

The Effect of Peri-operative Plasmapheresis during Cardiac Surgery



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BACKGROUND

Patients undergoing cardiopulmonary bypass (CPB) are at risk for haemostatic changes such as structural and biochemical alterations of platelets. In prolonged CPB times, this might lead to an increased risk of post-operative bleeding and transfusion of allogeneic blood components. In order to minimize the haemostatic disorders, peri-operative plasmapheresis can be effective. This prospective randomized study was performed to determine whether patients with a minimum CPB duration of 120 minutes might benefit from peri-operative plasmapheresis prior to CPB.

METHODS

The predonated whole blood was sequestered into platelet-poor plasma (PPP), platelet-rich plasma (PRP) and erythrocyte-concentrate (ERY). After heparin reversal with protamin to baseline ACT-value, PPP was reinfused followed by PRP. Haemostatic changes in coagulation screens and viscoelastic whole blood monitoring were performed with thromboelastography (TEG). During five specific intervals (baseline, pre-heparin, post-protamine, 1-hour and 4-hours post-CPB) platelet count, fibrinogen, D-dimers, thrombin time, and TEG-parameters (R-time, K-time, angle, MA (tissue-factor, tissue factor/abciximab and LY30)) were measured.

RESULTS

Seventeen patients had $21.4 \pm 1.8\%$ of their circulating blood volume predonated in citrate prior to heparinization and yielded a mean platelet count of $174 \pm 56 \times 10^9/\text{liter}$ per patient. The control group, not exposed to the plasmapheresis procedure consisted of twenty patients. There were no significant differences between treatment and control patients with regard to pre- and peri-operative CPB and surgical parameters. The treatment group had a significantly improved platelet function, qualified by TEG-measurement, four hours post-CPB ($P=0.04$) compared to the control group.

CONCLUSION

The use of peri-operative plasmapheresis improves platelet function post-CPB.