THE IMPACT OF NEW ON CALL PROCEDURES IN HISTOCOMPATIBILITY TESTING

Helsinki experience

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New procedures

• June 2015 - deceased donor HLA typing method was changed
  • previously SSP + serology
  • now real time-PCR with HLA-ABCDRDQA1DQB1DP 384 Typing Kit, Linkage Biosciences

• October 2015 method for crossmatching between donor and recipient was changed
  • previously donor blood T-cells in selected cases (hit-tray) and splenocytes routinely for all
  • now blood T- and B-cells only, RosetteSep™-methodology for cell separation
Impact of changes in laboratory

- HLA typing
  - faster results
    - old 6 h
    - new 3 h
  - more reliable results
  - wider HLA type
    - old A, B, C, DRB1, DQ
    - new A, B, C, DRB1, DRB3-5, DQA1, DQB1, DPA1, DPB1
  - same costs

Impact of changes in laboratory

- Crossmatching
  - no more waiting for splenocytes, thus much faster results
    - old 7 h after harvest
    - new 2 h and possibly prior to harvest
  - better cells, more reliable results
  - same costs

www.bloodservice.fi
### Current crossmatch interpretation

<table>
<thead>
<tr>
<th>T-cell crossmatch</th>
<th>B-cell crossmatch</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neg</td>
<td>Neg</td>
<td>Neg</td>
</tr>
<tr>
<td>Neg</td>
<td>Pos</td>
<td>Pos</td>
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<td>Pos</td>
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<td>Pos</td>
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</tr>
</tbody>
</table>

### Future crossmatch interpretation?

<table>
<thead>
<tr>
<th>T-cell crossmatch</th>
<th>B-cell crossmatch</th>
<th>Virtual crossmatch</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neg</td>
<td>Neg</td>
<td>Neg</td>
<td>Neg, normal risk</td>
</tr>
<tr>
<td>Neg</td>
<td>Neg</td>
<td>Pos</td>
<td>Neg, increased risk</td>
</tr>
<tr>
<td>Neg</td>
<td>Pos</td>
<td>Neg</td>
<td>Neg, high risk</td>
</tr>
<tr>
<td>Neg</td>
<td>Pos</td>
<td>Pos</td>
<td>Neg, very high risk</td>
</tr>
<tr>
<td>Pos</td>
<td>Neg/Pos</td>
<td>Neg/Pos</td>
<td>Pos</td>
</tr>
</tbody>
</table>

[www.bloodservice.fi](http://www.bloodservice.fi)
B-cells and hit-tray

- We use hit-tray to screen HI patients that may have negative cross-match
  - Previously we used T-cells for screening
    - lot of wrong negative screening results
  - Now we use B-cells
    - less wrong negative results
    - hit-tray negative patient is more often truly negative and get the kidney
  - Clinicians like new method and use it more likely

Impact of changes at the hospital

- HLA results come sooner that previously
  - selection of patients for crossmatching could be done earlier
  - sometimes this is difficult due to fact that surgeon is performing or preparing harvest-operation

- Crossmatch results come sooner than previously
  - previously surgeon who performed donor operation was able to rest prior to recipient operations
  - now patient selection is ready "too" soon, same surgeon must decide to operate immediately or let kidney wait at cold storage
Impact of new protocols on cold ischemia time

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean CIT</th>
<th>SD</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-2012 (n=2314)</td>
<td>20:54</td>
<td>5:44</td>
<td>21:26</td>
</tr>
<tr>
<td>2013 (n=189)</td>
<td>19:37</td>
<td>6:59</td>
<td>20:51</td>
</tr>
<tr>
<td>2014 (n=240)</td>
<td>18:31</td>
<td>6:18</td>
<td>19:52</td>
</tr>
<tr>
<td>2015 (old X-match, n=195)</td>
<td>19:20</td>
<td>6:26</td>
<td>20:23</td>
</tr>
<tr>
<td>2015-8/2016 (new X-match, n=216)</td>
<td>14:27</td>
<td>6:19</td>
<td>15:04</td>
</tr>
</tbody>
</table>

P<0.001

Impact of new protocols on delayed graft function

1.10.2014-11.10. 2015 (n=245)

- EF 74%
- DGF 26%

12.10.2015-15.8.2016 (n=211)

- EF 76%
- DGF 24%
Impact of new protocols on need for postTx dialysis

<table>
<thead>
<tr>
<th></th>
<th>With old x-match (n=63)</th>
<th>With new x-match (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>5.0</td>
<td>3.6</td>
</tr>
<tr>
<td>SD</td>
<td>5.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Median</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Differences are statistically not significant

Good and bad

- **Good**
  - More reliable and faster
  - No additional costs
    - reagents approx. same costs
    - less nighttime labour, less expences
  - Cold ischemia time decreased
    - good for long term??
  - Lab technicians are happier because methods are better
  - Lab experts are happier because methods are more reliable
  - Clinicians are "happier" because service is faster

- **Bad**
  - Sometimes "too fast results" are a little bit of inconvinient for clinicians
  - DGF and need for dialysis have not changed