# PERCUTANEOUS CORONARY INTERVENTION COMPARED WITH AORTOCORONARY BYPASS IN DIABETIC PATIENTS WITH MULTI-VASCULAR CORONARY DISEASE

Chawla A [1], Rai MK [1], Siddiqui MK [1]

[1] HERON Group, Chandigarh, India

## Introduction

The effectiveness of percutaneous coronary intervention (PCI) and coronary artery bypass graft (CABG) in patients with diabetes and coronary artery disease (CAD) in whom revascularization is clinically indicated and both procedures are feasible remains poorly understood. Choice of treatment in diabetic patients is much more controversial than in non-diabetics because CAD is often more complex and diffuse, left ventricular function is depressed, and concomitant multiple risk factors are present. The optimal revascularization strategy using either PCI or CABG remains debatable[1]. The objective of this study was to compare the clinical outcomes of PCI to CABG in diabetic patients with multi-vascular coronary artery disease.

## Methods

A PUBMED search of the English-language literature published between 1992 and 2009 and the bibliographies of relevant articles using keywords angioplasty, coronary, stent, PCI, coronary artery bypass surgery was conducted. Study selection for inclusion was based on a pre-specified protocol with the following inclusion criteria:

- Study design: RCT; head to head comparisons of PCI with CABG
- Disease: Multi-vascular coronary artery disease and diabetes or with subgroup for diabetic patients
- Intervention: Percutaneous intervention (stent) or coronary artery bypass graft
- Outcomes: Mortality, myocardial Infarction (MI), stroke and the use of additional revascularization procedures

All decisions regarding the inclusion/exclusion of studies involved two independent reviewers, with discrepancies resolved by a third reviewer. Following decision on the inclusion/exclusion of studies, a two-stage data extraction process was used to capture necessary information with discrepancies resolved by a third reviewer. Descriptive statistics were used when appropriate. Meta-analyses are presented as risk ratios, 95% confidence interval (CI) using a fixed-effect model. Heterogeneity between trials was assessed.

## Results

Of the 416 studies retrieved, five studies met the inclusion criteria. In total, 409 diabetic patients with MVD were randomized to PCI, and 404 to CABG. A total of 813 patients were included in the analysis (208 in Arterial Revascularization Therapies Study (ARTS)[2], 78 in Second Argentine Randomized Trial of Percutaneous Transluminal Coronary Angioplasty versus Coronary Artery Bypass Surgery in Multivessel Disease (EARCI-II)[3], 115 in Second Medicine, Angioplasty, or Surgery Study (MASS-II)[4], 353 in Bypass Angioplasty Revascularization Investigation (BARI)[5] and 59 in Emory Angioplasty versus Surgery Trial (EAST)[6].

Survival was significantly better after CABG than after PCI with a risk ratio of 1.29 (95% CI: 1.07 to 1.56); p = 0.009 for the five-year mortality rate (figure 1). Relative risk for revascularization rate at five year follow was higher with PCI than after CABG; RR 4.11 (95 CI: 2.20 to 7.68). Risk for myocardial infarction (MI) were non-significant with a risk ratio of 1.10 (95% CI: 0.73 to 1.65); p = 0.644 (figure 2). Summary risk ratios for major outcomes are shown in table 1.

**Table 1: Summary risk ratios for major outcomes with PCI vs CABG**

| Outcome | Risk Ratio (95% CI) | *P* | $I^2$ |
|---|---|---|---|
| Death | 1.29 (1.07 – 1.56) | 0.009 | 69.9% |
| MI | 1.10 (0.73 – 1.65) | 0.644 | 0.0% |

**Fig 1: Five-year survival in patients with diabetes and MVD**

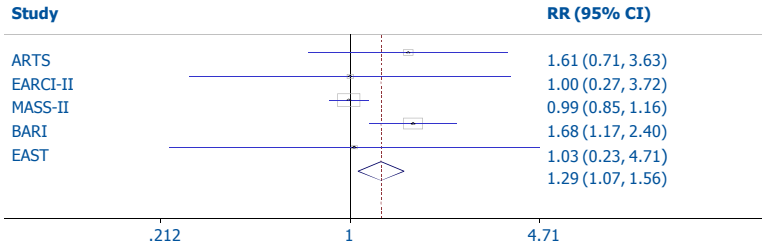
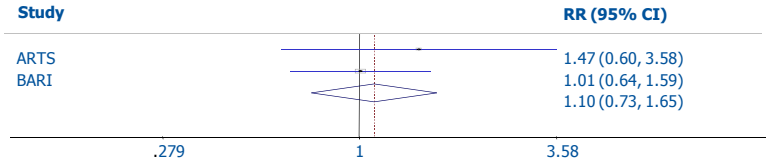



**Fig 2: Risk for MI in patients with diabetes and MVD**




## Conclusions

In the present analysis, using pooled patient-level five-year follow-up data from 5 randomized controlled trials, we found CABG was associated with lower incidence of mortality and repeat revascularization compared to PCI. Rate of MI was similar for both the procedures. Analysis from this review suggests that CABG greatly improves survival and re-intervention rate when compared to PCI, in diabetic patients with multi-vessel coronary artery. Currently ongoing prospective, randomized trials like FREEDOM and CARDia trials will further help address this question.

## References

[1] Farag NM, Sabet S, Elias RR, et al. Influence of Diabetes Mellitus on Short and Mid-term Outcome of Coronary Artery Bypass Grafting. Heart Mirror Journal. 2009;3(1):38-45.

[2] Serruys PW, Ong AT, van Herwerden LA, Sousa JE, Jatene A, Bonnier JJ, Schönberger JP, Buller N, Bonser R, Disco C, Backx B, Hugenholtz PG, Firth BG, Unger F. Five-year outcomes after coronary stenting versus bypass surgery for the treatment of multivessel disease: the final analysis of the Arterial Revascularization Therapies Study (ARTS) randomized trial. Journal of the American College of Cardiology. 2005 Aug 16;46(4):575-81

[3] Rodriguez AE, Baldi J, Fernández Pereira C, Navia J, Rodriguez Alemparte M, Delacasa A, Vigo F, Vogel D, O'Neill W, Palacios IF; ERACI II Investigators. Five-year follow-up of the Argentine randomized trial of coronary angioplasty with stenting versus coronary bypass surgery in patients with multiple vessel disease (ERACI II). Journal of the American College of Cardiology. 2005 Aug 16;46(4):582-8.

[4] Hueb W, Lopes NH, Gersh BJ, Soares P, Machado LA, Jatene FB, Oliveira SA, Ramires JA. Five-year follow-up of the Medicine, Angioplasty, or Surgery Study (MASS II): a randomized controlled clinical trial of 3 therapeutic strategies for multivessel coronary artery disease. Circulation. 2007 Mar 6;115(9):1082-9.

[5] BARI Investigators. The final 10-year follow-up results from the BARI randomized trial. Journal of the American College of Cardiology. 2007 Apr 17;49(15):1600-6. Epub 2007 Apr 2.

[6] King SB 3rd, Kosinski AS, Guyton RA, Lembo NJ, Weintraub WS. Eight-year mortality in the Emory Angioplasty versus Surgery Trial (EAST). Journal of the American College of Cardiology. 2000 Apr;35(5):1116-21.