Robotics in PCI

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First Robotic Catheter-based Procedures

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Figure 3. The operator control unit, composed of a computer, a control console, and a joystick. The screen has various control features, including precise positioning and discrete wire rotation options. Safety "STOP" button is emphasized in red.
PRECISE TRIAL

• Demonstrated feasibility of Robotic PCI in Non-Type C lesions
Hardware + Set-up

- Cassette
- Console
Robotic PCI in Complex CAD

Mahmud et al JACC Interv 2017

**TABLE 3** Procedural Characteristics and Clinical Outcomes of Both the Study (Robotic) and Control (Manual) Groups in the Entire Study Cohort

<table>
<thead>
<tr>
<th>Access site</th>
<th>Robotic Group (n = 108)</th>
<th>Manual Group (n = 226)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Femoral</td>
<td>88%</td>
<td>87.6%</td>
<td>0.93</td>
</tr>
<tr>
<td>Radial</td>
<td>12%</td>
<td>12.4%</td>
<td>0.93</td>
</tr>
<tr>
<td>Stents deployed</td>
<td>1.59 ± 0.79</td>
<td>1.54 ± 0.75</td>
<td>0.73</td>
</tr>
<tr>
<td>Lesions treated</td>
<td>1.47 ± 0.69</td>
<td>1.49 ± 0.67</td>
<td>0.78</td>
</tr>
<tr>
<td>Procedure time (min:s)</td>
<td>44:30 ± 26:04</td>
<td>36:34 ± 23:03</td>
<td>0.002</td>
</tr>
<tr>
<td>Fluoroscopy time (min)</td>
<td>18.2 ± 10.4</td>
<td>19.2 ± 11.4</td>
<td>0.39</td>
</tr>
<tr>
<td>Dose-area product (cGy · cm²)</td>
<td>12,518 ± 15,970</td>
<td>14,048 ± 18,437</td>
<td>0.045</td>
</tr>
<tr>
<td>Contrast volume (ml)</td>
<td>183.4 ± 78.7</td>
<td>202.5 ± 74</td>
<td>0.031</td>
</tr>
<tr>
<td>MACE*</td>
<td>0.9%</td>
<td>0.9%</td>
<td>1.00</td>
</tr>
<tr>
<td>CK-MB &gt;3 times ULN</td>
<td>5.6%</td>
<td>7.5%</td>
<td>0.51</td>
</tr>
</tbody>
</table>

**TABLE 4** Procedural Characteristics and Clinical Outcomes of the Propensity-Matched Subgroup

<table>
<thead>
<tr>
<th>Procedure time (min:s)</th>
<th>Robotic Group (n = 82)</th>
<th>Manual Group (n = 82)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.59 ± 26.14</td>
<td>34.01 ± 17.14</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Fluoroscopy time (min)</td>
<td>17.5 ± 9.9</td>
<td>17.1 ± 9.2</td>
<td>0.93</td>
</tr>
<tr>
<td>Dose-area product (cGy · cm²)</td>
<td>13,762 ± 17,907</td>
<td>12,393 ± 17,321</td>
<td>0.61</td>
</tr>
<tr>
<td>Contrast volume (ml)</td>
<td>183.9 ± 77.2</td>
<td>195.1 ± 65.4</td>
<td>0.22</td>
</tr>
<tr>
<td>MACE*</td>
<td>0.0%</td>
<td>1.2%</td>
<td>1.00</td>
</tr>
<tr>
<td>CK-MB &gt;3 times ULN</td>
<td>4.9%</td>
<td>4.9%</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Robotic-PCI
APEX EXPERIENCE

>250 Cases
Cross-over to h-PCI in 7 Cases
Hybrid procedure in 11 Cases
Technical Failure in 2 Cases
Type of lesions tested with Robotic PCI

• Simple

• Complex
  • Type C
  • CTO
  • STEMI PPCI

• Peripheral
Case: 1, LCX-OM Bifurcation stenting
Case: 2, LAD diffuse long segment stenosis
Case: 3, RCA CTO
Case: 4, Acute IWMI
Case: 5, RCA dissection
Case: 6, SVG-PDA ISR
Case: 7, renal artery stenting
REMOTE PCI  TELEROBOTIC PCI

WIRELESS REMOTE PCI
32 Kilometers (20 Miles) away from the patient via 100 Mbps connection
PATIENT’s VIEW
REMOTE-PCI

• Access to emergent PCI in remote areas

• Acute neurointervention and trauma intervention
Thank You