Abstract: Colloid oncotic pressure in relation to volume shifts in adult patients undergoing cardiopulmonary bypass: a single center observational study

**Background:** The purpose of this study was to investigate the relationship between colloid oncotic pressure (COP) and cardiopulmonary bypass (CPB) related hemodilution, blood loss, blood transfusion requirements and kidney function.

**Methods:** Perioperative data files of 319 adult patients who underwent a cardiac surgical procedure between August 2016 and June 2017 were reviewed. Two groups of patients were identified based on the median COP (group 1 <19.5, group 2 >19.5 mmHg). A colloid osmometer was used to measure COP.

**Results:** There was no significant difference between the patients in group 1 (n=147; 77% males) and group 2 (n=172; 81% males) with respect to body surface area (1.97 m² [1.81-2.08] vs. 1.95 m² [1.85-2.07], p=0.572). The perioperative fluid load was higher in group 1 (4200 mL [3390-5220] vs. 3420 mL [2722-4241], p<0.001). The patients in group 1 showed a lower hematocrit (23% [21-25] vs. 25% [23-27], p<0.001), and higher volume of blood was processed through the cell saver (1500 mL [1000-2000] vs. 1250 mL [900-1500], p=0.007), perioperatively. More patients received packed red blood cell (PRBC) transfusions in group 1 (n=32 (22%) vs. n=19 (11%)). Notably, CPB duration was longer in group 1 (94 minutes [71-145] vs. 82 minutes [61-101], p<0.001). However, the postoperative estimated glomerular filtration rate did not differ between the groups (1.4 mL/min/1.73m² [-4.6 to 7.4] vs. 1.1 mL/min/1.73m² [-3.6 to 7.1], p=0.792).

**Conclusion:** This study showed that a lower COP during CPB is associated with hemodilution, lower hematocrit, increased requirement for cell salvage and more PRBC transfusions.