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Abstract: Review

The Comparison of Left Atrial Appendage Closure and Oral Anti-Coagulant in the Prevention of Stroke in Non-Valvular Atrial Fibrillation: A Systematic Review and Meta-Analysis

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Background: Non-valvular atrial fibrillation (NVAf) has been known to increase the risk of stroke. Stroke prevention using oral anti-coagulant (OAC) is central in managing NVAf. Patients who cannot tolerate OAC are encouraged to undergo left atrial appendage closure (LAAC), a non-pharmacological approach to prevent stroke. This study aims to compare LAAC and OAC to prevent stroke in NVAf patients.

Methods: We conducted a systematic search using PubMed, SpringerLink, ProQuest, and EBSCOHost. Studies that compared LAAC with either warfarin or new oral anti-coagulants were included. The articles were collected using the PRISMA diagram, critically appraised using PICO analysis, the data were analyzed using review manager 5.4.1. We analyzed stroke events as the primary outcome and all-cause mortality, systemic embolism, and non-procedural bleeding, as the secondary outcome. The results were effect size expressed as risk ratio, heterogeneity, and study model. Risk of bias analysis was performed using a revised tool for Risk of Bias in randomized trials (RoB 2 tool).

Results: Five RCTs with a total of 2,625 NVAf patients showed no significant difference between LAAC and OAC in preventing stroke (RR= 0.61; 95% CI 0.22-1.66; p=0.33). There is a significant difference in non-procedural bleeding, but not in all-cause mortality and systemic embolism outcomes (RR= 0.58; 95% CI 0.42-0.80; p=0.0008; RR= 1.07; 95% CI 0.45-2.52; p=0.88; RR= 1.07; 95% CI 0.52-2.21; p=0.85, respectively). However, when we conducted sub analysis between LAAC and warfarin, LAAC appears to be significantly better than warfarin in decreasing stroke event, non-procedural bleeding, and all-cause mortality (RR= 0.29; 95% CI 0.13-0.63; p=0.002; RR= 0.61; 95% CI 0.38-0.99; p=0.04; RR= 0.69; 95% CI 0.51-0.92; p=0.01, respectively). Whereas for systemic embolism, the difference between LAAC and warfarin was not significant (RR= 1.27; 95% CI 0.58-2.79; p=0.55).

Conclusion

There is no significant difference in stroke event, all-cause mortality, and systemic embolism between LAAC and OAC. However, LAAC was better than OAC in decreasing non-procedural bleeding risk. Furthermore, LAAC was better than warfarin in decreasing stroke, all-cause mortality, and non-procedural bleeding risk. Thus, LAAC is a reasonable alternative for stroke prevention in NVAf patients who cannot tolerate OAC.

Keywords: Atrial fibrillation, left atrial appendage closure, oral anti-coagulant, preventive medicine, stroke

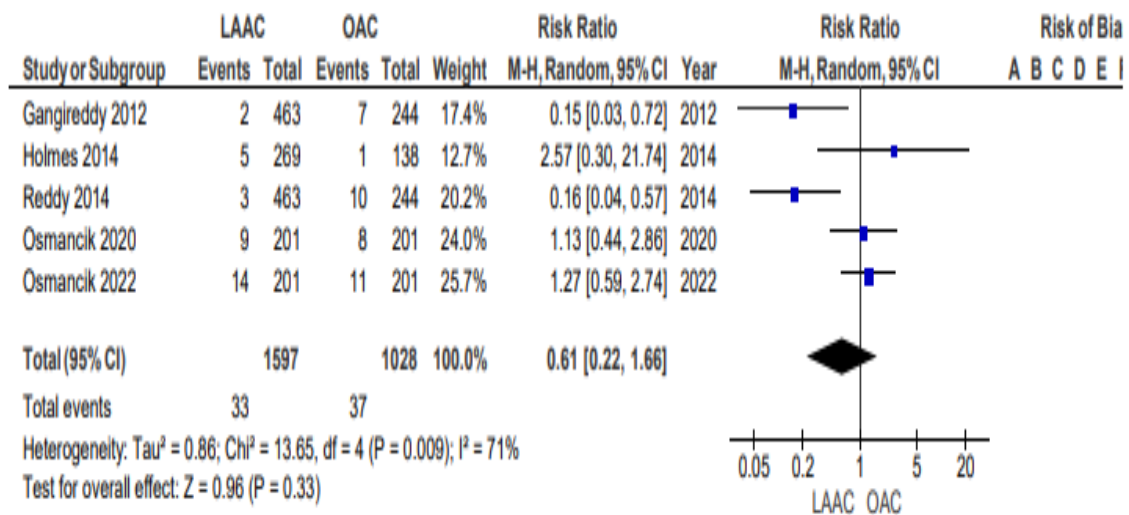




Figure 1. Forest plot of

OAC group

stroke event between LAAC and

REVIEW

Home-Based Cardiac Telerehabilitation Versus Center-Based Cardiac Rehabilitation in Coronary Artery Disease Patients: A Systematic Review and Meta-Analysis

