SCANSECT 2012, Vilnius
Serum cystatin C and serum creatinine after cardiopulmonary bypass with and without leukocyte filtration of mediastinal shed blood

A pilot study

Anders Svensson RN. MS. CCP, Magnus Rosén RN. MS. CCP, Ingemar Cederholm MD. PhD, Csaba P Kovesdy MD. FASN, Zoltán Szabó MD. PhD

1Department of Cardiothoracic and Vascular surgery, University Hospital Linköping, County Council of Östergötland, Sweden, University of Aarhus, Denmark
2Department of Cardiothoracic and Vascular surgery, University Hospital Linköping, County Council of Östergötland, Sweden
3Division of Nephrology, Salem Veterans Affairs Medical Center, Salem, VA USA. Division of Nephrology, University of Virginia, Charlottesville, VA USA
4Department of Cardiothoracic and Vascular surgery, University Hospital Linköping, County Council of Östergötland, Sweden
Department of Medical and Health Science, Faculty of Health Science, Linköping University, Sweden
Introduction

Haemodynamic factors
- Disturbed adrenergic and RAS activation
- Low cardiac output
- Systemic vasodilatation

Type of surgical procedures
- Nephrotoxic drugs
- Oxidative stress

Co-morbidity
- Exo- and endogenous toxins
- Microembolisation
- High age
- Immunological response
- Time on CPB
The purpose of this pilot study was to investigate the effect of the separation and leukocyte depletion of cardiotomy suction blood on the dynamics of s-cystatin C and s-creatinine in patients with normal preoperative kidney function. With focus on the first 72 hours post cardiopulmonary bypass.
Distribution of surgical procedures

<table>
<thead>
<tr>
<th>Surgical procedure</th>
<th>Non-filtered group n=9</th>
<th>LG6-group n=10</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitral and tricuspid valve repair</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Mitral and tricuspid valve repair, AVR, CABG x1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>MVR, CABG x1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Mitral and tricuspid valve repair, CryoMaze ablation</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Mitral and tricuspid valve repair, PFO closure</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>MVR, AVR, CryoMaze ablation</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>AVR, Supra-coronary ascending aorta replacement, CABG x3</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Mitral and tricuspid valve repair, AVR, CryoMaze ablation</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>AVR, CABG x1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>AVR, CABG x3</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>MVR, tricuspid valve repair, CABG x4</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>AVR, CABG x6</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>MVR, CABG x2</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>AVR, CABG x2</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>10</td>
<td>19</td>
</tr>
</tbody>
</table>

CBP Set up

Photo: U Wallgren
Timetable for bloodsampling

S-Creatinine och s-cystatin C were measured preoperatively and 72 hours post cardiopulmonary bypass.
Cardiotomy suction, volumes (ml)

- Shed blood post x-clamp
- Shed blood per x-clamp
- Shed blood pre x-clamp
S-cystatin C values [mg/L] without LDF (blue line) and with LDF (red line). Values as mean ±SEM.
$S$-creatinine values [μmol/L] without LDF (blue line) and with LDF (red line). Presented with mean ±SEM
Correlations between s-creatinine and s-cystatin C in the whole group of patients $n=19$ as tested with Spearman correlation test.

<table>
<thead>
<tr>
<th>Sampling time post-CPB</th>
<th>3h</th>
<th>6h</th>
<th>12h</th>
<th>24h</th>
<th>48h</th>
<th>72h</th>
</tr>
</thead>
<tbody>
<tr>
<td>R (Spearman) correlation coefficient at $p&lt;0.05$ s-creatinine/s-cystatin C</td>
<td>0.49</td>
<td>0.57</td>
<td>0.75</td>
<td>0.64</td>
<td>0.69</td>
<td>0.71</td>
</tr>
</tbody>
</table>
Conclusion

- No significant differences in s-cystatin C and s-creatinine levels between the groups (filter vs. non-filter).

- No significant difference in time between s-cystatin C och s-creatinine.

- S-cystatin C and s-creatinine showed increasing correlation from three hours up to twelve hours, and stable after then.
Limitations

- Small sample pilot study
- Only patients with normal or near normal kidney function
- No inflammatory or immunological biomarkers
- Focus on the first 72 h post CPB
Thank you for your attention