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Abstracts: Review Articles

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Comparison of Efficacy and Safety Between Endovenous Laser Ablation and Radiofrequency Ablation in Venous Insufficiency: A Systematic Review and Meta-analysis of Randomized Controlled Trials

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Background: The treatment of venous insufficiency has changed during the time and in association with technological advances, there has been continuous research for the treatment of the disease. This study was conducted to compare the efficacy and safety between endovenous laser ablation (EVLA) and radiofrequency ablation (RFA) in venous insufficiency.
Methods: We searched through PubMed, Science Direct, and Google Scholar for randomized controlled trials (RCTs) of EVLA and RFA for venous insufficiency. RCTs were screened with our eligibility criteria and the quality was evaluated using the Cochrane Risk Index of Bias tools. The primary outcome analyzed in this study were the safety and efficacy depicted by the venous clinical severity score (VCSS), pain, and complications manifested post-procedure, respectively measured as mean difference (MD), standardized mean difference (SMD), and risk ratio (RR) with 95% confidence intervals (CIs). Heterogeneity was assessed using the I^2 test. All statistical analysis were performed using Review Manager 5.4.
Results: Thirteen RCTs involving 3772 patients (of whom 1580 received EVLA) met the inclusion criteria. Our pooled analysis showed that the efficacy of RFA group was significantly better than EVLA group with lower VCSS (MD 0.33, 95% CI 0.16, 0.50, p=0.0001 , I^2=31%), while the post-procedural pain was not significant (SMD 0.17, 95% CI -0.14, 0.74, p=0.55 , I^2=97%). Furthermore, the occurrence of complications post-procedure were also not significant (RR 0.92, 95% CI 0.67, 1.27, p=0.62, I^2 = 82%).
Conclusion: Our study revealed that there was significant difference in treatment efficacy shown by the lower VCSS result in the RFA group, while a non-significant difference in post-procedural pain were observed. Furthermore, this study also suggested that there were no significant difference for the aspect of safety between both groups, as demonstrated by non-significant difference in the occurrence of complications post-procedure.

Keywords: Endovenous Thermal Ablation; Endovenous Laser Ablation; Radiofrequency Ablation; Venous Insufficiency

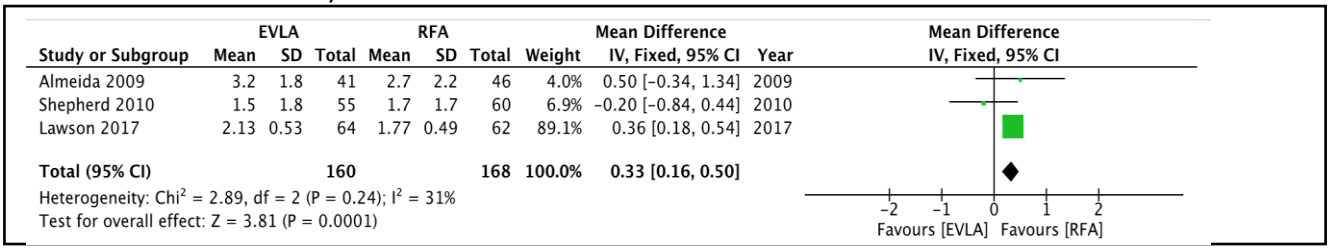

Figure 1. Forest Plot of comparative efficacy shown by the VCSS post EVLA and RFA procedure.

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Fractional Flow Reserved-Guided Multivessel versus Culprit Lesion Only Percutaneous Coronary Intervention in ST-Elevation Myocardial Infarction with Multivessel Coronary Artery Disease: A Meta-Analysis of Randomized Controlled Trials

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Background and aims: This study aims to compare the outcomes of patients following fractional flow reserve (FFR) guided multivessel percutaneous coronary intervention (PCI) and culprit lesion only PCI for ST-elevation myocardial infarction (STEMI) with multivessel coronary artery disease.
Methods: We performed a systematic search in PubMed, ScienceDirect, and ProQuest for randomized controlled trials comparing FFR-guided multivessel PCI and culprit lesion only PCI in STEMI patients with multivessel coronary artery disease. Included studies were evaluated for risk of bias based on Cochrane Collaboration's tool for assessing risk of bias. A meta-analysis was conducted using the data extracted from each study. Review Manager (RevMan) 5.4 was utilized to compute the summary of odds ratios (OR) and 95% confidence intervals (CI) for the outcomes (major adverse cardiac events (MACEs) that defined as all cause mortality, myocardial infarction (MI), and urgent revascularization).
Results: We identified three randomized controlled trials involving 1,633 STEMI patients; 689 underwent FFR-guided multivessel PCI and 944 underwent culprit lesion only PCI. Pooled analysis showed that FFR-guided multivessel PCI led to significant reduction of MACE (composite of death, MI, and urgent revascularization) compared to culprit lesion only PCI [OR 0.47 (95% CI 0.36, 0.63; p<0.00001; I^2=0.64)]. This result was primarily driven by significant reduction in urgent revascularization [OR 0.36 (95% CI 0.26, 0.51; p<0.00001; I^2=0.70)]. There were no significant differences in all cause mortality and myocardial infarction of both groups.
Conclusion: FFR-guided multivessel PCI was associated with significant reduction of MACE compared to culprit lesion only PCI in STEMI patients with multivessel coronary artery disease. This difference was primarily driven by lower rate of urgent revascularization in FFR-guided multivessel PCI group.