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Background: Home-based cardiac telerehabilitation (HBCT) is considered to be an effective and practicable alternative to the conventional center-based cardiac rehabilitation (CBCR), however there have been no studies performed to compare those two methods, mainly in coronary artery disease (CAD) patients. This study was aimed to assess the effect of HBCT compared to CBCR regarding cardiorespiratory fitness and quality of life in CAD patients.

Methods: A comprehensive literature retrieval of PubMed, Cochrane, and ProQuest from the inception of databases to July 7, 2022 was performed. Randomized clinical trial studies reporting CAD patients and comparing the cardiorespiratory impact of HBCT versus CBCR were included. Outcomes of interest were some post treatment' cardiorespiratory fitness indicators across both groups, including peak VO₂, maximum heart rate and peak workload. We pooled the standardized mean difference along with 95% CI using inverse variance and fixed-effect model.

Results: Six studies involving 429 subjects (224 subjects undergone HBCT) were finally taken into the quantitative analysis. Most of the sample was male (96.97%), with mean age of 58.61±2.55 years old. Our findings showed that HBCT improved peak VO₂ (SMD: 0.43, 95% CI: 0.23 to 0.63, P < 0.001) and peak workload (SMD: 0.60, 95% CI: 0.35 to 0.84, P < 0.001) post treatment compared to the baseline. There were not any significant differences documented in peak VO₂, maximum heart rate nor peak workload among HBCT compared to CBCR patients with CAD (SMD: 0.04, 0.10, and -0.13, 95% CI: -0.16 to 0.23, -0.17 to 0.37 and -0.37 to 0.12, P = 0.72, P = 0.47 and P = 0.31 respectively).

Conclusion: Home-based cardiac rehabilitation was found effective in enhancing some cardiorespiratory fitness aspects in CAD patients. No outcome difference was found between HBCT and CBCR, which means that HBCT could be considered as a substitution of the conventional method.

Keywords: home-based cardiac telerehabilitation, HBCT, center-based cardiac rehabilitation, coronary artery disease

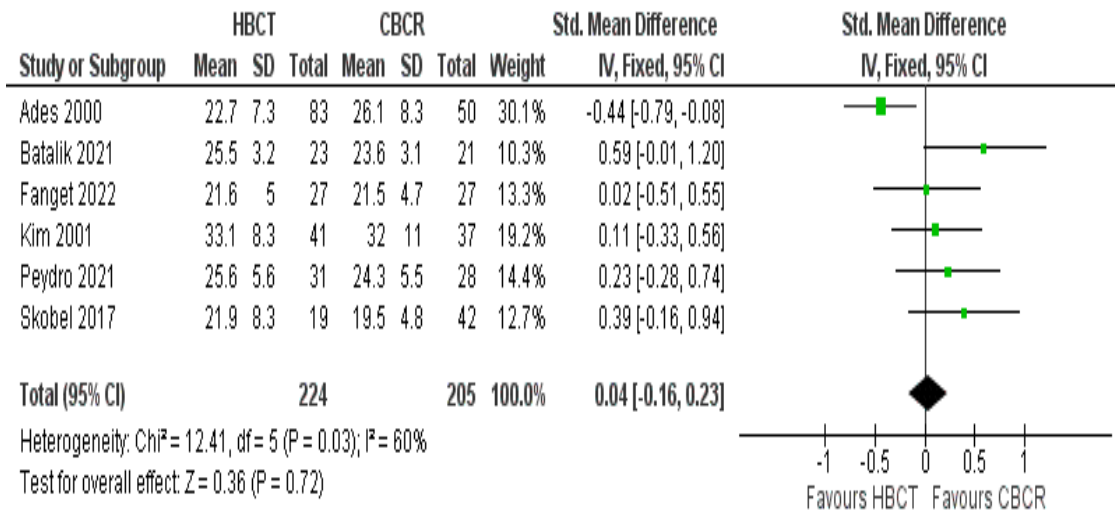


Figure 1. Forest plot of meta-analysis between HBCT versus CBCR regarding peak VO₂ in patients with CAD

