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Meta-analysis of Usefulness of Drug Coated Balloon Versus Standard Balloon in the Treatment of Femoropopliteal In-Stent-Restenosis

The current guidelines for the treatment of femoropopliteal disease recommend percutaneous transluminal angioplasty either alone or in combination with atherectomy, drug-coated balloon angioplasty or angioplasty integrated with stent implantation as feasible alternatives. Although the use of stents has improved the patency rates following percutaneous transluminal angioplasty in femoropopliteal disease, the rates of in-stent stenosis (ISR) still ranges from 15% to 32%. The evidence and guidelines for the management of ISR after femoropopliteal stent implantation are not conclusive. Studies have compared drug-coated balloon (DCB) versus standard balloon for the treatment of femoropopliteal ISR in the past. We performed an updated meta-analysis of randomized controlled trials (RCTs) and observation studies comparing DCB versus standard balloon for the treatment of femoropopliteal ISR.

We performed a systematic search of the PubMed and Cochrane databases from the inception of the databases to March 2020. The inclusion criteria were RCTs and observation studies comparing DCB versus standard balloon as a treatment option for femoropopliteal stent ISR. The outcomes of interest were all-cause mortality and target vessel revascularization. We used the inverse variance method with the Paule-Mandel (PM) estimator of tau with Hartung-Knapp-Sidik-Jonkman adjustment to analyze risk ratio (RR) with 95% confidence interval (CI) and 95% prediction interval. All analysis were carried out using R version 3.6.2.

Five studies, 4 RCTs and 1 observational studies were included in the final analysis.[1−5] There was no difference in the risk of all-cause mortality between DCB versus standard balloon as a treatment modality for the treatment of femoropopliteal stent ISR (RR 0.87, 95% CI 0.37 to 2.04, $I^2 = 0\%$, 95% PI 0.28 to 2.76) (Figure 1). Likewise, there was no difference in the risk of target vessel revascularization between the treatment strategies for femoral ISR (RR 0.87, 95% CI 0.37 to 2.04, I2 = 0%, 95% PI 0.28 to 2.76) (Figure 1). The pooled estimate had considerable heterogeneity, however, individual studies were heterogeneous based on treatment effect and were not heterogeneous based on the conclusion.

The present meta-analysis studied DCB versus standard balloon angioplasty as a treatment modality for femoropopliteal stent ISR and found no difference in the risk of all-cause mortality or target vessel revascularization between two treatment modality. The European society of cardiology guidelines provides a

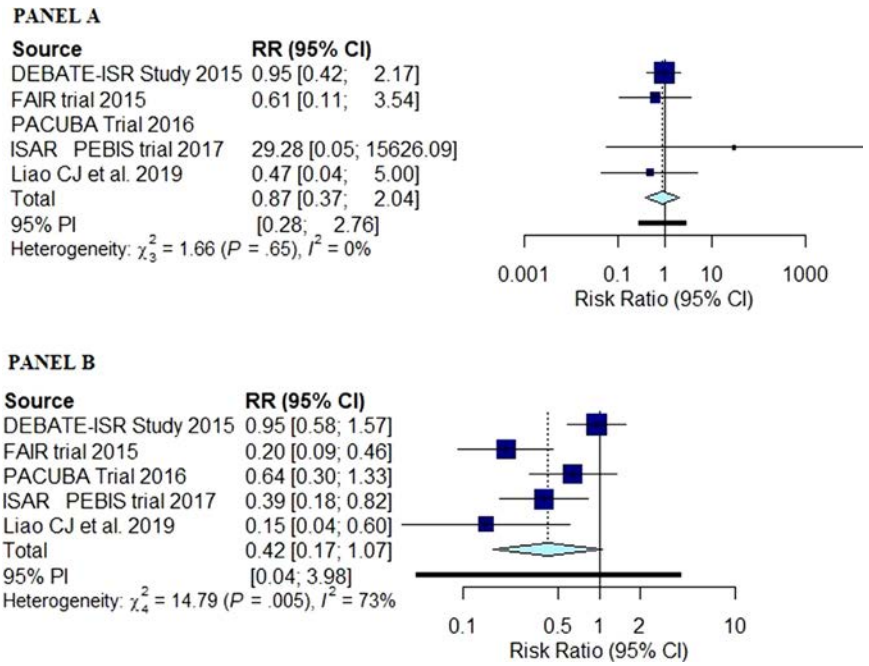

Figure 1. Forest plot for *(PANEL A)* All-cause mortality, *(PANEL B)* target vessel revascularization. CI = confidence interval; PI = prediction interval; RR = Risk Ratio. Risk Ratio for individual study is indicated by square and 99% confidence interval by horizontal line. Overall risk ratio and their confidence interval are represented by diamond.

class II B, level B evidence for the treatment of femoropopliteal ISR with DCB, while the 2016 American College of Cardiology/American Heart Association guidelines for the management of lower extremity peripheral artery disease issues no recommendations. Contrary to our results, a previous meta-analysis of 3 studies concluded DCB provides better clinical performances as compared to standard balloon angioplasty at 1-year follow-up. However, the study had limitations, as it included studies with follow up between 6 and 12 months, and lacked long-term follow-up. The present meta-analysis included studies with a 3-year follow-up. Additional the previous analysis reported no benefit in Rutherford classification or ankle-brachial index at 1-year follow-up. The present meta-analysis also has a few limitations. First, it is a study-level meta-analysis. Second, both RCTs and observational studies were included in the present meta-analysis, though the majority was constituted by RCTs. In conclusion, the present meta-analysis found no difference in the risk of all-cause mortality or target vessel revascularization between DCB compared with standard balloon angioplasty in femoropopliteal ISR patients.

Disclosures

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Meta-Analysis of the Effect of Percutaneous Coronary Intervention on Death and Myocardial Infarction in Patients With Stable Coronary Artery Disease and Inducible Myocardial Ischemia

Background. There has been a continuous debate about the survival benefit of percutaneous coronary intervention (PCI) for the management of patients with stable ischemic heart disease (SIHD) and moderate to severe ischemia. In this study we aimed to summarize the currently available evidence from randomized controlled trials (RCTs) on PCI versus medical therapy (MT) for patients with SIHD.

Methods. An electronic database search was conducted for RCTs that compared PCI on top of MT versus MT alone. A random effects model was used to calculate relative risk (RR) and 95% confidence intervals (CIs).

Results. A total of 7 RCTs with 10,043 patients with a mean age of 62.54 ± 1.56 years and a median follow up of 3.9 years were identified. Among patients with SIHD and moderate to severe ischemia by stress testing, PCI didn't show any benefit for the primary outcome of all-cause mortality compared to MT(RR = 0.85; 95% CI 0.646−1.12; p = 0.639). There was also no benefit in cardiovascular (CV) death (RR = 0.88 ; 95% CI 0.71−1.09; p = 0.18) or myocardial infarction (MI) (RR = 0.271; 95% CI 0.782−1.087; P = 0.327) in the PCI group as compared to MT.

Conclusion. Among patients with SIHD and evidence of moderate to severe ischemia by stress testing, PCI on top of MT appears to add no mortality benefit as compared to with MT alone. **(Am J Cardiol 2020;133:168−185)**

Whether percutaneous coronary intervention (PCI) reduces death or myocardial infarction in patients with stable coronary artery disease remains controversial. Although data from large observational studies have shown that the presence of moderate or severe myocardial ischemia[1] increases the risk of death and myocardial infarction and that PCI reduces this risk in patients with stable coronary artery disease as compared with medical therapy (MT) alone, randomized controlled trials, including the Clinical Outcomes Utilizing Revascularization and Aggressive