

Title of Mini-CAT

Paramedic Mini CAT – Fanshawe College

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Clinical Scenario:

A 50-year-old male is found responsive and is complaining of rapid heart palpitations, shortness of breath and dizziness. The paramedics attending discover that the patient is in an AV nodal re-entrant tachycardic rhythm/SVT. Due to this type of arrhythmia, vagal maneuvers are considered to terminate this rhythm and convert it to a normal sinus rhythm. Considering the effectiveness of vagal maneuvers in the prehospital setting, does the standard Valsalva maneuver compared with the modified Valsalva maneuver result in a better cardioversion for patients with an SVT rhythm?

Background

The studies focused on patients in a SVT rhythm (AV Nodal Re-entrant tachycardia) and compared the effectiveness of the modified Valsalva maneuver compared to the standard modified Valsalva maneuver for the termination of the arrhythmia. All studies used RCT for their data.

Review question

For patients with a supraventricular tachycardia rhythm (SVT)/ AV nodal re-entrant tachycardia, does the modified Valsalva maneuver compared with the standard Valsalva maneuver result in terminating the SVT and a sustained cardioversion to a sinus rhythm?

Search strategy (Basic): (Valsalva maneuver) and (modified Valsalva maneuver) and (vagal maneuvers) and (supraventricular tachycardia) and (AV nodal re-entrant tachycardia)

Limits: Limited population sizes, Article relevancy (outdated), Limited search results

Databases searched: EBSCO, PubMed

Search results: 15

Included for review: 3, Most recent studies, setting (prehospital), Referenced frequently by other studies

Title, author, year	Study design & LOE	Population	Intervention	Outcomes	Results	Weaknesses & Strengths
<p>Comparing the success rates of standard and modified Valsalva maneuvers to terminate PSVT: A randomized controlled trial, Çorbacioğlu, Şeref Kerem Akıncı, Emine Çevik, Yunsur Aytar, Halit Öncül, Mehmet Veysel Akkan, Sedat Uzunosmanoğlu, Hüseyin, 2017</p>	<p>Randomized Control Trial LOE: 1</p>	<p>Patients with a paroxysmal supraventricular rhythm (18-65 years old) n=56 Modified Valsalva Maneuver (MVM) n=28 Standard Valsalva Maneuver (SVM) n=28</p>	<p>Standard Valsalva Maneuver Pt's were instructed sit vertically and to blow into a 10ml syringe for 15 seconds while trying to maintain an intrathoracic pressure of 40mmHg. Pt were then assessed by ECG for 45s Modified Valsalva Maneuver Pt's were instructed to blow into a 10ml syringe, while trying to maintain an intrathoracic pressure of 40 mmHg, Pt's were then in a supine position and had their legs passively raised at 45 degrees.</p>	<p>Primary Outcome A comparison of the success rate between the MVM and SVM for achieving a sinus rhythm Secondary Utilizing a form of treatment for the termination of SVT aside from the vagal maneuvers</p>	<p>SVM 3/28 (10.7%) converted to a sinus rhythm 25/28 (89.3 %) received rescue treatment MVM 12/28 (42.9%) converted to s sinus rhythm 16 (57.1%) received rescue treatment. <u>Difference</u> MVM vs SVM Achieving sinus rhythm (32.2%) Rescue Treatment</p>	<p><u>Weakness</u> Limited population size, Inconsistency with the intrathoracic pressure being generated by the patient (being able to maintain a intrathoracic pressure of 40 mmHg) <u>Strengths</u> Reviewed and compared with various studies, Low risk of error when conducting maneuvers due to the simplicity of</p>

			Pt's were monitored for 45s by ECG monitoring. Attempted up to 3 times for both groups if the conversion was unsuccessful		(32.2%)	the procedures
Title, author, year	Study design & LOE	Population	Intervention	Outcomes	Results	Weaknesses & Strengths
Initial and Sustained Response Effects of 3 Vagal Maneuvers in Supraventricular Tachycardia: A Randomized, Clinical Trial, Ceylan, Ezgi Ozpolat, Cigdem Onur, Ozge Akoglu, Haldun Denizbasi, Arzu, 2019	RCT LOE:1	Patients in a stable supraventricular tachycardia n=98 (36 – 72 years old) MVM: n= 32 SVM: n= 33 Carotid Sinus Massage (CSN): n= 33	Vagal Maneuvers monitored by a 12 lead ECG SVM Pt is sitting vertically Pt is asked to blow into a syringe, which is connected to a sphygmomanometer, to achieve 30-40 mmHg of intrathoracic pressure MVM Pt is sitting vertically	Primary Outcome: A comparison of the effectiveness of the SVM & MVM at the 5 th min post treatment. Secondary Outcome: A comparison of the effectiveness of the SVM & MVM immediately	MVM 14/32 (43.7%) resulted in a successful treatment SVM 8/33 (24.2%) Resulted in successful treatment Response after 1 st min SVM 4/33 (12.1%)	<u>Weaknesses</u> Limited population size <u>Strengths</u> Focused on early outcome of the treatment Researched vagal maneuvers aside from SVM and MVM