REVIEW

Impacts of Interleukin-6 Levels on Anatomical, Functional, and Clinical Outcomes of Patients with Acute Coronary Syndrome: A Systematic Review and Meta-Analysis

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Background: The occurrence of acute coronary syndrome (ACS) has been linked to an increase in both local and systemic inflammatory responses. This evokes the exploration of the potential prognostic roles of inflammatory biomarkers, including interleukin-6 (IL-6). However, the correlation between IL-6 and adverse outcomes in patients with ACS differs considerably among studies. Therefore, we conducted a systematic review and meta-analysis to investigate the correlation between IL-6 and anatomical and functional outcomes in ACS patients, as well as its ability to predict clinical outcomes.

Methods: Systematic literature search was performed through Pubmed, EMBASE, and ClinicalKey using pre-determined inclusion and exclusion criteria. Studies assessing the association between IL-6 and either clinical, anatomical, or functional outcomes in ACS patients were included. Quality assessment was performed using Newcastle-Ottawa Scale. All meta-analyses were performed using Review Manager version 5.4.

Results: The systematic review comprised 29 studies with 35,744 subjects (male 71.7%, average age 56 years) ACS patients. In terms of anatomical outcome, all studies (six studies, n = 1,364) demonstrated a significant positive correlation between IL-6 levels and final infarct size. Five studies (n = 1,786) performing correlation analysis showed a significant negative correlation between IL-6 and left ventricular ejection fraction (LVEF) and one study (n = 258) showed significantly lower median LVEF in patients with higher IL-6 levels. Pooled analyses showed that IL-6 levels were significantly associated with mortality (HR 1.59, 95% CI 1.25 – 2.02; p<0.001) and composite adverse cardiovascular events (HR 1.20, 95% CI 1.06 – 1.36; p=0.005). No significant association was found for the incidence of reinfarction (HR 1.09, 95% CI 0.77 – 1.54; p=0.63) and heart failure (HR 2.00, 95% CI 0.92 – 4.35; p=0.08).

Conclusion: Higher IL-6 levels may provide independent prognostic values for predicting anatomical, functional, and clinical outcomes in ACS patients.

Keywords: Interleukin-6, acute coronary syndrome, outcomes

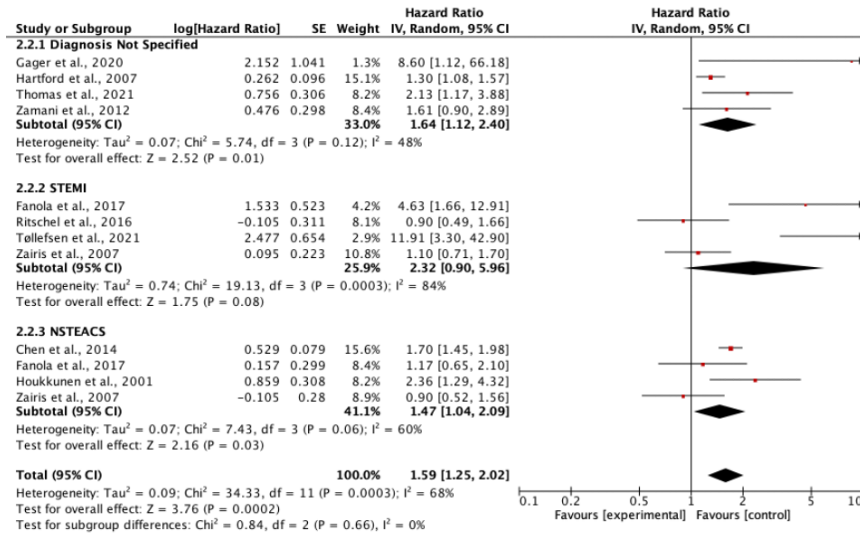


Figure 1. Meta-analysis for the association between IL-6 levels and mortality



REVIEW

Association between Sleep Duration and Acute Coronary Syndrome: A Meta-Analysis of Cohort Studies

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Background: Recently, sleep was identified for having an important role in the pathogenesis of cardiovascular diseases. In this study, we aimed to figure out the association between sleep duration and the incidence of Acute Coronary Syndrome (ACS).

