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Fractional Flow Reserve-Guided Complete Revascularization in Patients with ST-Elevation Myocardial Infarction: A Meta-analysis of Randomized Controlled Trials



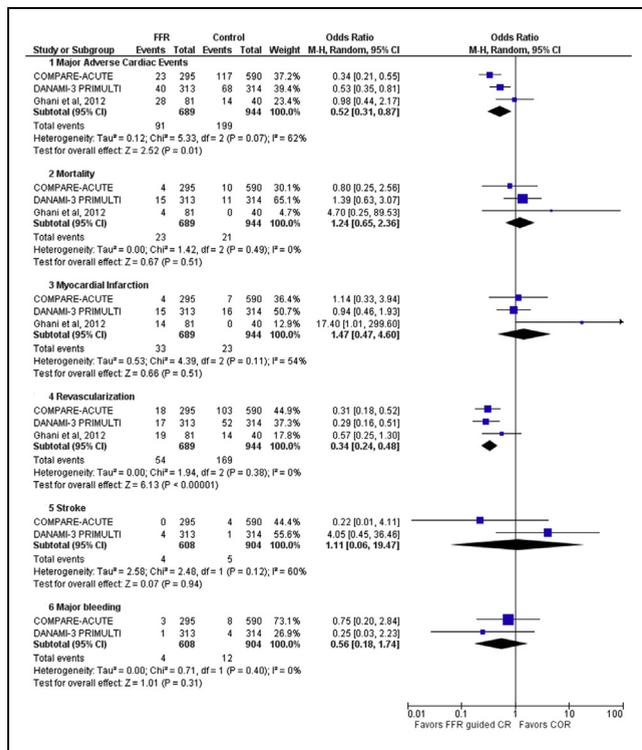
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INTRODUCTION Randomized controlled trials (RCTs) have compared the strategies of culprit-only revascularization (CoR) versus complete revascularization (CR) in patients with ST-elevation myocardial infarction (STEMI) and multivessel disease (MVD). The role of fractional flow reserve (FFR) guided complete revascularization is not well-established in patients with STEMI with MVD. We performed a meta-analysis of RCTs comparing FFR-guided CR versus CoR in patients with STEMI with MVD.

METHODS Electronic search of PubMed, Cochrane Central, and EMBASE databases was performed in addition to manual search of relevant references for the RCTs from inception through October 31, 2017. Major adverse cardiac events (MACE), mortality, non-fatal myocardial infarction (MI), revascularization, major bleeding, and stroke were the major outcomes.

RESULTS Data from three published RCTs were included in this meta-analysis with a total of 1633 patients (689 patients in FFR-guided CR and 944 in CoR). FFR-guided CR, compared to CoR resulted in a lower risk of MACE [odds ratio (OR): 0.52 (95% confidence interval: 0.31-0.87; P= 0.01), which was driven by reduction in revascularization [0.34 (0.24 - 0.48); P <0.00001]. No difference was observed in the risks of mortality [1.24 (0.65-2.36); P=0.51], non-fatal MI [1.47 (0.47-4.60); P=0.51], major bleeding [0.56 (0.18-1.74); P=0.31], and stroke [1.11 (0.06-19.47); P=0.73] between the two groups.

CONCLUSIONS In patients presenting with STEMI with multivessel disease, FFR-guided complete revascularization was associated with reduced MACE and revascularization and similar outcomes of mortality, non-fatal MI, major bleeding and stroke.



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Correlation Of Fractional Flow Reserve And Pd/Pa With Resting Diastolic Index Calculated By A Novel Algorithm: The dPR-study



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BACKGROUND iFR (instantaneous wave-free ratio) is a new vasodilator-independent index correlated to FFR (fractional flow reserve). Recent studies proved non-inferiority of iFR- as compared to FFR-guided revascularization. However, the use of iFR is restricted to a single device with software using a fully automated algorithm acting over the wave-free period of a minimum of five heartbeats. We hypothesized that a diastolic pressure ratio (dPR) calculated using different software might have similar diagnostic accuracy as compared to FFR and resting Pd/Pa.

METHODS This is an observational, prospective, single-center cohort study including 100 consecutive patients undergoing pressure wire (PW) or microcatheter-based FFR measurements. Dedicated software (Rubo DICOM, Rubo Medical Imaging BV) was used to calculate the dPR from DICOM pressure curves used to calculate Pd/Pa and hyperemic indices. By indicating the “flat” period of the Dp/Dt signal (the “wavefree” period) in 5 consecutive heartbeats, the Rubomed viewer collected the Pa and Pd values of the indicated region. Measurements were performed by 3 independent operators to assess inter-observer variability.

RESULTS One hundred patients who underwent FFR by using either the microcatheter system (n=50) or a PW system (n=50) were assessed. Mean age was 66±11 years and 80 (80%) were males. No significant differences were found in baseline characteristics between Navvus vs. PW system. Mean FFR, resting Pd/Pa and dPR calculated by the novel algorithm was 0.85±0.09; 0.94±0.05; and 0.93±0.07, respectively. There was a significant linear correlation between dPR and FFR and between dPR and resting Pd/Pa (R²=0.78, p<0.001 and R²=0.95, p<0.001, respectively). The correlation coefficient in the Navvus cohort was higher compared with the PW-system cohort (R²=0.81, p<0.001, and R²=0.76, p<0.001, respectively). Pd/Pa and dPR had good accuracy in the identification of patients with significant FFR values defined as FFR1<0.80 (AUC of 0.86 (95% CI: 0.79-0.94) and 0.84 (95% CI: 0.75 to 0.92) respectively).

CONCLUSION Resting, adenosine-independent diastolic pressure ratio dPR, calculated by a novel algorithm, had a linear correlation with the hyperemic index FFR and resting Pd/Pa and it had a high inter-observer reliability.

LASER

CRT-100.49

Utility Of Excimer Laser Coronary Angioplasty In Under-expanded Stents



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BACKGROUND Stent underexpansion due to underlying calcified or fibrotic lesion can be associated with increased rates of in-stent restenosis (ISR) and stent thrombosis. The aim of this study was to evaluate the feasibility, effectiveness, and safety of Excimer Laser Coronary Angioplasty (ELCA) to improve stent expansion in lesions that failed to respond to high-pressure non-compliant (NC) balloon.

METHODS Within the percutaneous coronary intervention (PCI) registry at our center, we identified eight patients presenting with either acute or ISR of underexpanded stents. These stents were treated with ELCA following an unsuccessful expansion with high