

## **Standard Valsalva vs. Modified Valsalva for Treatment of SVT**

Paramedic Mini CAT – Fanshawe College

Date of review: 11.03.2021

**Author:** Sarah Aszalos, Primary Care Paramedic student, Fanshawe College, Ontario, Canada.

**Second party appraiser:** Alan Batt, Professor, Paramedic Programs, Fanshawe College, Ontario, Canada.

### **Clinical Scenario:**

Two paramedics are responding code 4 to a 25 year-old female patient complaining of chest pain. Upon arrival you find an obviously distressed female sitting on the couch holding her chest. She tells you that she not actually in pain, rather it feels like her heart is racing and jumping out of her chest. The attending paramedic collects a cardiovascular history while their partner hooks the patient up to the monitor using the 3 leads. Once hooked up the ECG reveals that the patient's rhythm is an SVT. The attending paramedic uses the current practice of the standard Valsalva maneuver in hopes to convert the SVT back into a normal sinus rhythm. Is this the most effective vagal intervention to use?

### **PICO (Population – Intervention – Comparison – Outcome) Question:**

In patients with SVT does the modified Valsalva maneuver when compared to the standard Valsalva maneuver result in more effective cardioversion?

### **Search Strategy:**

Modified Valsalva AND (Standard Valsalva OR Vagal Maneuvers) AND (SVT OR Supraventricular Tachycardia OR AVNRT OR AV Nodal Re-Entry Tachycardia)

**Limits:** 2015-2021, English language

**Search results:** 18 unique results; (18 Pubmed, 13 CINAHL)

**Included for review:** 3 articles were chosen for this mini CAT (articles were chosen based on relevance and the newest research currently available)

<b>Title, author, year</b>	<b>Study design &amp; LOE</b>	<b>Population</b>	Intervention	<b>Outcomes</b>	<b>Results</b>	<b>Weaknesses &amp; Strengths</b>
--------------------------------	-----------------------------------	-------------------	--------------	-----------------	----------------	---

<p>Comparing the success rates of standard and modified Valsalva maneuvers to terminate PSVT: A randomized controlled trial</p> <p>Çorbacioğlu et al. (2017)</p>	<p>Prospective, single-centre, randomized controlled trial.</p> <p>Conducted in the emergency department between Dec 1, 2015 and Dec 31, 2016.</p> <p>LOE: 2</p>	<p>56 patients were included in this study.</p> <p><b>Criteria:</b></p> <p>Aged 18-65 years</p> <p>Had a PSVT rhythm detected by an ECG</p>	<p>Both groups were required to blow into a 10 ml syringe for 15 seconds to achieve an intrathoracic pressure of approximately 40 mmHg.</p> <p><b>Intervention:</b></p> <p>The modified Valsalva group, was then brought to the supine position while the researcher held the patient's legs at 45 degrees for another 45 seconds</p> <p><b>Comparison:</b></p> <p>Standard Valsalva remained vertical after blowing into the syringe for 15 seconds</p>	<p><b>Primary Outcome:</b></p> <p>To compare the success rate of achieving a sinus rhythm and discharge from the emergency department after standard and modified Valsalva treatments</p> <p><b>Secondary Outcome:</b></p> <p>To determine if there are any adverse events during the use of any rescue treatment for SVT</p>	<p>Statistically, significantly more patients converted to a normal sinus rhythm when using the modified Valsalva maneuver (42.9%) when compared with the standard Valsalva maneuver (10.7%).</p> <p>Significantly fewer patients also required a rescue treatment after the modified Valsalva maneuver was used (57.1%) in comparison to the standard Valsalva (89.3%)</p> <p><b>Secondary Outcome:</b></p> <p>There were no serious adverse</p>	<p><b>Weaknesses:</b></p> <p>The population of the study used was very small therefore the results cannot be generalized</p> <p>The researchers and patients were also not blind to which maneuver was being used due to the nature of the study.</p> <p>The pressure created by the syringe was also not standardized by a manometer</p>
--	--	---	--	---	---	---

Title, author, year	Study design & LOE	Population	Intervention	Outcomes	Results	Weaknesses & Strengths
					<p>effects in either group.</p> <p>Indirectly, the modified Valsalva maneuver also reduced the need for anti-arrhythmic medications such as adenosine</p>	