Keywords: *Fractional flow reserve, percutaneous coronary intervention, multivessel coronary artery disease, ST-elevation myocardial infarction*

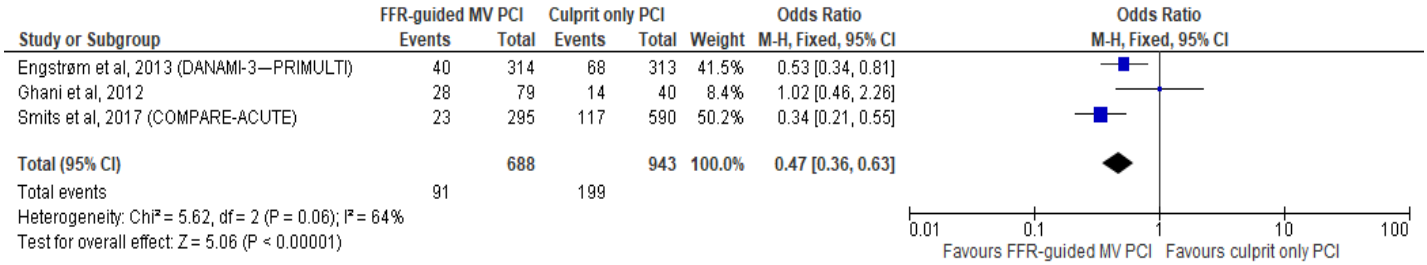

Figure 1. Forest plot for MACE.

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Cost-effectiveness of transcatheter aortic valve implantation in patient with Severe Symptomatic Aortic Stenosis and intermediate surgical risk: a Systematic Review

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Background and aims: Transcatheter aortic valve implantation (TAVI) has rapidly emerged as a standard of care for inoperable patients and "preferred" less invasive alternative to surgical aortic valve replacement (SAVR) for patients with severe symptomatic aortic stenosis and high surgical risk. This study was conducted to analyse the cost-effectiveness of this novel technique for patients with intermediate operative risk.

Methods: The systematic review was conducted by two reviewers using 3 electronic databases with timeframe of January 2016 to August 2021 as per PRISMA guidelines. The primary endpoints were the incremental cost-effectiveness ratio (ICER) and the probability of cost-effectiveness. The eligible studies included those in which the cost-effectiveness data were measured or projected for TAVI and SAVR in patients with severe aortic stenosis with intermediate surgical risk. All forms of TAVI were included, and all retrieved publications were limited to the English language.

Results: Five studies were included for quantitative assessment. The ICER for TAVI compared with SAVR for intermediate-risk surgical candidate are TAVI dominant in two studies, and calculatable ICER ranged from US$ 8,622 to US$ 25,036 per quality-adjusted life year (QALY) gained. The probability of TAVI being cost-effective compared with medical therapy ranged from 0.75 to 0.98, with four of five studies shown cost-effective probability over 90%.

Conclusions: The use of TAVI is potentially a cost-effective option compared to SAVR in treating patient with severe symptomatic aortic stenosis with intermediate surgical risk.

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Early versus late transcatheter closure of ventricular septal rupture following myocardial infarction: A systematic review and meta-summary of cases

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Background and aims: Ventricular septal rupture (VSR) is rare but catastrophic complication of acute myocardial infarction. Transcutaneous closure of post-myocardial infarction ventricular septal defect (PIVSD) is nowadays a reliable alternative to surgery. Although the recent guidelines recommend immediate intervention, the optimal timing for PIVSD closure is a matter of ongoing debate. In this study, we aim to compare the clinical outcome in patients with early versus late transcatheter closure of PIVSD.

