Editorial

Some Patients with Persistent Coronary Artery Occlusion after Acute Myocardial Infarction May Require Revascularization

Key words: coronary artery occlusion, acute myocardial infarction, revascularization

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The DECOPI Trial

In 2004, the DEsobstruction COronaire en Post-Infarctus (DECOPI) trial was published in the *European Heart Journal* by Philippe Steg and colleagues.¹ This trial was designed to evaluate the efficacy of percutaneous coronary interventions (PCI) compared with medical therapy in patients with an occluded coronary artery 2–15 days

after myocardial infarction. Of the 212 patients, 109 were randomized to PCI and 103 were randomized to medical therapy. The medical therapy and PCI used were state-of-the-art. The mean time to PCI was 8 days. A large percentage of patients had single-vessel disease. Results indicated there was no difference in the primary combined endpoint of cardiac death MI or ventricular tachyarrhythmias between the two treatment arms. At 6 months, angiographic patency was more frequent in the PCI arm and left ventricular ejection fraction was greater. The trial was likely underpowered for the primary endpoint analysis and cases were at relatively low risk since exclusions from the trial were left main coronary stenosis, need for CABG, and PCI not technically feasible.

The Occluded Artery Trial

At the 2006 American Heart Association meeting in Chicago, Judith Hochman presented the Occluded Artery Trial (OAT).² This was a National Heart, Lung, and Blood Institute-supported trial. This trial was similar to the DECOPI trial, but more patients were enrolled, such as 1,082 randomized to PCI/stent plus medical therapy and 1,084 randomized to medical therapy. Patients were stable but had persistent occlusion of the infarct-related artery, 3–28 days following myocardial infarction. Most (82%) had single-vessel disease, 49% involving the right coronary artery. Primary endpoint was death, MI, or severe heart failure, and the mean follow-up was 3 years. It must be emphasized that these patients were stable myocardial infarction survivors who did not receive PCI within the first 12 h of their infarction. It must also be emphasized that the patients who received PCI/stent also received optimal medical therapy as did all patients randomized to medical therapy. Exclusions from this trial included patients with high grade left main coronary artery stenosis or high grade three-vessel disease, angina at rest, severe ischemia on stress testing, hemodynamic or electrical instability, serum creatinine greater than 2.5 mg/dL, class III or IV heart failure, or shock. As in the DECOPI trial, median time from myocardial infarction to randomization was 8 days. In this group of selected randomized patients, results showed there was no difference in the primary composite endpoint of death, reinfarction, or severe heart failure. Initial success was seen in 87% of the PCI group and 89% were still open at 1 year. In the patients randomized to medical therapy, ninety patients crossed over to revascularization, suggesting that recurrent symptoms were present. There was a trend toward more reinfarction in the PCI group than in the medical group. This may be related to the fact that patients who received PCI had more patent arteries that might reocclude compared to the smaller percentage of patent arteries in patients randomized to medical therapy. No information is available related to the duration of patients taking thienopyridines after discharge. There was no difference in death or heart failure. These investigators concluded that among stable patients

with occlusion of an infarct-related artery treated within 28 days after myocardial infarction, there was no difference of intention to treat in the composite primary endpoint for a mean follow-up of 3 years. Investigators further concluded that their study does not support the performance of late percutaneous coronary intervention for stable persistent coronary artery occlusion after an acute myocardial infarction in patients similar to those randomized 3–28 days after an acute myocardial infarction in OAT.

The Total Occlusion Study of Canada Trial

A substudy of OAT was called *Total Occlusion Study of Canada TOSCA*.³ There were 381 patients enrolled. The goal was to determine whether late PCI improves patency and indices of left ventricular size and function. Results indicated that late PCI maintains long-term patency, but has no effect on left ventricular ejection fraction but there was a trend for end diastolic volume index for the PCI group to be less than that seen in patients randomized to medical therapy. These investigators concluded that there is no place for late PCI stents in patients with stable postmyocardial infarction occlusion of a coronary artery.

Who Needs Recanalization of an Occluded Artery?

I do not think anybody will argue that the results for the patient population studied in DECOPI, OAT and TOSCA suggest that these patients should undergo routine recanalization therapy.

However, although extremely important, the results of these trials should not be confused with the management strategy of those patients who were excluded from these trials.

Several years ago, the Cardiac Arrhythmia Suppression Trial (CAST) trial revealed that treatment of patients with encainide or flecainide postmyocardial infarction who had asymptomatic or minimally symptomatic ventricular arrhythmia was detrimental.⁴ The term “structural heart disease” was used to define this patient population. CAST told us that use of flecainide and encainide was dangerous in patients with a recent myocardial infarction who had post infarction arrhythmias. The clinical practice following CAST has been to eliminate the drugs encainide and flecainide in patients with “structural heart disease.” This is an incorrect interpretation of CAST since structural heart disease in this circumstance was recent myocardial infarction. CAST did not tell us anything about patients with other forms of structural heart disease, which includes many etiologies other than a recent myocardial infarction. I hope the same type of generalization will not be concluded from the OAT trial.

Conclusions

Aggressive revascularization therapy should still be considered for patients postmyocardial infarction with infarct artery occlusion who were not candidates for the OAT, for example, severe heart failure, rest angina, cardiogenic shock, multivessel coronary artery disease, serum creatinine >2.5 mg/dL, or left main coronary artery stenosis. The patients I am referring to usually have persistent symptoms and evidence of more than mild to moderate myocardial ischemia, either at rest or during stress, related to the area perfused by the occluded artery. In symptomatic patients viable myocardium, collateral blood flow and left ventricular dysfunction in the area supplied by the infarct-related artery could justify restoring antegrade flow. Since the OAT did not address this group of patients, revascularization therapy still remains an option. Unless a clinical trial is performed to show that these patients have no benefit from PCI, I think it is reasonable to perform PCI/stent of the infarct related occluded coronary artery in this patient population in addition to aggressive medical therapy.

As I read the ACC/AHA guidelines⁵ for the management of patients with ST segment elevation myocardial infarction, any patient with clinically significant ischemia, no matter how detected, should be sent for cardiac catheterization/angiography and revascularization as indicated.

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