

## Can measuring of oxygen delivery during cardiopulmonary

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### Abstract

The primary purpose of cardiopulmonary bypass (CPB) is to provide systemic oxygen delivery (DO<sub>2</sub>) that is sufficient to meet systemic oxygen demand during open cardiac surgery. CPB can be individualized by continuous measurement of oxygen delivery per square meter (DO<sub>2i</sub>), oxygen consumption per square meter (VO<sub>2i</sub>) and oxygen extraction (VO<sub>2</sub>/DO<sub>2</sub>%). DO<sub>2</sub> during CPB depends on blood flow, haematocrite and arterial saturation. Traditionally a fixed systemic pump flow of 2.4 L/min/m<sup>2</sup> is used during CBP, but during the last decade there is a change into a more individualized pump flow aiming for more stable level of DO<sub>2i</sub>. Low haematocrite during CPB is associated with an increased risk of acute renal failure, mainly due to a low DO<sub>2i</sub>. The hypothesis was that an perfusion to 2.4 L/min/m<sup>2</sup> is not enough to reach a DO<sub>2i</sub> that could minimize the risk of postoperatively acute kidney injury.

### Method

The patients were randomized in two groups, Non Goal Directed Perfusion (Non GDP, n=10) where we assumed a fixed systemic blood flow index 2.4 L/min/m<sup>2</sup> and Goal Directed Perfusion (GDP, n=10) where we individualized perfusion with a goal to reach an DO<sub>2i</sub> around 300 mL/min/m<sup>2</sup>.

DO<sub>2i</sub> was continuously measured with Goal Directed Perfusion Monitor, (Sorin Group, Mirandola, Italy) during aortic cross clamp time.

Serum creatinine (µmol/L) and serum cystatin C (mg/L) was analyzed pre- and postoperatively.

### Results

There were no differences in level of serum-creatinine (µmol/L) or serum-cystatin C (mg/L) preoperatively and postoperatively. There was no significant difference in DO<sub>2i</sub> between the groups. Mean of DO<sub>2i</sub> was above 300 mL/min/m<sup>2</sup> in both groups.

### Conclusion

We were not able to detect any differences in postoperatively acute injury markers between patients perfused with a fixed systemic indexation of 2.4 L/min/m<sup>2</sup> or patients perfused with an individualized perfusion with a goal directed to reach DO<sub>2i</sub> > 300 mL/min/m<sup>2</sup>.

**Keywords:** Goal directed perfusion, Systemic index