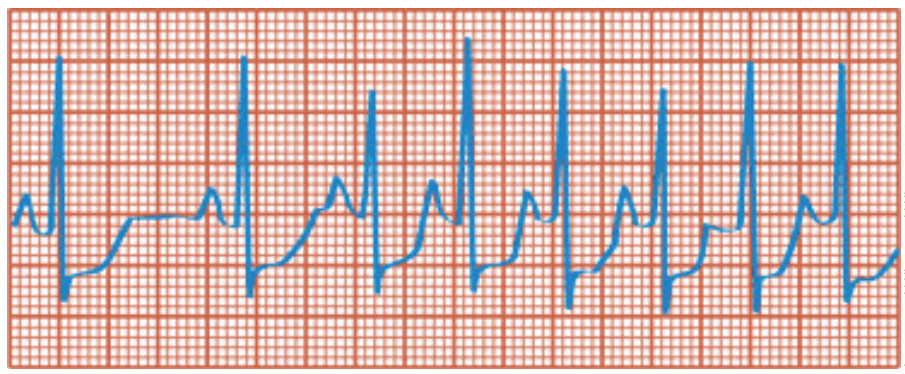
A Modified Valsalva Stops PSVT 40% of the Time

BY DAVID VINSON, MD, & DUSTIN BALLARD, MD



Lippincott Williams & Wilkins, 2012

We all know that the Valsalva maneuver is one of the most effective and least risky first-line approaches to paroxysmal supraventricular tachycardia, even recommended by the American Heart Association and the like. (*Circulation* 2003;108[15]:1871; *Lancet* 1988;1[8596]:1181.) But that doesn't mean clinicians always employ it or even know how to use it properly.

The customary Valsalva puts the patient in a supine or semi-recumbent position and has him exhale forcefully for 15 seconds against a closed glottis after a normal inspiratory effort. The strained exhalation can be accomplished by having the patient blow into a 10 mL syringe to the point of just moving the plunger, and the maneuver can be repeated if unsuccessful. But success rates range from six to 54 percent (*Eur J Emerg Med* 2012;19[6]:346), and those low rates demonstrate how lack of education and technique standardization can greatly handicap outcomes. The truth is that physicians often don't know how to correctly apply the maneuver, so it's not routinely used as a first-line therapy. (*Emerg Med Australas* 2004;16[4]:284.)

A new study from Britain, however, published in *Lancet* by Appelboam, et al., adds a new twist to the Valsalva. (2015;386[10005]:1747.) The researchers modified the technique by adding a leg lift at the end to attenuate the natural sympathetic surge that follows the Valsalva strain. The Modified Valsalva Maneuver begins with the patient in a semi-recumbent position performing strained exhalation for 15 seconds. Upon completing the strain, the patient's torso is dropped into a supine position while undergoing a passive leg raise at 45 degrees for 15 seconds. The patient is then restored to the initial position for 30 seconds. If paroxysmal supraventricular tachycardia (PSVT) persists, these steps can be repeated once.

This modified Valsalva maneuver restored sinus rhythm in 43 percent of the 214 patients with narrow complex PSVT in Appelboam's

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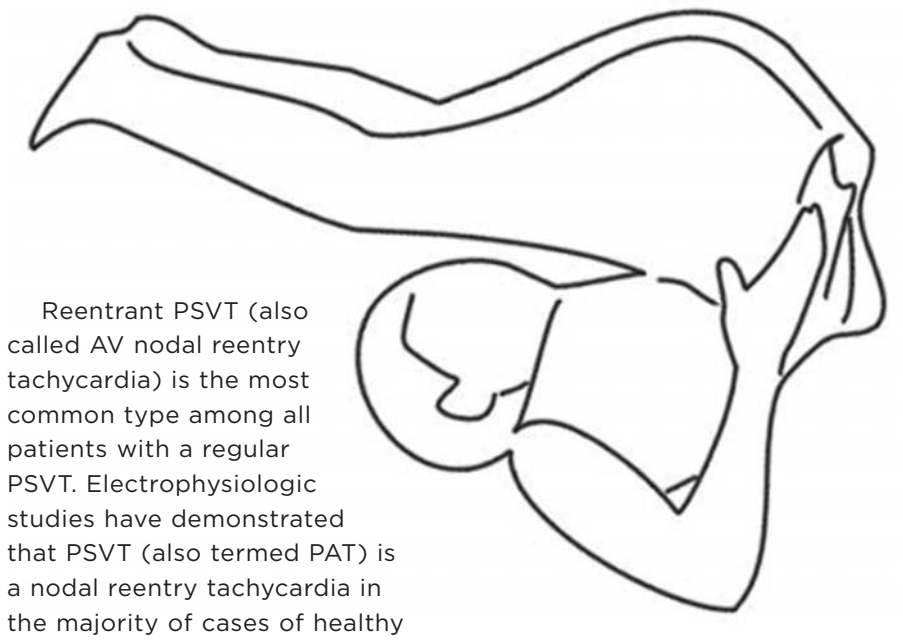
An Effective Maneuver to Break PSVT

