**Abstract:** P292

**Pulsatile extracorporeal circulation: Doppler evaluation of renal perfusion and haemolysis related.**

**Pilot study**

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**Topic(s):**
Intraoperative and Interventional Echocardiography

**Citation:**

**Introduction**
Acute renal failure is a recognized complication after cardiopulmonary bypass (CPB) cardiac surgery. Several studies suggested that pulsatile flow on CPB may have beneficial effects on renal function. Modifications on CPB parameters (amplitude/base flow) can increase revolutions per minute and lead to haemolysis.

**Purpose**
The aim of the study is to evaluate renal perfusion with Doppler ultrasound during pulsatile CPB and assess haemolysis related.

**Methods**
We conducted a prospective study, after Committee approval, including 20 patients undergoing elective CPB cardiac surgery. Pulse wave (PW) Doppler was performed on segmental renal arteries prior CPB (T1) and during CPB (T2). Resistance index and acceleration time were measured. Once CPB established, 10 patients received continuous flow (C-CPB group) and 10 received pulsatile flow (P-CPB group): frequency 60, amplitude 30%, base flow 30%. Cardiac output was maintained in both groups around 2.2 L/min. Haemolysis evaluation was performed previously and after CPB, then 24 hours after surgery by collecting: haemoglobin, haematocrit, haptoglobin, schistocytes, platelet count, potassium, lactate dehydrogenase and haemoglobinuria.

**Results**
Wilcoxon test for paired data from renal ultrasonography prior to CPB (T1) showed no statistical differences compared with pulsatile CPB modality (T2), as RI and AT were similar to the basal one (T1). CPB time was 107± 38 minutes and aortic clamp time was 75± 30 minutes. Data analysis showed a mean haematocrit and platelet count similar in C-CPB and P-CPB group. Both groups showed an increased in LDH (> 600 U/L) while haptoglobin decreased (<30 mg/dl). Two P-CPB patients presented schizocytes after CPB, normalizing values at 24h. Six patients presented haemoglobinuria 24h post surgery, two of them from P-CPB group. Two patients required transfusion from C-CPB and one from P-CPB group. There was no statistical evidence of haemolysis in any of two groups.

**Conclusions**
The decrease in the amplitude and the base flow pattern during pulsatile CPB showed a renal PW Doppler waveform similar to the basal or T1. Pulsatile CPB with low amplitude/base flow did not increase significantly the incidence of haemolysis in either group. Further studies are necessary in order to establish the pulsatile CPB implications on haemolysis and renal function.

<table>
<thead>
<tr>
<th></th>
<th>Resistance index</th>
<th>Acceleration time (ms)</th>
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<tbody>
<tr>
<td>T1</td>
<td>0,62±0,1</td>
<td>145±10</td>
</tr>
<tr>
<td>T2</td>
<td>0,51±0,1</td>
<td>150±0,7</td>
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T1: previous CPB or basal T2: pulsatile CPB
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