

Effects of on-pump versus off-pump coronary artery bypass grafting on oxidative stress and cerebral oxygenation

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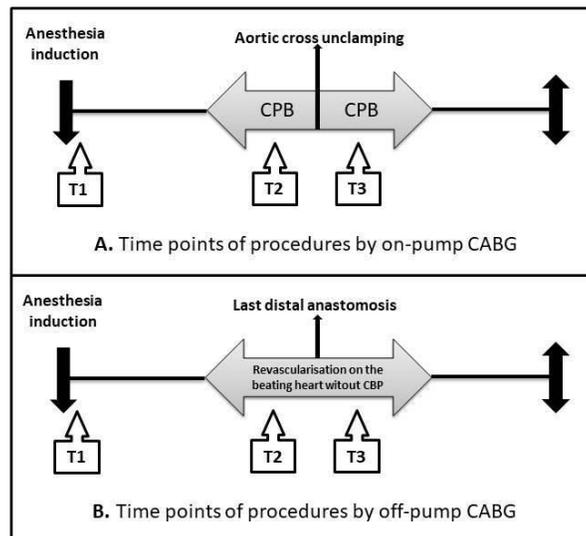
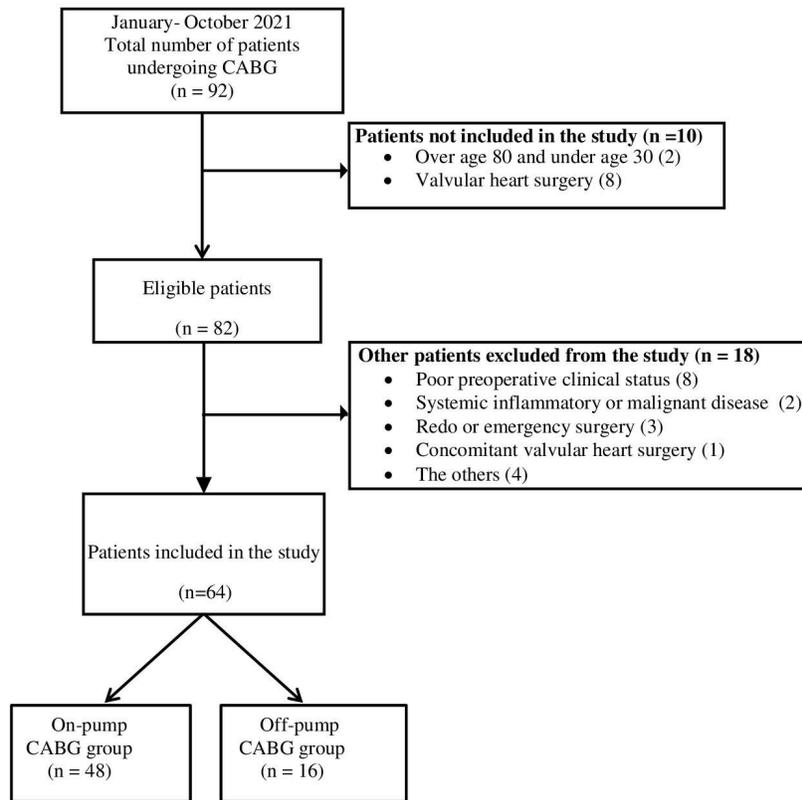
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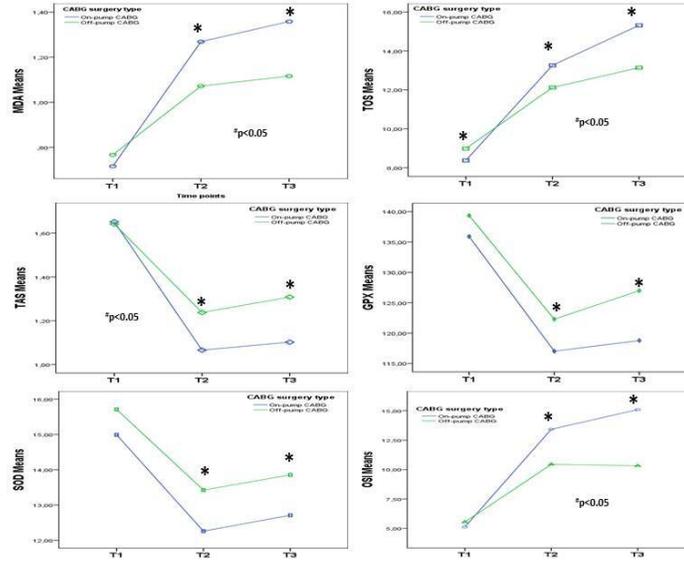
Abstract

Objectives: To determine the relationship between serum levels of oxidative stress (OS) parameters and regional cerebral oxygen saturation (rSO₂), as well as postoperative clinical outcomes in patients undergoing coronary artery bypass graft surgery (CABG). **Materials and Methods:** This prospective observational study included 64 adult patients undergoing elective CABG [on-pump-CABG (n=48) and off-pump CABG (n=16)]. The OS level was determined according to total oxidant status and malondialdehyde. OS levels and rSO₂ values were measured intraoperatively at three-time points (T1: after induction, T2: 15min before aortic cross-clamp removal or before the last distal anastomosis, T3: 15min after aortic cross-clamp removal or the last distal anastomosis). **Results:** In the on-pump group, OS levels at T2-3 and lactate values at T2-3 were found to be higher (p<0.001), rSO₂ at T2 was lower (p=0.024). There was a negative correlation between rSO₂-T2 values and OS parameters, lactate levels at T2-3, aortic clamp time, postoperative mechanical ventilation (MV) time, and length of stay (LOS) in the ICU. In the multivariate linear regression analysis [F(2,61)=8.26, p=0.001], lactate values at T2 were found to be the only factor affecting the OSI-T2 index (Beta=0.388, p=0.006). **Conclusions:** In this study, we observed that OS levels were increased and rSO₂ values were relatively low during on-pump CABG procedures, furthermore, lower rSO₂ values were associated with increased OS levels and poor postoperative clinical outcomes. The OS response and cerebral oxygenation could be improved in off-pump CABG by limiting global ischemia, resulting in a favourable postoperative outcomes such as less MV time and LOS in the ICU.

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