BY ALAN C. SCHWARTZ, MD



I have tried many vagal maneuvers (coughing, straining, ice water to the face, carotid massage, and others) over the years to break paroxysmal supraventricular tachycardia (PSVT) in otherwise healthy patients, all with little success. I discovered a maneuver, however, that has a far higher rate of success. It is relatively simple and works in approximately 20 to 30 seconds.

Have the patient lie flat on his back and raise his feet over his head as far as he can. (Pictured.) The knees can be bent. Increase the effectiveness of this maneuver by having the patient take a breath and strain while in this position. As with any other medical intervention, this maneuver has some risk, such as back injury, neck injury, spinal cord injury with paralysis, and stroke, to name a few. Do not do this maneuver if your patient's rapid heart rate is from a different cause.

Reentrant PSVT (also called AV nodal reentry tachycardia) is the most common type among all patients with a regular PSVT. Electrophysiologic studies have demonstrated that PSVT (also termed PAT) is a nodal reentry tachycardia in the majority of cases of healthy patients with no structural heart disease. The patients most likely to respond to vagal maneuvers are those with paroxysmal reentry nodal tachycardia because vagal stimulation prolongs AV nodal conduction time and can terminate arrhythmias, which depend on AV nodal reentry for their continuation. Vagal maneuvers would not be expected to work and may be dangerous in patients whose arrhythmia is secondary to a cause such as hypovolemia, hypoxia, sepsis, drugs, and many others.

Vagal maneuvers increase vagal tone via multiple mechanisms, two of which are increasing intrathoracic pressure and increasing blood pressure. I would suggest that the maneuver described in this article works better simply because it causes a greater rise in blood pressure and intrathoracic pressure and causes greater vagal stimulation than other vagal maneuvers. Increasing arterial blood pressure stretches the baroreceptors (high pressure receptors) in the large arteries of the upper body, most notably in the aortic arch and the internal carotid artery just above the carotid bifurcation (carotid sinus). When baroreceptors are stimulated, nerve impulses enter the brain and result in increased vagal output and inhibition of sympathetic nervous system output.

The blood pressure and intrathoracic pressure of patients in the position pictured probably rise more than when they are straining in the supine or sitting position. Holding the legs above the head also increases venous return to the heart and adds to the rise in blood pressure that one experiences in this position. **EMN**

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study, compared with 17 percent in the standard Valsalva group. (Adjusted odds ratio for success was 3.7 [95% CI 2.3–5.8; p<0.0001]). Patients who failed to respond to both versions of the Valsalva maneuver were treated with intravenous adenosine: 69 percent in the standard group vs. 50 percent in the modified.

This is promising new evidence. The methodology of the maneuver makes physiologic sense and seems easy to deploy in practice. How about a real-life trial? This is what happened when one of us (Dr. Ballard) gave it a go.

Putting into Practice

A 60-year-old patient presented with palpitations and tachycardia. A quick perusal of the patient's medical record demonstrated a known history of PSVT. The patient was nontoxic but glistened with sweat and exuded anxiety. His heart rate was 220 bpm on the ECG, regular, and looked a lot like narrow-complex PSVT.

Many EPs are not familiar with the Valsalva maneuver, resulting in varying success rates and low usage

We tried the modified Valsalva maneuver. The patient made the stopper of the syringe flicker a bit for 15 seconds, and then down went his head and up went his legs. The monitor, however, did not blip; it kept on ticking along double time. "I'll put in an IV and ask Charles to get the adenosine," the nurse said and abruptly left the room.

Sure enough, after returning to a semi-recumbent position, there was no change in rhythm. The patient was offered another round of the modified Valsalva, but we ultimately opted for the adenosine instead. A few minutes later, he was back in normal sinus rhythm. No one involved seemed impressed by the Appelboaming.

Based on an n of one, this particular piece of new research may not be ripe for robust knowledge translation, but the maneuver is quite simple and easy to remember — 15 seconds of blowing, 15 seconds of leg raising — and we will consider trying it again.

This technique (done twice if needed) worked two of five times in Appelboam's hands. If we achieve a rate in keeping with that trial (40%), we'll save a number of patients an IV insertion and the uncomfortable experience of adenosine. **EMN**

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