of a modified Valsalva maneuver (MVM) for patients presenting to the emergency department in SVT is a low cost and safe treatment for returning patients to normal sinus rhythm.^[7] Adenosine (3–12 mg rapidly intravenous (IV) in incremental doses until tachycardia stops) or verapamil (5 mg IV over 1 min) will restore sinus rhythm in most cases. IV beta-blocker or flecainide can also be used. In rare cases, when there is severe hemodynamic compromise, the tachycardia should be terminated by direct current cardioversion.^[1,8,9]

The aim of the study was to measure out the number of the SVT patients that will respond to MVM.

MATERIALS AND METHODS

A cross-sectional study (survey) was carried out on SVT 60 patients admitted to ER in Rozhalat Emergency Hospital in Erbil city. The study carried out over 6 months' duration; from July 15, 2018, to January 15, 2019, after getting approval from Scientific Committee of Kurdistan Board for Medical Specialties.

The inclusion criteria included all SVT patients aged more than 12 years. However, patients who arrived with normal rhythm, hemodynamically unstable patients, and patients who declined to participate were excluded from the study.

Data collection was done through designated questionnaire form and all patients or their companion provided with informed consent prior to participation in the study; the questionnaire form included demographic data, onset of symptoms, history of previous SVT attacks, drug history, and use of MVM as the first line of treatment. Patients divided into two groups – responders (patients responded to MVM and inverted to sinus nonpharmacologically) and nonresponders (patients not responded to MVM and needed some sort of medications to be inverted to sinus).

Statistical analysis began by entering the data into computer using Microsoft Excel worksheet (Excel 2010), and then statistical package for social sciences program version 25 (SPSS, IBM Company, Chicago, IL, USA) was used for data analysis. The results were analyzed using frequency distribution and Chi-square test. $P < 0.05$ was considered as statistically significant.

RESULTS

A total of 60 SVT patients enrolled in this study. About 65% of the participants were female and 35% of them were male. Half of the cases were belonging to the 40–65 years of age group, 43.3% were <40 years, and only 6.7% of them were more than 65 years old. Among all the participants, 46.7% of them had the SVT for 1–3 h prior to reaching the emergency hospital, 30% of them had it for <1 h, and then 23.3% of them for more than 3 h. Most of the patients (76.7%) had previous episodes of SVT. Half of the cases were not on any sort of treatment, while 20% of them were on calcium channel blocker (CCB), followed by 10% for each of beta-blockers, beta-blockers and CCB, and other medications [Table 1].

A quarter (25%) of the patients well responded to MVM, 16.7% from the first trial and 8.3% of total SVT cases on the second trial of MVM [Figure 1].

Table 1: Demographic data of the involved patients

Variables	Categories	n (%)
Gender	Male	21 (35)
	Female	39 (65)
Age groups (years)	<40	26 (43.3)
	40–65	30 (50)
	>65	4 (6.7)
Time of onset (h)	<1	18 (30)
	1–3	28 (46.7)
	>3	14 (23.3)
Previous episode	Yes	46 (76.7)
	No	14 (23.3)
Drug history	None	30 (50)
	Beta blocker	6 (10)
	CCB	12 (20)
	Beta blocker and CCB	6 (10)
	Others	6 (10)
Total		60 (100)

CCB: Calcium channel blocker

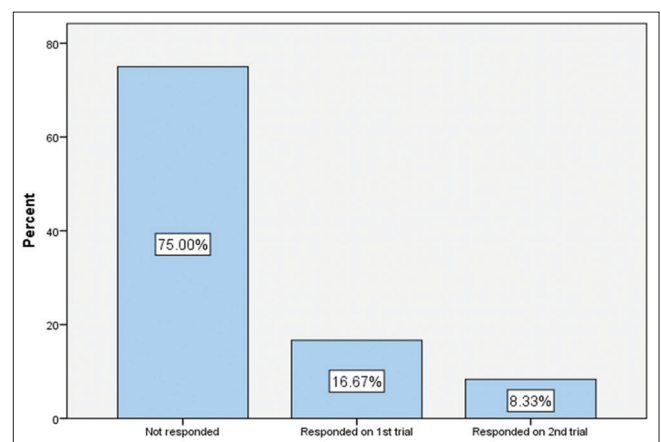


Figure 1: Response rate to modified Valsalva maneuver among supraventricular tachycardia cases and number of trials that achieved response

The findings of Table 2 revealed that there was no statistically significant association between response to MVM and gender. About 53.3% of patients who responded to MVM were male and 46.7% of them were female. Chi-square test was used to find out the association and $P = 0.08$.

According to the results of Table 3, there was a statistically significant relationship between response to MVM and time of onset. More than half of responded patients (53.3%) had the onset of <1 h, and none of the responders had the onset for more than 3 h. In contrary, only 22.2% of nonresponded patients had an onset of <1 h and 31.1% of them had the onset for more than 3 h. Chi-square test was used to find out the association and $P = 0.01$.