Methods: A systematic searching from online databases was performed. This study was conducted according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) statement. All cases series, case reports, observational studies and trials reporting the timing of transcatheter closure of PIVSD and outcome of 30-day mortality were included in search. Intervention was defined early if performed within ≤ 14 days and late if performed >14 days after diagnosis of PIVSD. A statistical analysis was performed using SPSS version 25.0. Chi-squared and T-test were used for comparison.

Results: A total of 22 studies on 111 patients were included. The overall 30-day mortality was 42.3% and successful device implantation was high (85.6%). Cardiogenic shock was found in 54.6% patients. There were 54% of procedures performed earlier in acute phase (≤14 days). There were no significant differences in baseline characteristics between early and late group, except in VSD location. The 30-day mortality in early group was significantly higher than late group (58.3% vs 23.5% respectively, $p<0.00001$). PIVSD patients with cardiogenic shock was also associated with a significantly higher mortality (69.8% vs 42.6%, $p=0.008$) compared to patients without cardiogenic shock. The probable reason for higher mortality in patients undergoing PIVSD closure in acute phase might be related to weak and fragile infarcted myocardium and unstable hemodynamics.

Conclusion: Our study confirms the early transcatheter closure of PIVSD (≤14 days) was associated with higher mortality. Therefore, the time between VSR diagnosis and its repair is a determining factor for survival of PIVSD patients. Further and larger studies are needed to better evaluate the optimal timing for PIVSD closure.

Keywords: Post-myocardial infarction, ventricular septal rupture, transcatheter closure

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Pulmonary Artery Denervation as Safe and Effective Treatment for Pulmonary Hypertension: A Systematic Review and Meta-Analysis

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Background: Sympathetic overactivity plays an important role in the progression of pulmonary hypertension (PH). Destruction of pulmonary arterial sympathetic nerves by pulmonary artery denervation (PADN) may be beneficiary for PH patients. This study aims to determine the safety and efficacy of PADN for PH treatment.
Methods: We performed systematic review of literatures on online databases from inception to September 12, 2021. Risk of bias and quality of each studies were assessed using Newcastle-Ottawa Scale (NOS).
Results: A total of 7 studies comprising 308 patients were included in the meta-analysis. The follow-up period varied between studies, from 3 to 12 months. The pooled proportion of PADN-related adverse events was 1% (95% CI -0.01-0.02), and most of the adverse events were non-serious. We found significantly greater reduction in pulmonary vascular resistance in PADN group compared with medical therapy group (MD 401.31 dyn.s.cm-5; 95% CI 69.24-733.39; p=0.02; I2=95%), and greater reduction in systolic pulmonary artery pressure (sPAP) and mean pulmonary artery pressure (mPAP) in PADN group ([MD 10.77 mmHg, 95% CI 5.33-16.21, p=0.0001, I2=0%] and [MD 9.44 mmHg; 95% CI 4.9-13.98; p<0.0001; I2=74%], respectively). We also found greater improvement in cardiac output in PADN group (MD 0.44 l/min; 95% CI 0.05-0.83; p=0.03; I2=81%). For echocardiographic parameter, we found greater reduction in RV Tei-index in PADN group (MD 0.16%; 95% CI 0.08 - 0.24; p<0.0001; I2=65%), however the improvement in TAPSE was not statistically significant (MD 0.25 mm; 95% CI -0.05-0.56; p=0.10; I2=80%). For clinical outcomes, we found significantly greater increment in 6-minutes walk distance (6MWD) test (MD 101.08 m; 95% CI 32.86 - 104.34; p=0.002; I2=84%) and greater reduction in NT-proBNP concentration in PADN group (MD 834.53 pg/mL; 95% CI 150.64 - 1518.41; p=0.02; I2=76%). We also found higher risk of rehospitalization in medical therapy group compared with PADN group (RR 3.90; 95% CI 1.36-11.20; P=0.01; I2=23%), however the risk of all-cause death was not statistically significant (RR 2.62; 95% CI 0.78-8.79; p=0.12; I2=0%).
Conclusion: PADN in patients with PH was safe, effective, and resulted in substantial improvement in hemodynamic, echocardiographic, and clinical outcomes compared with medical therapy.

