Evaluating treatment and diagnostics in cardiac intervention

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Background

Although treatment and diagnostics in cardiac intervention is one of the most progressive fields in medicine, cardiovascular diseases such as myocardial infarction (MI) remains the number one cause of death. MI is treated by percutaneous coronary intervention (PCI). Oxygen is considered vital for pain management and reduction of ischemia. However, evidence for the use of oxygen in patients with normal saturation is weak and oxygen might have harmful sideeffects. The aim of project 1 and 4 is to investigate the analgesic effect of oxygen during PCI.

Aortic stenosis is a structural heart disease with considerable mortality. Transcatheter aortic valve intervention (TAVI) is a minimal invasive treatment option. During TAVI, hemodynamic instability is common and might be associated with poor outcome. Mild hypothermia seems to have positive hemodynamic efectcs. The aim of project 2 was to study hemodynamic and cerebral effects of hypothermia in TAVI.

In non-critical coronary lesions, fractional flow reserve (FFR) is a diagnostic technique used to determine stenosis physiological significans. FFR requires hyperemia, mediated by an adenosine infusion. The aim of project 3 is to explore if increased doses of adenosine is associated with improved accuracy of FFR.

Methods

Patients with suspected myocardial infarction treated by PCI was included in project 1 and 4. Project 1 was a single center, double-blind, randomized controlled trial. Project 4 was a multicenter trial performed at 10 hospitals in Sweden.

Project 2 was a pilot randomized trial where patients admitted for TAVI were included and randomized to hypothermia or normothermia.

Project 3 was a prospective study with a modified cross-over design. Patients undergoing coronary angiography with non-critical coronary lesion were included.
Preliminary results

Project 1: Oxygen did not demonstrate analgesic effects during PCI

Project 2: Mild hypothermia was safe, feasible and correlated to positive hemodynamic effects during TAVI

Importance

In project 1, 4 and 5, the role of oxygen in MI is investigated. If oxygen fails to demonstrate positive effects, it will change the daily practice in interventional cardiology.

In project 2, mild hypothermia during TAVI seems beneficial and will provide a solid base for larger trials with selected patient cohorts.

Publications


3. Zughaft D., Gotberg, M., Harnek, J and Erlinge D. "Increased doses of intravenous Adenosine do not improve accuracy in Fractional Flow Reserve". (manuscript in preparation)


5. Hofmann, R, ....Zughaft, D., Erlinge D....Svensson,L. et al. DETERmination of the role of OXygen in Acute Myocardial Infarction (DET02X-AMI) (enrollment of patients)