Reviewer's report

Rationale and Design of EXPLORE: a Randomized, Prospective, Multicenter Trial Investigating the Impact of Recanalization of a Chronic Total Occlusion on Left Ventricular Function in Patients after Primary Percutaneous Coronary Intervention for Acute ST-Elevation Myocardial Infarction

The goal of this study is to investigate whether recanalization of a chronic total occlusion in a non-infarct related artery after primary percutaneous coronary intervention for ST-elevation myocardial infarction results in an improved left ventricular ejection fraction, reduced end-diastolic volume and enhanced clinical outcome.

For that purpose, investigators will enroll 300 patients who underwent primary PCI for STEMI and who have a chronic total occlusion of a non-infarct related vessel. The primary endpoints are left ventricular ejection fraction and left ventricular end-diastolic volume assessed by cardiac Magnetic Resonance Imaging at four months. Clinical follow-up will be continued for five years.

Comments

Basically, this study addresses the problem of invasive management following primary PCI after STEMI. In the protocol it is mentioned that the patients should have at least one chronic total occlusion in a non infarct related coronary artery (NIRCA). This is somewhat embarrassing because there are several combinations

1) A CTO in one NIRCA and stenoses in other NIRCA: For example: a patient with an anterior MI: Primary PCI of the LAD . Total occlusion of RCA + narrowings on the circ. In that case one will compare the outcome of the complete revascularization (RCA CTO + PTCA of the circ) vs. medical management

2) A CTO in one NIRCA and no lesion on the rest of the coronary tree (except the residual stenosis of the IRCA, i.d. LAD in the previous example: Is it really worthwhile to attempt the CTO and only this CTO? Is it safe to do that? Authors claim that the procedural success of CTO recanalization is around 80 % but this seems somewhat optimistic. Is the risk balance by a real benefit

In other words, based on the cases mentioned before, authors should separate
the cases of multilatation including CTO vs. CTO recanalizaton alone.

The primary endpoints are essentially hemodynamic parameters. MACE are secondary end points. However, we need to assess carefully the safety of the procedure. Thus, authors should be more precise concerning the definition of peri-procedural MI, stent thrombosis. The CCE (critical events committee) should be especially cautious on that matter. A reinfarction in this setting would be a disaster.

Another point is the case of patients undergoing PCI for an inferior infarction: Primary PCI of the RCA. Discovery of a CTO on the Circ. In case of recanalization of the CTO it will be difficult to evaluate the benefits.

In conclusion, this study is at a first glance interesting but I doubt that it will bring some lights concerning the management of similar cases

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests