Effect of permanent right internal mammary artery occlusion on right coronary artery collateral function. A randomized controlled trial

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Background: Extracardiac coronary artery supply via the pericardiophrenic branch of the internal mammary arteries (IMA) has been well documented anatomically. Recently, a proof-of-concept study has found functional relevance of these anastomoses in patients with coronary artery disease (CAD) during a brief right coronary artery (RCA) occlusion.

Purpose: The aim of the present randomized controlled, single-blind trial was to investigate the effect of permanent right IMA (RIMA) occlusion on RCA collateral flow index (CFI) and on the occurrence of angina pectoris. We hypothesized that the change in RCA CFI from baseline to follow-up examination is higher in the group of patients with than without permanent RIMA occlusion.

Methods: One hundred patients with CAD were randomly allocated (1:1) to permanent RIMA device occlusion at baseline or to no RIMA occlusion (sham control group). The primary study endpoint was CFI change in the RCA from baseline to the 6-week follow-up examination. CFI is the ratio between mean coronary occlusive and aortic pressure both subtracted by central venous pressure as obtained during a 1-minute proximal RCA balloon occlusion. RCA CFI was measured at baseline before RIMA occlusion or the sham procedure and at the follow-up invasive exam. At the end of the same occlusion, occurrence of angina pectoris was assessed. Percutaneous coronary intervention (PCI) of the RCA was deferred until after follow-up RCA CFI measurement.

Results: There were 51 patients in the RIMA occlusion (verum) group and 49 patients in the sham control group. PCI in the left coronary territory was performed at baseline for clinical reasons in 27 patients of the verum group and in 25 patients of the sham control group. There were no differences in clinical characteristics at baseline between the groups (age 68±12 years, 88 men). RCA CFI change during the 6 weeks of follow-up was equal to +0.028±0.077 in the verum group and -0.026±0.079 in the sham control group (p=0.0017). Angina pectoris during CFI measurement had disappeared at follow-up exam in 30% of the verum group and in 2% of the sham control group (p=0.0013).

Conclusions: Right coronary collateral function is augmented 6 weeks after permanent RIMA occlusion when compared to sham treatment. This manifests as less frequent angina pectoris during myocardial ischemia among patients with RIMA occlusion.