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INTERVENTIONAL CARDIOLOGY

# Examining the issues related to PCI without on-site surgical back-up

A meta-analysis conducted by a team of researchers from the USA has provided new evidence that could lend support to the use of percutaneous coronary intervention (PCI) at treatment centers that do not have on-site facilities for CABG surgery. In their paper, which was published in *JAMA*, Dr Mandeep Singh (Mayo Clinic, Rochester, MN, USA) and co-workers report low in-hospital mortality and rates of emergency CABG surgery that were similar between surgical centers and those that do not have on-site surgical facilities. "To our knowledge, this is the first study to systematically summarize in-hospital outcomes after PCI at centers with and without on-site surgery," write the authors.

In the early years of coronary angioplasty, the procedure was beset by frequent complications, and up to 10% of patients required emergency, life-saving CABG surgery. Clearly, the capability to perform surgery on site was then a 'must', but is this requirement still valid? The introduction of stenting greatly improved the success of PCI and reduced the risk of adverse events, such that the requirement for bailout CABG surgery is now less than 0.5%. However, a lack of consensus exists about whether on-site surgery is still required, which is reflected in the current ACCF/AHA guidelines. Conducting PCI at nonsurgical centers, although currently neither recommended nor contraindicated, could extend access to the procedure to more patients, such as those in remote areas or rural communities.

Singh *et al*. set out to bring some clarity to this uncertain issue. Following the Meta-analysis Of Observational Studies in Epidemiology (MOOSE) guidelines, they conducted a search of various databases for literature published in the English language between January 1990 and December 2009. This date range covers the prestent era of balloon angioplasty (before 1994), the bare-metal stent era (1994–2004), and the drug-eluting stent era (2004 onwards). From a total of 1,029 potential papers, the investigators selected 15 for inclusion in the meta-analysis. All had a case–control study design, compared outcomes of PCI between surgical and nonsurgical centers, and included statistical adjustment for potential confounders, such as patient and center-related characteristics. Although not prespecified, only high-quality studies that met at least 15 of the STROBE (Strengthening The Reporting of OBservational studies in Epidemiology) criteria were selected. Pooled odds ratios (ORs) were calculated using random-effects models and the investigators used two separate methods to control for the potential effects of publication bias.

For primary (nonelective) PCI for ST-segment elevation myocardial infarction (124,074 patients), no difference in the pooled ORs for in-hospital mortality was observed between nonsurgical and surgical centers (4.6% and 7.2%, respectively; OR 0.96, 95% CI 0.88–1.05). Heterogeneity ($I^2$) was 0%. Neither was an increase in risk for emergency CABG surgery after primary PCI recorded for nonsurgical versus surgical centers (0.22% vs 1.03%; OR 0.53, 95% CI 0.35–0.79; $I^2 = 20\%$). For the 914,288 patients undergoing nonprimary (elective and urgent) PCI, in-hospital mortality did not seem to differ between the two types of center (nonsurgical: 1.4%, surgical: 2.1%; OR 1.15, 95% CI 0.93–1.41). The $I^2$ was 46%, however, and after adjustment for publication bias, mortality was increased by 25% among patients treated at nonsurgical compared with surgical centers. In terms of emergency CABG surgery after nonprimary PCI, no differences were evident between nonsurgical and surgical centers (0.17% vs 0.29%; OR 1.21, 95% CI 0.52–2.85 $I^2 = 5\%$).

The investigators concluded that, in general, outcomes after PCI are similar at centers with and those without on-site surgical facilities. However, they were concerned by the increase in the adjusted in-hospital mortality for patients undergoing elective PCI at nonsurgical centers and suggest that this finding warrants additional study. In an accompanying editorial in *JAMA*, Dr Scott Kinlay (Brigham & Women's Hospital, Boston, MA), who was not involved in the meta-analysis, suggests that the outcomes of PCI might be "less dependent on the presence of on-site CABG surgery and more dependent on an operator's skill to select appropriate patients, their technical skill to complete PCI, and their commitment to maintain skills". Whether surgical facilities exist or not, the importance of these factors should not be overlooked.



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