

INPLASY

Efficacy and safety of the modified Valsalva manoeuvre for treatment of paroxysmal supraventricular tachycardias: a meta-analysis

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 28 October 2023 and was last updated on 28 October 2023.

INTRODUCTION

Review question / Objective The present study aimed to investigate the efficacy and safety of modified Valsalva maneuver in the treatment of paroxysmal supraventricular tachycardia (PSVT) compared with the standard Valsalva maneuver.

Rationale The ethical guidelines and patient consent were not applicable for meta-analysis based on published articles.

Condition being studied Paroxysmal supraventricular tachycardias (PSVT) is the most common cardiac arrhythmia in emergency departments, with a prevalence of approximately 2.25/1000 individuals and 35 new cases per 100,000 individuals each year. PSVT is characterized by sudden onset and termination, variable duration of episodes, and generally has no impact on blood pressure. However, if not

promptly terminated in elderly patients or those with underlying conditions such as coronary artery disease or severe infections, it can lead to circulatory failure or even sudden death.

Common treatment methods for PSVT include vagal maneuvers, antiarrhythmic drug therapy, and radiofrequency ablation. Vagal maneuvers include the diving reflex, oculocardiac reflex, carotid sinus massage, bearing down and gag reflex/stimulating the cough reflex, and Valsalva maneuver. Standard Valsalva maneuver has been recommended by international guidelines for terminating PSVT, but its success rate in restoring normal rhythm was low. Modified Valsalva maneuver involves assuming a semi-recumbent position and passive leg raising to an angle of 45° immediately after the standard Valsalva maneuver. By changing body position, it increases intrathoracic and intra-abdominal pressure, more effectively stimulates the activities of carotid body and aortic arch baroreceptors, activates the vagus nerve, and slows down heart rate.

In recent years, there have been several studies reporting that modified valsalva maneuver significantly improves the success rate of restoring normal rhythm in PSVT and has good safety. However, due to differences in study design, intervention method and small samples, the results of different studies are quite different, its safety and overall efficacy are difficult to quantify and there are no sufficient large-scale clinical researches and evidence-based medicine to guide clinical practice. Therefore, this study aims to conduct a systematic review to evaluate the effectiveness and safety of modified valsalva maneuver in treating PSVT, in order to provide reference for clinical practice.

METHODS

Search strategy The databases PubMed, Embase, Web of Science, Chinese National Knowledge Infrastructure, WanFang and China Science and Technology Journal Database were systematically searched for studies published from inception to May 1, 2023 without language limits. We also manually searched the lists of included studies to identify additional potentially eligible studies. If there were two or more studies described the same population, only the study with the largest sample size was chosen. The following keywords were used, both separately and in combination, as part of the search strategy in each database: “Valsalva”, “supraventricular tachycardias” and “PSVT”.

Participant or population Adults patients with SVT.

Intervention The experimental group was treated with MVM.

Comparator The control group was treated with SVM while the experimental group was treated with MVM.

Study designs to be included randomized controlled trials.

Eligibility criteria Studies were included in the meta-analysis if they had randomized controlled trials (RCTs) involving more than 30 adults patients with SVT, if the patient's hemodynamic stability is maintained; if the control group was treated with SVM while the experimental group was treated with MVM and if they reported sufficient details about the success rate of achieving sinus rhythm after VM and the rate of adverse events.

Information sources The databases PubMed, Embase, Web of Science, Chinese National Knowledge Infrastructure, WanFang and China Science and Technology Journal Database were systematically searched for studies published from inception to May 1, 2023 without language limits. We also manually searched the lists of included studies to identify additional potentially eligible studies.

Main outcome(s) The total success rate of cardioversion, the success rate of first cardioversion and adverse reactions.

Quality assessment / Risk of bias analysis The quality of included studies was independently evaluated by the two reviewers based on the Revised Cochrane risk of bias tool for randomized trials. Any disagreement was resolved by another reviewer.

Strategy of data synthesis All meta-analyses were performed using STATA 16 (StataCorp, TX, USA). The the risk ratio (RR) in binary variables between patient groups were calculated, together with the associated 95% confidence intervals (CIs). The heterogeneity between studies was analyzed using a chi-squared test ($p < 0.10$) and quantified using the I² statistic. When no statistical heterogeneity was observed, a fixed-effects model was utilized. Otherwise, a random-effects model was used. Sensitivity analysis was conducted to examine the impact of individual studies on the overall effect size. Funnel plot together with Begg's test were used to evaluate publication bias. A two-tailed $P < 0.05$ was regarded as statistically significant.

Subgroup analysis Potential sources of clinical heterogeneity were identified using subgroup.

Sensitivity analysis Sensitivity analysis was conducted to examine the impact of individual studies on the overall effect size.

Language restriction No.

Country(ies) involved China.

Keywords Paroxysmal supraventricular tachycardias; Modified Valsalva manoeuvre; Meta-analysis; Systematical review; Randomized controlled trial.

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