Methods: We searched the online database PubMed until July 2022. We used the following KEYWORD: (sleep duration OR sleep amount OR length of sleep) AND (Acute Coronary Syndrome OR Myocardial Infarction) AND cohort. We identified 16 studies and filtered the studies through title and abstract screening and applying the inclusion and exclusion criteria, we further reviewed eight studies with full-text reading. We excluded five studies because of insufficient data required. Meta-Analysis were conducted using RevMan 5.4.

Results: A Total of 3 studies were collected, involving 114166 adults. The incidence of ACS was 0.99% in Short Sleep Duration (SSD) ($t < 6$ h), 0.69% in Normal Sleep Duration (NSD) ($6 < t < 9$ h), and 2.19% in Long Sleep Duration (LSD) ($t > 9$ h). The meta-analysis demonstrated that SSD increased the risk of ACS compared with NSD (RR = 1.51, 95% CI: 1.15-1.97, $P = 0.003$), LSD increased the risk of ACS compared with NSD (RR = 1.55, 95% CI: 1.06-2.26, $P = 0.02$), and the risk of ACS has no significant difference between SSD and LSD (RR = 1.11, 95% CI: 0.79-1.55, $P = 0.56$).

Conclusion: Short sleep duration or long sleep duration can increase the risk of Acute Coronary Syndrome compared to normal sleep duration. Several studies stated that sleep disorders are associated with an increase in sympathetic activity, increase in blood pressure and a decrease in glucose tolerance.

Keywords: sleep duration, acute coronary syndrome, meta-analysis



REVIEW

Outcomes of Optical Coherence Tomography Guided Percutaneous Coronary Intervention Against Angiography Guided in Patients with Coronary Artery Disease: A Systematic Reviews and Meta-Analysis

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Background: Previous studies compared optical coherence tomography (OCT) guided percutaneous coronary intervention (PCI) and angiography-guided was still limited. Therefore, we performed comprehensive meta-analysis to investigate the clinical outcomes of OCT-guided compared with angiography-guided PCI to provide a higher level of evidence.

Methods: A systematic search from electronic databases such as Pubmed, EMBASE, SpringerLink, and Cochrane Library was conducted to obtain original articles comparing OCT and angiography. Major adverse cardiac events (MACE), cardiovascular death, myocardial infarction (MI), stent thrombosis, target vessel revascularization, stenosis area, PCI procedure time, contrast volume, and procedural side effects were the measured outcomes. The primary end-points were MACE and cardiovascular death.

Results: Total 11 studies included 5814 patients were analyzed, with 3431 using OCT-guided and 2383 using angiography-guided. Pooled estimates of outcomes, presented as odds ratios (OR) [95% confidence intervals], were generated with random-effect models. Regarding clinical outcomes, OCT-guided PCI showed significantly lower rate of MACE (odds ratio [OR] 0.52, 95% confidence interval [CI] 0.38 to 0.72, $p < 0.001$), cardiovascular death (OR 0.47, 95% CI 0.33 to 0.67, $p < 0.001$), and higher contrast volume (OR 1.6, 95% CI 0.81 to 2.39, $p < 0.001$). OCT-guided has longer PCI procedure time (OR 2.42, 95% CI 1.33 to 4.42, $p = 0.004$). OCT-guided has no significant difference in lower risk of periprocedural MI (OR 0.59, 95% CI 0.35 to 1.00, $p = 0.05$), stent thrombosis (OR 0.69, 95% CI 0.2 to 2.43, $p = 0.56$), target vessel repeat revascularization (OR 0.74, 95% CI 0.47 to 1.14, $p = 0.17$), stenosis area (OR -0.63, 95% CI -1.5 to 0.25, $p = 0.56$), and adverse events related to procedures (OR 1.33, 95% CI 0.8 to 2.19, $p = 0.27$).

Conclusion: Our meta-analysis demonstrated that OCT-guided PCI is significantly associated with lower MACE, cardiovascular death, and higher contrast volume. It is also associated with a longer duration of PCI. However, it is not associated with MI, stent thrombosis, target vessel revascularization, stenosis area, and adverse events related to procedures.

