DEM Journal Club

Article Appraisal

Article: Postural modification to the standard Valsalva manoeuvre for emergency treatment of supraventricular tachycardias (REVERT): a randomised controlled trial

Date of Journal Club: November 5, 2015

Resident Reviewer Name(s) and Residency Affiliation: Dr. Kerry Walker RCPS-EM R2

Faculty Methodology/Bio-statistics Resource Person: Dr. Iain McPhail

---

Background and Study Objective(s):

Supraventricualr tachycardia (SVT) is a common form of cardiac dysrthmia which presents to the Emergency Department (ED). Standard ACLS and ED protocol are to attempt valsalva maneuvers in a stable patient without any contraindications to the maneuver. Classically, it has been found that there has been highly variable cardioversion to sinus rhythm, with results varying from 5 to 20%. Subsequently, patients are given intravenous Adenosine, which is an unpleasant experience for patients and can result in adverse events.

This study sought to compare the cardioversion rate of classic valsalva maneauver to a modified version meant to increase vagal stimulation.

Study Design:

Inclusion: >18yrs, non-a. fib/flutter SVT presenting to ED with no prior tx for this episode and not enrolled in the study previously

Exclusion: unstable (SBP<90 or indication for immed. cardioversion), suspected flutter requiring adenosine trial, contraindication to valsalva, inability to perform valsalva (AS, ACS, CM, glaucoma, retinopathy), lie supine, or have legs lifted, 3rd trimester of pregnancy

Intervention: Patients supine with HOB at 45 degrees, did standardized strain 40mmgHg for 15 seconds (monitored), then had ECG done after 60 seconds. The modified group were laid completely supine and their legs lifted to 45 degrees for 15 seconds immediately after the strain. They subsequently had an ECG done after 45 seconds. All treatments afterwards were at the discretion of the physician.

Multi-centred pragmatic RCT with permuted block concealed allocation
- permuted block allocation - sequence of blocks each containing a pre-specified number of treatment assignments in random order (2,4,6 in a 1:1 randomization) and stratified by centre

- 10 Emergency Departments were involved - 2 academic and 8 district hospitals in England over 28 months
- patients and health care workers (clinicians) could not be blinded to treatment
- all other investigators were blinded, including cardiologists and electrophysiologists

Intention to treat and per protocol analysis
- intention to treat - used in superiority trials to avoid any bias
- per-protocol - comparison of treatment groups that includes only those patients who completed the treatment originally allocation, which can lead to bias
- missing data - endpoint committee reviewed chart to determine outcome and sensitivity analysis done
- no cross-overs in study and no patients lost to follow-up

Results:

- Recruitment by centre varied from 5.1-15%, but each centre had equal numbers of the groups
- Baseline characteristics of the groups (and missed cases) similar
- All patients had the treatment they were assigned as the first valsalva attempt, but after there was a significant variability in the treatments given
- All patients were given d/c instructions and 10cc syringe
- study powered for 12% absolute improvement
- standard valsalva presumed cardio version rate 15%

Primary outcome = return to sinus (ECG confirmed) at 1min after intervention
- standard valsalva 17%, modified valsalva 43%, absolute difference ARR 26.2% ($p<0.001$, NNT 3.8)

Secondary outcomes = use of adenosine, hospital admission, length of stay in ED, adverse events
- adenosine standard 69%, adenosine modified 50%, P = 0.0002 NNT 5.3
- any anti-arrhythmic tx 80% vs 57% $P<0.0001$
- d/c home from ED 68% vs 63% P = 0.28
- any adverse event standard 4%, any adverse event modified 6%, not statistically significant P = 0.32
- 0 serious adverse events
- no difference in hospital admission or length of stay in ED; P = 0.28 and 0.31

Validity of Results:

- well-designed trial
- the only noted criticism is that they used manometers to measure the strain instead of the syringe technique, but the syringe technique has been validated in other studies

Generalizability of Results:

- appears to apply to our stable SVT patients as the study was done within similar institutions
- their SVT prevalence was higher than some local EP's felt ours were, but this would need to be reviewed
- there were no serious adverse event recorded and no statistical different between the groups for overall adverse events
- the intervention does not cost any more than the control and certainly can save a significant amount of money if it is successful

The Bottom Line:

Modified valsalva (added leg lift) compared to standard valsalva leads to an increased cardioversion rate (NNT = 4) and decreased adenosine administration (NNT = 5), without any serious adverse events.

Video see http://rebelem.com/the-revert-trial-a-modified-valsalva-maneuver-to-convert-svt/