The data from Table 4 showed a nonsignificant association between response to MVM and drug history. Most (73.3%) of the patients who responded to MVM were not on any kind of medical treatment, while only (26.7%) of them were taking CCB. In reverse to that, 42.3% of nonresponders had negative drug history, 17.8% of them were on CCB alone and 13.3% of them for each of beta-blockers alone, beta-blockers with CCB, and other medications ($P = 0.07$).

Table 2: Association between response to modified Valsalva maneuver and gender

Gender	MVM		Total	P
	Not responded	Responded		
Male (%)	13 (28.9)	8 (53.3)	21 (35)	0.08
Female (%)	32 (71.1)	7 (46.7)	39 (65)	
Total (%)	45 (100)	15 (100)	60 (100)	

MVM: Modified Valsalva maneuver

Table 3: Association between response to modified Valsalva maneuver and time of onset

Time of onset (h)	MVM		Total	P
	Not responded	Responded		
<1	10 (22.2)	8 (53.3)	18 (30)	0.01
1-3	21 (46.7)	7 (46.7)	28 (46.7)	
>3	14 (31.1)	0 (0)	14 (23.3)	
Total	45 (100)	15 (100)	60 (100)	

MVM: Modified Valsalva maneuver

Table 4: Association between response to modified Valsalva maneuver and drug history

Drug history	MVM		Total	P
	Not responded	Responded		
ppp-				
None	19 (42.3)	11 (73.3)	30 (50)	0.07
Beta-blocker	6 (13.3)	0 (0)	6 (10)	
CCB	8 (17.8)	4 (26.7)	12 (20)	
Beta-blocker and CCB	6 (13.3)	0 (0)	6 (10)	
Others	6 (13.3)	0 (0)	6 (10)	
Total	45 (100)	15 (100)	60 (100)	

MVM: Modified Valsalva maneuver, CCB: Calcium channel blocker

DISCUSSION

The study results revealed that majority of samples are patients with middle-aged (40–65 years) and female by 50% and 65%, respectively, [Table 1]. We can find that among responders to MVM, male patients were better responder to MVM when compared to female gender. 53.3% of responders were males and 46.7% of them were females (although the association was statistically not significant ($P = 0.08$), as demonstrated in Table 2.

Our study found that most SVT patients who responded to MVM, came to ER within 1st h of onset of symptoms (53.3%) and then they inverted to sinus nonpharmacologically. Results also found that 46.7% of responders were from group of patients who came within 1–3 h of onset of symptoms, while none of patients who came after 3 h from onset of symptoms responded to MVM (0%) ($P = 0.01$) as shown in Table 3. Such patients needed some sort of medications to be inverted to sinus rhythm.

The study revealed that majority of SVT patients who responded to MVM were not receiving any home treatment (73.3%), and rest of 26.7% of responders were on CCBs, while patients on beta-blockers and other medications were resistant to MVM with $P = 0.07$ as shown in Table 4.

In regard to drug history, we found that 10% of patients were on combined beta-blocker and CCB as shown in Table 1, which is contraindicated, and such patients will have the risk of fatal complete heart block.^[1]

In general, in this study, with poor technique of applying MVM, uncooperative patients, and overcrowded department, MVM technique was successful to invert 25% of patients to sinus rhythm nonpharmacologically. It is worth to mention that among 25% of patients who responded to MVM, 8.33% of them needed more than one trial of MVM to achieve inversion to sinus rhythm [Figure 1], so one should bear in his/her mind that failure to the first trial of MVM shall not take our focus to pharmacological options to invert the rhythm to sinus. When we compare our study with a similar study that was done by Walker,^[10] we found that response to MVM in our study was less effective (25% and 32%), respectively. Çorbacioğlu *et al.*^[11] compared standard VM versus MVM as first-line treatment for SVT patients, and he found that 12 of 28 patients (42.9%) in MVM group were returned to sinus rhythm after the intervention, while in our study only 25% returned to sinus with MVM.

Appelboom, in his randomized controlled trial for emergency treatment of SVTs, found that 93 (43%) of 214 patients responded to MVM, which is again above what we achieved in our study (25%), and this can be explained by overcrowdedness of Rozhalat emergency department, inexperience of junior doctors who conducted MVM on patients, and impatience and uncooperativeness of patients who participated in study to do a proper MVM.^[12]

Our study supports previous observations that there is lack of standardization of using MVM as first-line treatment for SVT patients, and an apparent reliance on pharmacological choice as first-line treatment, and the impact of introducing proper MVM technique to ER standards will raise nonpharmacological inversion of SVT patients.^[13,14]

CONCLUSIONS

We can conclude from the study that males are better responders to MVM than females. As long as SVT patients come early to the emergency room, they will be better responders to MVM. According to our study, MVM was a very good technique for treating SVT patients, and that is a very good reason for prioritizing of MVM as first-line treatment for SVT patients.

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Conflicts of interest

There are no conflicts of interest.

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