Robotic Routing: How far are we from Remote Control?

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Disclosure

Speaker name: Thomas Nolte

I have the following potential conflicts of interest to report:

- [x] Consulting (HansenMedical Inc.)
- [ ] Employment in industry
- [ ] Stockholder of a healthcare company
- [ ] Owner of a healthcare company
- [ ] Other(s)

- [ ] I do not have any potential conflict of interest
Robotic Routing shall:

- enhance precision in intravascular navigation by 3d-control of catheter-devices
- add predictability and safety in complex endovascular procedures
- allow for new techniques (e.g. in situ-fenestration, ...)
- reduce radiation exposure by adding distance to the field: remote control
Platform: Magellan™
(HansenMedical)
## Robotic Catheters:

<table>
<thead>
<tr>
<th>Type</th>
<th>OD</th>
<th>ID</th>
<th>Single Catheter</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 F</td>
<td>4,3 F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 F</td>
<td>6 F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 F</td>
<td>7 F</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Access: femoral and axillary
Challenges: Emergency cases
#62: CADC with true-lumen-stenosis
Robotic Routing for TEVAR

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>br-TEVAR  (97% Tbranch™, COOK)</td>
<td>35</td>
</tr>
<tr>
<td>Crawford I</td>
<td>2</td>
</tr>
<tr>
<td>Crawford II</td>
<td>5</td>
</tr>
<tr>
<td>Crawford III</td>
<td>7</td>
</tr>
<tr>
<td>Crawford IV</td>
<td>4</td>
</tr>
<tr>
<td>perirenal Ax</td>
<td>10</td>
</tr>
<tr>
<td>aortic dissections</td>
<td>7</td>
</tr>
<tr>
<td>f-EVAR</td>
<td>12</td>
</tr>
</tbody>
</table>

In total: 47
Results:

- Freedom from conversion: 100%
- Freedom from rupture: 100%
- Freedom from Endoleak Ia/Ib: 100%
- Primary technical success with robot: 95%
  - 154 of 163 target-vessels reached

Robot-related events:
- Catheter damage due to overload: 3
- Function failure of robot: 3
Robotic Routing has proven to

- enhance precision in intravascular navigation
- add predictability and safety in complex procedures
- allow for new techniques (e.g., in situ-fenestration, ...)

but failed for enabling true remote control in our setting.
Reasons: Workflow!

- appropriate stent-grafts demand at least 7F delivery channels, so usage of the robot is mostly restricted to wire-placement
- in tortuous anatomies mechanical friction occurs even in matching dimensions!
- Who of the team shall leave the control area?
- change of scrubs for every stent device?
- regard time and sterility concerns!
True remote control

- is close to grab, but
  - robot and adjunct devices need further modifications to overcome mechanical limitations

- is the only way to reduce our individual radiation exposure significantly
  - Wouldn´t it be nice to work without lead apron?