The aim of the present work was to identify oxidative stress during ischemia-reperfusion in humans. In three clinical studies (S) on patients treated with elective PCI (S1, N=38); primary PCI (S2, N=16), and elective CABG (S3, N=20) we have followed levels of 8-iso-PGF$_2\alpha$ (a major isoprostane, and a marker of oxidative stress in vivo) and Troponin T in blood samples taken at multiple timepoints before, during and after procedures. 8-iso-PGF$_2\alpha$ increased from baseline level (median 62, 30 and 192 pM) in S1, 2 and 3 respectively to 104, 72 and 423 pM after revascularization. In S3 we observed a stepwise rise with elevation after start of surgery and a non-significant further increase after onset of cardiopulmonally bypass (CPB) and after reperfusion. No correlation between 8-iso-PGF$_2\alpha$ and Troponin T was found. Baseline levels of plasma 8-iso-PGF$_2\alpha$ differ in all groups with lowest level among the patients with acute myocardial infarction (S2), and the highest level among the patients with stable angina recruited for CABG (S3). These patients are reflecting the status of treatment with acetylsalicylic acid (ASA) and heparin.

Conclusions: Oxidative stress in the form of isoprostane release was observed during all procedures. However, following CABG isoprostane release was related to the surgical trauma rather than to CPB or reperfusion. Oxidative stress is a multifactorial process with complex interactions between pro- and antioxidant factors. Drugs in common use like ASA and heparin may reduce oxidative stress in a clinical setting.