Keywords: OCT, Angiography, PCI

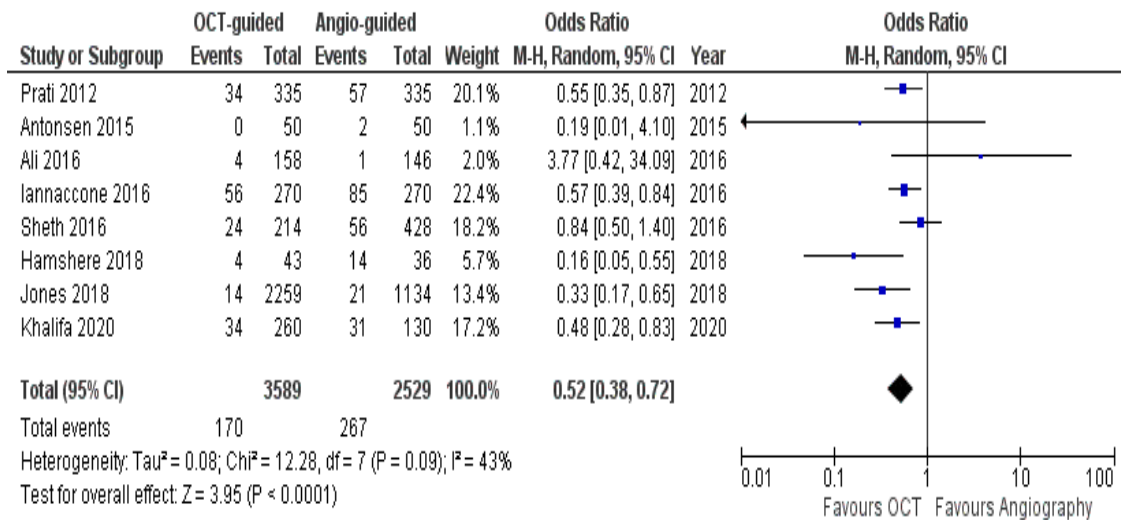


Figure 1. Forest plot of meta-analysis comparing MACE outcomes between OCT-guided against angiography-guided in PCI

REVIEW

Small or Asymptomatic Ventricular Septal Defects: Close or Not to Close? A Systematic Review

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Background: Most small or asymptomatic Ventricular Septal Defects (VSD) close spontaneously in early childhood, however a proportion persists to adulthood. Decision surrounding closure of small or asymptomatic VSDs have been controversial, however in its natural history, some may impose various long-term sequelae including development of arrhythmia, ventricular outflow obstruction, decreased exercise tolerance and bouts of infective endocarditis. This study aims to systematically review available evidence regarding long-term clinical and echocardiographic outcomes in unrepaired small or asymptomatic VSDs to rationalize whether closure should be considered.

Method: Four databases (PubMed®, OVID EMBASE, Scopus, and The Cochrane Library) were searched for articles published up to July 2022. Studies fulfilling our predetermined eligibility criteria were critically appraised using the appropriate tools (Newcastle-Ottawa Scale for cohort studies, ROB-2 tool for randomized controlled trials (RCT) and ROBINS-I tool for non-randomized trials)). Data were extracted and subsequently analyzed qualitatively.

Results: Thirteen studies (One RCT, one non-randomized trial and 11 cohort studies) from nine different countries were included in our qualitative synthesis, amassing a total of 7073 small or asymptomatic unrepaired VSD patients. Out of the 11 cohort studies, six studies were of good quality, three were of fair quality and two were of poor quality, while both RCT and non-randomized controlled trials had moderate risk of bias. Patients with small, unrepaired VSDs had significant reductions in peak aerobic cardiopulmonary exercise test values as well as anaerobic ventilatory threshold values compared to healthy controls. Infective Endocarditis mostly developed in adulthood and is mostly seen in unrepaired VSDs. Aortic Regurgitation can be observed on a small proportion of small unrepaired VSDs and are mostly mild and are more prevalent in moderate to large sized VSDs, while most arrhythmias occurring on small VSDs are of supraventricular origin.

Conclusion: Incidences of Aortic Regurgitation, arrhythmia, and Infective Endocarditis in small unrepaired VSDs are low but may still develop in later life, and patients still possess lower exercise tolerance. Closure of small VSDs still need to be made on a case-to-case basis, however careful surveillance of its clinical course is needed to avoid serious morbidities.

Keywords: Small Regurgitation, Arrhythmia, Infective Endocarditis, Exercise Test

Ventricular Septal Defect, Aortic

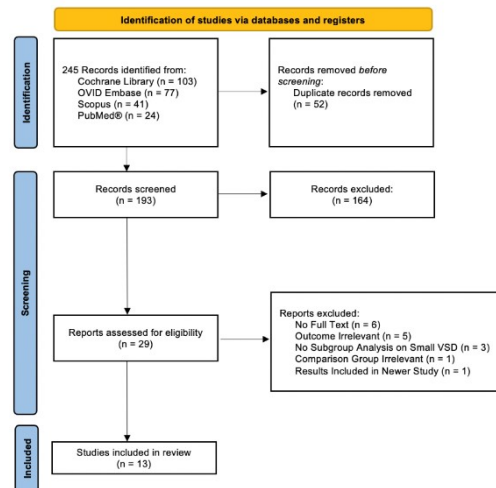


Figure 1. PRISMA Flow Diagram for Study Selection. VSD: Ventricular Septal Defect.