<p>Initial and sustained response effects of 3 vagal maneuvers in supraventricular tachycardia: a randomized, clinical trial</p> <p>Ceylan et al. (2019)</p>	<p>Prospective, single-centre, randomized clinical trial within a training hospital's emergency room.</p> <p>Conducted between June 3, 2016, and Nov 10, 2017</p> <p>LOE 2:</p>	<p>98 adult patients that presented with SVT to the ED were included in this study.</p> <p><b>Criteria:</b></p> <p>Over the age of 18</p> <p>Present with SVT to the ED</p>	<p><b>Intervention:</b></p> <p><u>Standard Valsalva Maneuver (sVM):</u> patients sit vertically and blow into a syringe for 20 seconds.</p> <p><u>Modified Valsalva Maneuver (mVM):</u> first applied the sVM then followed up by raising the patient's legs 45 degrees</p> <p><u>Carotid Sinus Massage (CSM):</u> patient is placed in supine position with head tilted in the opposite direction. The carotid sinus</p>	<p><b>Primary Outcome:</b> sustained success rates five minutes after the application of the vagal maneuver.</p> <p><b>Secondary Outcome:</b> Success rates immediately after the performance of the vagal maneuver</p>	<p><b>Instances of SVT that were initially treated successfully:</b></p> <p>mVM 14/32 (43.7%) patients</p> <p>sVM 8/33 (24.2%) patients</p> <p>CSM 3/33 (9.1%)</p> <p>Although the conversion rate for mVM is greater than both sVM and CSM, there is only enough statistical support that mVM is a more effective intervention for treating SVT than CSM.</p>	<p><b>Strengths:</b></p> <p>The extensive exclusion criteria for the SVT patients within this study decreases likelihood that the outcome is based off an extraneous variable</p> <p><b>Weaknesses:</b></p> <p>The study was carried out in a single center decreasing any potential variability and diversity.</p> <p>Despite block allocation of maneuvers, the mean age of patients in mVM was significantly lower.</p>
--	---	---	---	---	--	--

Title, author, year	Study design & LOE	Population	Intervention	Outcomes	Results	Weaknesses & Strengths
			is located below the angle of the jaw and finger pressure is used to massage the carotid sinus in an upward-downward motion followed by a posterior-anterior motion.			Due to the nature of the maneuvers, it is impossible for neither the patient nor the physician to be blind to the study.

<p>Postural modification to the standard Valsalva manoeuvre for emergency treatment of supraventricular tachycardias (REVERT): a randomised controlled trial</p> <p>Appelboam, A., et al. (2015)</p>	<p>Randomized, multicenter parallel group trial in ten emergency departments in southwest England.</p> <p>Conducted between Jan 1, 2013, and April 30, 2015.</p> <p>LOE 2:</p>	<p>711 patients experiencing SVT were screened at various emergency departments in southwest England. Of these patients 433 adults were randomly assigned as participants.</p>	<p>Both interventions started with the patient forcing expiration against a standardized pressure of 40 mmHg for 15 seconds</p> <p><b>Intervention:</b></p> <p>The modified Valsalva (lying down with leg lift Valsalva)</p> <p><b>Comparison:</b></p> <p>The standard Valsalva Maneuver (stay sitting Valsalva) was used as a control where the patient would remain seated at the 45 degree angle.</p>	<p><b>Primary Outcome:</b></p> <p>Achieve a sinus rhythm at 1 minute after one minute of the Valsalva maneuver</p> <p><b>Secondary Outcomes:</b></p> <p>The use of adenosine</p> <p>The use of any emergency treatment of SVT</p> <p>Need and reason for admission to hospital</p> <p>Length of time participants spend in the emergency department</p>	<p>93/214 (43%) of the participants in the modified Valsalva group achieved sinus rhythm at one minute</p> <p>37/214 (17%) of the participants in the standard Valsalva group achieved sinus rhythm at one minute</p>	<p><b>Strengths</b></p> <p>Strict allocation concealment regarding the control and the intervention was disguised from patients</p> <p>The diversity and variability of the sample size due to the use of multiple emergency departments, and larger sample size</p> <p><b>Weaknesses</b></p> <p>Treating physicians would not be masked to treatment allocation due to the nature of the procedure</p>
--	--	--	--	---	---	---

## **Comments:**

There is very little available research comparing different vagal interventions. Studies regarding the modified Valsalva maneuver are limited. The first available randomized controlled study of this regard by Appelboam et al. is included above.

## **Considerations:**

As of right now the published research available has all been conducted within the emergency department setting. Although, promising, more research needs to be done regarding the effectiveness of the modified Valsalva maneuver within the pre-hospital setting to determine whether or not the success rate can be replicated in an uncontrolled environment.

## **Clinical bottom line:**

The standard Valsalva maneuver has been used in the past to convert supraventricular tachycardia (SVT) to a normal sinus rhythm it may not be the most effective intervention that paramedics can perform. The modified Valsalva maneuver showed greater effectiveness across all the papers reviewed. Not only does the modified Valsalva more effectively convert SVT back to normal sinus rhythm it also produces secondary indirect effects including the reduction of SVT conversion medication being administered including adenosine. However, there is still a lack of research regarding the modified Valsalva maneuver

## **References**

Appelboam, A., et al. (2015). Postural modification to the standard Valsalva manoeuvre for emergency treatment of supraventricular tachycardias (REVERT): a randomised controlled trial. *Lancet*, 386:1747-53.

[http://dx.doi.org/10.1016/S0140-6736\(15\)61485-4](http://dx.doi.org/10.1016/S0140-6736(15)61485-4)

Ceylan, E., et al. (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.

<https://doi.org/10.1016/j.jemermed.2019.06.008>

Çorbacioğlu, S. K., et al. (2017). Comparing the success rates of standard and modified Valsalva maneuvers to terminate PSVT: A randomized controlled trial. *American Journal of Emergency Medicine*, 35 (11), 1662-65.

<http://dx.doi.org/10.1016/j.ajem.2017.05.034>

