Does removal of inflammatory factors during bypass improve outcome in high-risk patient undergoing cardiac surgery?

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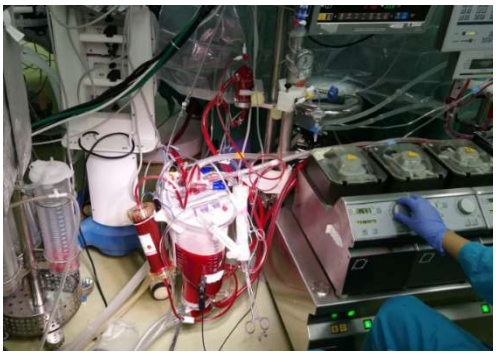
Objective: To investigate whether removal of proinflammatory factors during cardiopulmonary bypass (CPB) improves the postoperative outcomes for the high-risk patients undergoing cardiac surgery..

Method:This is a prospective, randomized, controlled study. Patients over 18 years and scheduled for cardiac or vascular surgery under CPB were eligible. The inclusion criteria were EuroSCORE II > 2 and TNF-a over 8.0 pg/mL. Patients who were pregnant, or had long-term glucocorticoid use, or with immune system diseases (such as HIV infection), or without informed consent were excluded. The patients were randomly divided into HA380 group and Control group. In the former group, an adsorber (HA380 haemoperfusion cartridge, Jafron Biomedical Co.,China) was used continuously during CPB. The perfusionist was aware of the grouping, while the staffs for follow-up and the statisticians were blinded.
The primary outcome were composite events, including all-cause mortality in 30-day, permanent or transient neurological dysfunction, new onset myocardial infarction or low cardiac output, renal failure, acute respiratory disease syndrome, intestinal bleeding or ischemia, and prolonged intubation time (> 24-hours). The secondary outcomes were hospitalization time, blood product consumption and chest drainage. Pre- and Post-operative TNF-a levels and white blood cell counts were also obtained.



Results:A total of 40 patients were included into the study (20 in each group). Their demographic characteristics were comparable between groups. There were no significant difference between control group and HA380 group regarding the preoperative complications, EuroScore II, surgical types, CPB time, and cross-clamp time.
The composite events occurred in 4 (20%) patients in HA380 group, and in 7 (35%) patients in control group (p=0.48).

Both hospitalization time and blood product consumption were similar between groups, but the chest drainage after 4 hours were slightly lower in HA380 group (median: 75 mL) than that in control group (median: 150 mL) (p=0.19). Although there were no significant differences regarding to peak plasma levels of creatinine, bilirubin, transaminase, troponin between groups (all p>0.1), TNF-a levels (28±12 pg/mL vs. 30±17 pg/mL, p=0.78), counts of leukocyte (median: 7.5*10^9/L, vs 10.9*10^9/L, p=0.08), neutrophil (5.9 *10^9/L vs 8.3*10^9/L p=0.11) and monocyte (0.36 *10^9/L vs 0.64 *10^9/L, p=0.02) were slightly lower in HA380 group than control group.

Conclusion:This prospective, randomized, controlled study showed that removal of inflammatory factors during cardiopulmonary bypass may help to attenuate the systemic inflammation for the high-risk patients undergoing cardiac surgery on CPB. Whether it improves outcomes for these population needs further studies with larger sample size.