Figure 1. PRISMA Flow Diagram for Study Selection. VSD: Ventricular Septal Defect.

REVIEW

The Role of 6 Minutes Walking Test as a Predictor for Mortality in Heart Failure with Reduced Ejection Fraction Patients: A Meta-analysis Study

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Background: The 6 Minutes Walking Test (6MWT) is a simple and non-invasive test that can be used to assess performance capacity in patients with Heart Failure (HF). The results then can be analyzed to predict the mortality of HF patients, particularly those with Reduced Ejection Fraction (HFrEF). The aim of this study was to examine the prognostic value of 6MWT as a predictor for mortality in Heart Failure with Reduced Ejection Fraction (HFrEF) patients.

Methods: Systematic literatures search was conducted through online databases including PubMed and Wiley to find relevant Studies from 2000 to 2022. Random-effect model was used to analyze. Confidence Interval (CI) of 95% were reported. I² test was used to assess the heterogeneity across studies. Meta-analysis was performed using RevMan 5.3.

Result: Five studies involving 10064 participants were included. On pooled analysis, mortality was higher in group of patients with poor performance in 6MWT compared to the patients in good performance group: 27% vs 10.1%, respectively (RR 2.17 [1.38, 3.41], p: 0.0008, I²: 95%)

Conclusion: Good performance in 6MWT was associated with lower mortality rates in patients with heart failure.

Keywords: 6MWT, Mortality, Reduced Ejection Fraction, Heart Failure

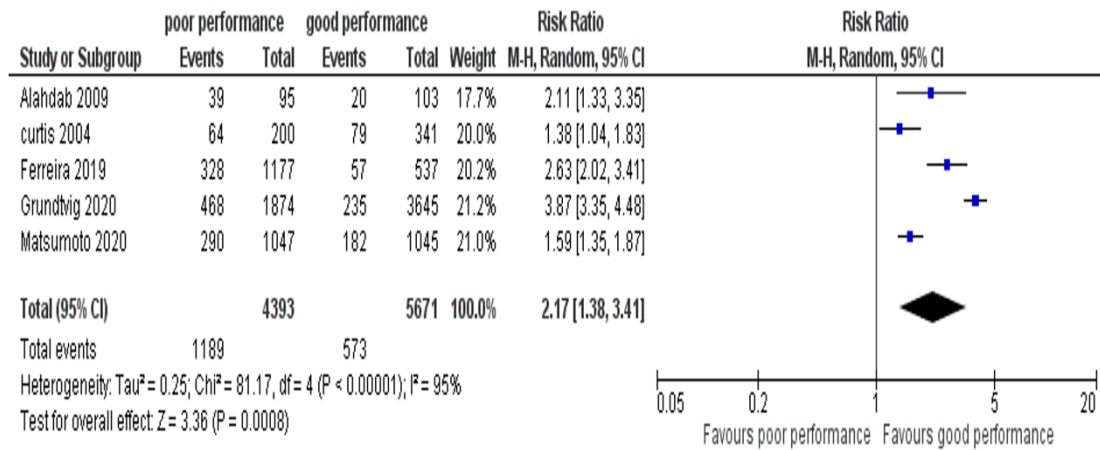


Figure 1. Forest Plot.

REVIEW

Clinical Effectiveness and Safety of Aspirin and Other Anticoagulants for Venous Thromboembolism Prophylaxis after Major Orthopedic Surgery: A Systematic Review and Meta-analysis of Randomized Controlled Trials

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Background: Patients undergoing major orthopedic surgeries such as total hip replacement (THR), total knee replacement (TKR), and trauma surgery are at an elevated risk of venous thromboembolism (VTE), causing significant morbidity and mortality. Previous studies have investigated the use of aspirin as a thromboprophylaxis agent for arthroplasty apart from trauma surgery. Therefore, we sought to analyze the efficacy of aspirin compared to other anticoagulants for VTE prophylaxis in patients undergoing major orthopedic surgeries.