			<p>Pt is asked to blow into a syringe, which is connected to a sphygmomanometer, to achieve 30-40 mmHg of intrathoracic pressure</p> <p>Pt has their legs passively raised to 45 degrees</p> <p>Adenosine was administered if the vagal maneuvers were unsuccessful with the cardioversion of SVT</p>	after and at the 1st min post treatment	<p>MVM 12/33 (37.5%)</p> <p>Response after 5th minute</p> <p>MVM 9/33 (28.1%)</p> <p>SVM 2/33 (6.1%)</p>	
Title, author, year	Study design & LOE	Population	Intervention	Outcomes	Results	Weaknesses & Strengths
<p>A multicenter randomized controlled trial of a modified Valsalva maneuver for cardioversion of supraventricular tachycardias,</p> <p>Chen, Chaofeng Tam, Tsz Kin Sun, Shuai Guo, Yanyan Teng, Peng Jin, Dong Xu, Liujian Liu, Xingpeng, 2020</p>	<p>Randomized Control Trial</p> <p>LOE: 1</p>	<p>Patients with a supraventricular tachycardia rhythm (18-70 years old)</p> <p>n=238</p> <p>Modified Valsalva</p>	<p>Vagal Maneuvers repeated up to 3 times if the Pt stays in an SVT rhythm</p> <p>Standard Valsalva Maneuver</p> <p>Pt takes a deep breath, and blows for</p>	<p>Primary:</p> <p>Conversion to sinus rhythm and is confirmed via ECG</p> <p>Secondary:</p>	<p>Primary Outcome:</p> <p>55(46%) in the MVM converted to a sinus rhythm compared to the SVM which 19(16%)</p>	<p><u>Weaknesses</u></p> <p>Differences in ways vagal maneuvers are performed</p>

		<p>Maneuver (MVM) n=119</p> <p>Standard Valsalva Maneuver (SVM) n=119</p>	<p>15s in a 10cc syringe and attempt to move the plunger</p> <p>Modified Valsalva Maneuver</p> <p>Blow 15s into 10cc syringe and passively held Pt 's legs up for 15s</p> <p>If the vagal maneuvers are unsuccessful then medications are used for the cardioversion of SVT</p>	<p>Medication Admission to hospital</p> <p>Length of time stayed in the ED</p>	<p>converted to a sinus rhythm.</p> <p>30% difference between the treatments</p> <p>Secondary outcome:</p> <p>Medications: SVM 84 (71%) converted to a sinus rhythm compared to the MVM in which 54(45%) converted to a sinus rhythm</p>	<p><u>Strengths</u></p> <p>Vast population size</p> <p>Implemented comparisons between different arrhythmias</p>
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Comments:

All of these studies were focused on patients who are in the ER or currently admitted in hospital. A lot of variable change in the prehospital settings such as time, the patient's condition, and setting the treatment is being done. Articles on vagal maneuvers in the prehospital setting are scarce and more research needs to be conducted in that area.

Considerations:

Each study focuses on the effectiveness of terminating an SVT rhythm by the standard and modified vagal maneuvers. Although this is a temporary fix for the arrhythmia, the underlying cause of the rhythm may not be solved and can possibly re-occur. More research is required to determine what the underlying causes of this arrhythmia is which can potentially modify the maneuvers to make them even more effective, and help with treatment. 2/3 studies had limited number patients available for the study which can change the variables of outcome.

Clinical bottom line:

All three studies came to the consensus that the modified Valsalva maneuver is considered to be the most effective treatment for the cardioversion of a SVT into a sinus rhythm. All three studies show a 20%+ difference in the effectiveness of the vagal maneuvers when they are compared in the clinical setting. Another benefit to the modified Valsalva maneuver is that it reduces the use of medication like adenosine for post treatment of the arrhythmia if the maneuver was unsuccessful. The modified Valsalva maneuver was also more effective in sustaining the sinus rhythm compared to the standard Valsalva.

References

- Çorbacioğlu, Ş K., Akıncı, E., Çevik, Y., Aytar, H., Öncül, M. V., Akkan, S., & Uzunosmanoğlu, H. (2017). Comparing the success rates of standard and modified Valsalva maneuvers to Terminate Psvt: A randomized controlled trial. *The American Journal of Emergency Medicine*, 35(11), 1662-1665. doi:10.1016/j.ajem.2017.05.034
- Ceylan, E., Ozpolat, C., Onur, O., Akoglu, H., & Denizbasi, A. (2019). Initial and sustained Response effects of 3 Vagal maneuvers In SUPRAVENTRICULAR Tachycardia: A Randomized, clinical trial. *The Journal of Emergency Medicine*, 57(3), 299-305. doi:10.1016/j.jemermed.2019.06.008
- Chen, C., Tam, T. K., Sun, S., Guo, Y., Teng, P., Jin, D., . . . Liu, X. (2020). A multicenter randomized controlled trial of a modified Valsalva maneuver for cardioversion of Supraventricular tachycardias. *The American Journal of Emergency Medicine*, 38(6), 1077-1081. doi:10.1016/j.ajem.2019.158371