Pilot study to assess the changes of NGAL molecule as a marker of warm ischemia after partial nephrectomy

Stevens, M. ¹, Macek, P. ¹, Kalousová, M. ², Hanuš, T. ¹
¹ General University Hospital and 1st Faculty of Medicine Charles University, Dept. of Urology, Prague, Czech Republic, ²General University Hospital and 1st Faculty of Medicine Charles University, Dept. of Medical Biochemistry and Laboratory Diagnostics, Prague, Czech Republic

Introduction and Objective:
• The aim of the study is to assess the changes of neutrophil gelatinase-associated lipocalin (NGAL) level over time in patients undergoing partial nephrectomy in relation to warm ischemia time (WIT). We are aware that postoperative function of the kidney is complex and apart from WIT it may be influenced by other parameters as well, but WIT is a modifiable factor.

Materials and Methods:
• A pilot prospective study was done. Totally 19 patients (13 males, 6 females) undergoing a partial nephrectomy for renal tumor between 3/2015 - 12/2016 were included. Median age was 66, median tumor size was 25mm. Median WIT was 16 min, ranging from 8 to 30 min.
• In every patient, serum creatinine level (crea) before surgery (crea_pre), 4 hours after surgery (crea_H4) and 3 days postoperatively (crea_D3) was measured.
• The level of NGAL in serum before surgery (NGAL_pre), 4 hours after surgery (NGAL_H4) and 3 days postoperatively (NGAL_D3) was assessed by ELISA.

Results:
• Median crea_pre: was 88 μmol/l, median crea_H4: 107 μmol/l, median crea_D3: 97 μmol/l.
• Median NGAL_pre: 147,7ng/ml, median NGAL_H4: 212,1ng/ml, median NGAL_D3: 163,2ng/ml.
• We calculated the changes over time for creatinine and NGAL and analyzed the results in relationship to the WIT using nonparametric test.
• Results are summarized in the table.

<table>
<thead>
<tr>
<th>Spearman's rho WIT</th>
<th>Crea_change H4</th>
<th>Crea_change H4_percent</th>
<th>Crea_change D3</th>
<th>Crea_change D3_percent</th>
<th>NGAL_change H4</th>
<th>NGAL_change H4_percent</th>
<th>NGAL_change D3</th>
<th>NGAL_change D3_percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation coefficient</td>
<td>0,605</td>
<td>0,006</td>
<td>0,497</td>
<td>0,03</td>
<td>0,063</td>
<td>0,797</td>
<td>0,097</td>
<td>0,694</td>
</tr>
<tr>
<td>Significance (2-tailed)</td>
<td>-0,030</td>
<td>-0,903</td>
<td>-0,603</td>
<td>-0,006</td>
<td>-0,623</td>
<td>-0,004</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conclusion:
• There is a change in the level of NGAL over time in patients undergoing partial nephrectomy. On the 3rd day after surgery, this change shows a negative correlation with WIT and is statistically significant. The reason for the negative correlation is not clear and remains the subject of ongoing research.