Methods: This study was performed and reported according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Guideline. The protocol of the study was registered to PROSPERO. Randomized controlled trials that investigated the use of aspirin as thromboprophylaxis on major orthopedic lower limb surgery were included and analyzed. The quality analysis of the literature and level of evidence was assessed. The primary clinical outcome was VTE (DVT or PE). Secondary clinical outcomes included mortality, bleeding events, and wound complication.

Results: Eight high-quality studies, with level 2 evidence, (published within 2006-2021) were included, with a total of 6209 patients. The incidence of VTE in aspirin was found not significant than other anticoagulants (RR = 1.18, P=0.25). Regarding secondary outcomes, there are no significant differences between aspirin and other anticoagulants (mortality P=0.69; bleeding events P=0.61; wound complication P=0.24).

Conclusion: The current meta-analysis showed no difference between aspirin and other anticoagulants for thromboprophylaxis agents in preventing VTE, mortality, bleeding events and wound complications in patients who underwent major orthopedic surgeries.

Keywords: Aspirin, anticoagulants, VTE, orthopedic surgeries

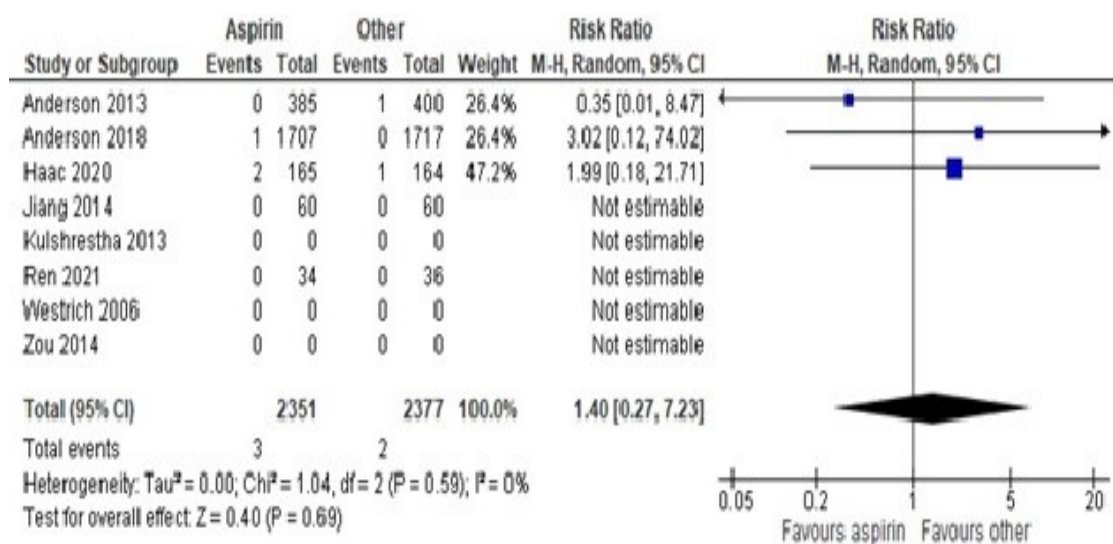


Figure 1. Forest plot of VTE incidence

REVIEW

Evaluation Of Myocardial Fibrosis And Dysfunction In Congenital Heart Disease With Pulmonary Arterial Hypertension Using Cardiac T1 Mapping: A Systematic Review

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Background : Myocardial fibrosis contributes to the development of heart failure in congenital heart disease (CHD), especially later in adulthood when pulmonary arterial hypertension (PAH) develops. The right ventricle (RV) characteristics of its thin wall and trabeculations proved to be challenging in measuring the myocardial extracellular volume (ECV). Elevated myocardial T1-mapping and ECV measured on CMR is associated with myocardial fibrosis. This review aims to provide a summary of T1-mapping in myocardial fibrosis in PAH due to congenital heart disease.

Method : A systematic research was conducted through PubMed, Cochrane and ScienceDirect using KEYWORD of T1 mapping, CMR, myocardial fibrosis, congenital heart disease and pulmonary heart disease in July 2020. Selections include original articles and full-text papers appraised with PRISMA®.

Result : A total of 8 articles were identified in corresponding KEYWORD. Overall, T1 values were higher in PAH due to congenital heart disease with ranging from MD 1,059-1,160 vs 943-1,023 (control) at RV insertion point (RVIP) and then at RV free wall MD 996-1,126 vs 0-1,012 (control) at RV free wall, followed by MD 981-1,066 vs 940-1,017 (control) at septum measured using 1.5 Tesla Siemens system. ECV values were also higher in CHD-PAH compared with control most notably at RV insertion points (MD 34.2 vs 28.4), followed by RV free wall and septum (34.2 vs 26.7; 33.6 vs 27.9, respectively).

