Introduction:
Colloids are widely used for volume resuscitation. Among synthetic colloids, hydroxyethyl starch (HES) is commonly administered. In cardiac surgery, priming of the cardiopulmonary bypass (CPB) circuit with colloids minimizes resuscitation volume and results in less pulmonary fluid accumulation. However, the use of HES has been associated with a higher incidence of renal damage and a higher occurrence of coagulopathy. The aim of this study was to investigate the effect of low dose (5 - 10 ml/kg) HES 6% (130/0.4) in CPB pump priming on fluid balance, blood loss, transfusion requirement and occurrence of acute kidney injury.

Methods:
In a pre-post design, data from 1120 patients undergoing cardiac surgery with CPB were analyzed. In 560 patients, priming solution consisted of 1250 ml balanced crystalloids, 250 ml mannitol 15%, tranexamic acid 2g and 500 I.E. heparin. For the other 560 patients, 500 ml of the crystalloids were replaced with HES 6% (130/0.4), the other components were the same. Patients were matched 1:1 with propensity score method. The primary endpoint was intraoperative fluid balance. Secondary endpoints were perioperative blood loss, transfusion requirement and the occurrence of acute kidney injury.

Results:
In total, 866 patients were analyzed. The HES group showed less positive fluid balance than the crystalloid group (p< 0.001). There was no difference in intraoperative blood loss (p=0.426) and transfusion requirement (p=0.442). The occurrence of acute kidney injury was not significantly different between the two groups (p=0.147).

Conclusion:
Low-dose administration of 5-10 ml/kg HES 6% (130/0.4) to CPB pump priming decreased intraoperative fluid accumulation without increasing perioperative blood loss and transfusion requirement. There was no effect on the incidence of acute kidney injury. Priming CPB pumps with a low-dose of HES 6% (130/0.4) is an important component for a restrictive volume strategy and might safely be used in patients with preexisting renal dysfunction.