Keywords: pulmonary artery denervation, pulmonary hypertension, pulmonary artery pressure, pulmonary vascular resistance

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Long-term Clinical Outcome Comparison of Spot Stenting Implantation versus Full Lesion Coverage for Long Coronary Lesions: A Comprehensive Meta-analysis

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Background: The use of overlapping stents, number of stents, and stent length have all associate with an increase in stent implantation procedure bad outcomes. Therefore, we conducted a meta-analysis with the available studies comparing spot stenting implantation and full lesion coverage for long coronary lesion treatment.
Methods: A comprehensive literature searching was conducted through four electronic databases (PubMed, Cochrane Library, Proquest, and Ebscohost) from inception to October 10th, 2021 for studies assessing the long-term clinical outcomes of the spot stent implantation and full lesion coverage implantation in treating long coronary lesions. The primary outcome was the incidence of death, stent thrombosis, myocardial infarction, target vessel revascularization, target lesion revascularization, and restenosis. Data were analyzed using a random-effects model with RevMan version 5.4.
Results: Three randomized control trials; two prospective cohort studies – with a total of 2294 patients were finally included for meta-analysis. The result showed similar outcomes between spot stenting implantation and full lesion coverage implantation for treatment of long coronary lesions with regard to the incidence of death (pooled risk ratio, RR=0.88 95% CI [0.35, 2.21]; p=0.78), stent thrombosis (pooled risk ratio, RR=1.02 95% CI [0.32, 3.29]; p=0.98), myocardial infarction (pooled risk ratio, RR=0.74 95% CI [0.26, 2.09]; p=0.57), and target vessel revascularization (pooled risk ratio, RR=0.78 95% CI [0.16, 3.75]; p=0.76). However, this study showed that the rate of target lesion revascularization (pooled risk ratio, RR=0.66 95% CI [0.46, 0.96]; p=0.03) and restenosis (pooled risk ratio, RR=0.61 95% CI [0.43, 0.85]; p=0.004) were significantly lower in long coronary lesions treated with spot stenting strategy compared with full lesion coverage strategy.
Conclusion: Spot stenting implantation decreased the risk of stent thrombosis and restenosis in long-term observation compared with full lesion coverage implantation for long coronary lesions. More high quality studies are needed to confirm this finding.

Keywords: stent, revascularization, long coronary lesion

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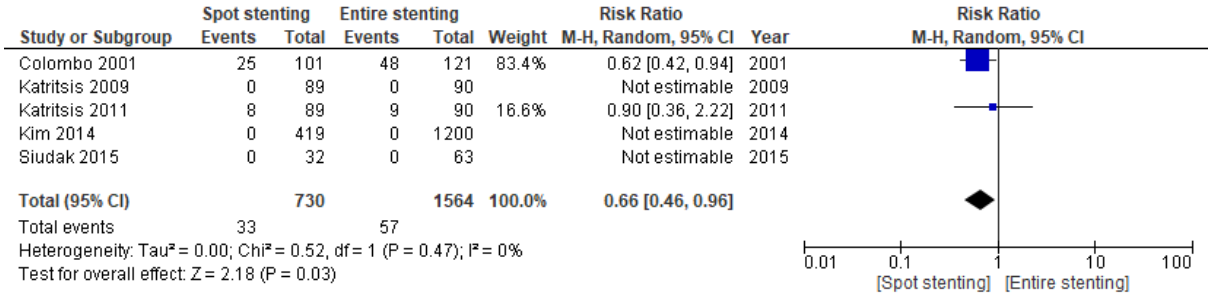

Figure 1. Forest plot of comparison: spot stenting vs entire stenting or full lesion coverage for long coronary lesion or diffuse coronary lesion or extensive coronary lesion, outcome: Target lesion revascularization.

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Contrast-Induced Nephropathy and the association with vascular access in invasive coronary catheterization: a Literature Review

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Background and aims: Contrast induced nephropathy (CIN) is a common problem issue of procedures that using contrast media, such as interventional coronary management. In this review, we will discuss the association of contrast-induced nephropathy (CIN) and the vascular access approaches in invasive coronary catheterization.
Discussion: Contrast-induced nephropathy (CIN) is a well-known serious complication of contrast media (CM) use in percutaneous coronary intervention (PCI), and is associated with increased morbidity and mortality. The pathophysiology of contrast-induced nephropathy after invasive coronary catheterization is multifactorial. It derives from multiple mechanism, including contrast volume use, type of contrast media, and embolization of cholesterol into the renal arteries during the catheter manipulation in the aorta due to the vascular access approach such as transradial-access (TRA) or transfemoral-access (TFA).
Conclusion: Altough the exact mechanisms leading to the development of CIN is remain unclear and complex, the vascular access approaches of PCI may also play a role. Transradial percutaneous coronary intervention is associated with a reduction in vascular complications and bleeding, and may thereby reduce the risk of renal injury from hemodynamic instability resulting from hemorrhagic complications. By using transradial PCI to avoid descending aortic catheterization, the risk of cholesterol embolization to the kidney can be minimized, which can also reduce the risk of renal complications after PCI.

Keywords: contrast induced nephropathy; invasive coronary catheterization; vascular access.