Conclusion : Myocardial T1 mapping and ECV values are comparably higher in patients with congenital heart disease and pulmonary arterial hypertension than in healthy controls using CMR acquisition. The highest point of differences are at the RV insertion point. Elevated T1 mapping and ECV measured on CMR were associated with RV fibrosis, poor RV function and RV dilatation. T1 mapping can predict the myocardial dysfunction and severity of PAH.

Keywords: congenital heart disease, T1 mapping, pulmonary arterial pressure, ventricle fibrosis, cardiac mri

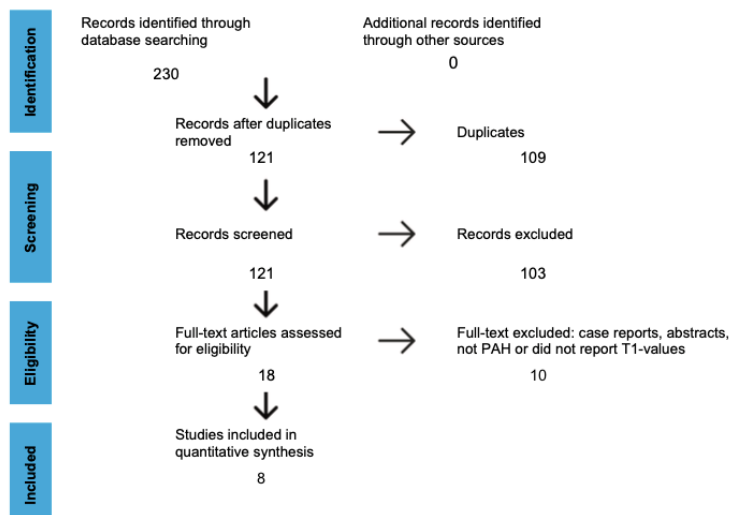


Figure 1. PRISMA Flowchart.

REVIEW

Marked Reduction of Ischemia Signs After Extracorporeal Shockwave Myocardial Revascularization Therapy in Patient with Refractory Angina: A Single Center Experience

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Background and Aim: Extracorporeal shockwave myocardial revascularization (ESMR) is a novel potential treatment for patients with refractory angina due to coronary artery disease. However, there was still limited study regarding the efficacy of ESMR to reduce myocardial ischemia. We therefore aimed to study the effect of ESMR to reduce ischemia signs in patient with refractory angina.

Methods: We retrospectively studied 10 patients with refractory angina despite optimal medical therapy and not suitable for further PCI or CABG, who underwent ESMR in Dr. Mohammad Hoesin General Hospital, Palembang, Indonesia from March 2021 to March 2022. Stress echocardiography, speckle tracking echocardiography (STE), and Seattle Angina Questionnaire (SAQ)-7 assessment were performed at baseline and 3 months after the last session of ESMR.

Results: A total of six male and four female patients from 48-64 years old were included. Nine sessions of ESMR therapy were successfully applied to each patient without major side effects. After ESMR, there was a significant improvement in global longitudinal strain (GLS) value assessed by STE from $-12.6\% \pm 5.82$ to $-14\% \pm 4.65$ ($p=0.036$). There was no difference in wall motion score index (WMSI) delta ($p=0.596$) and LVEF from baseline to 3-month follow-up ($49.8\% \pm 19.58$ vs $47.6\% \pm 17.90$, $p=0.168$). Angina onset was slightly increased from 215 to 233 seconds, but not significant ($p=0.72$). Moreover, evaluation of SAQ-7 scores at follow-up demonstrated significant improvement of symptoms in the aspect of physical limitation ($p=0.005$), angina frequency ($p<0.0001$), and quality of life ($p=0.005$). GLS was known to be more sensitive than LVEF to predict LV function because it indicates sub-clinical myocardial dysfunction. The improvement of GLS value showed that ESMR did not cause myocardial damage in our patients. We also identify one patient with improvement from positive at baseline to negative stress-induced ischemia at 3 months after ESMR. The negative stress test result after therapy strengthened the potential efficacy of ESMR.

Conclusion: This study demonstrated that ESMR was safe and efficacious treatment for refractory angina patients, as it can reduce the ischemia signs by improving clinical outcomes and echocardiography parameters. Larger studies with longer follow-up period are necessary to better elucidate our findings.

Keywords: Extracorporeal shockwave myocardial revascularization, ischemia, refractory angina, global longitudinal strain



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