Laparoscopy And Articulated Robots For Aortic Surgery Is A Failed Experiment

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Disclosures
• Consulting Medtronic, Inc.
• Intellectual property, Cook, Inc.

Why Laparoscopic aortic surgery?

Ann Vasc Surg 2013
Results of laparoscopic surgery for abdominal aortic aneurysms in patients with standard surgical risk and anatomic criteria compatible with EVAR.
Javerliat I, Capdevila C, Beauchet A, Di Centa, Goeau de Brisonniere O, Coggia M

• 99 eligible for EVAR
• Operative time: 210 (180-520) minutes = 3-8 hrs
• Clamping time 81 (35-140) minutes = up to 2 hrs

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Javerliat I, Capdevila C, Beauchet A, Di Centa, Goeau de Brisonniere O, Coggia M

• 0% mortality
• 3% severe morbidity
• 10% moderate morbidity
• Operative time indicative for complications
An overview of laparoscopic techniques in abdominal aortic aneurysm repair

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Table 3. Aneurysm repair: Operative data of included studies

<table>
<thead>
<tr>
<th>Year</th>
<th>N</th>
<th>Operative time (min)</th>
<th>Clamping time (min)</th>
<th>Aneurysm size (mm)</th>
<th>Hospital stay (d)</th>
<th>Mortality</th>
<th>Conversion to open</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>200</td>
<td>235±20</td>
<td>101±25</td>
<td>50±10</td>
<td>4±2</td>
<td>0.05</td>
<td>7.5±3</td>
</tr>
<tr>
<td>2005</td>
<td>180</td>
<td>230±20</td>
<td>100±20</td>
<td>50±10</td>
<td>4±2</td>
<td>0.05</td>
<td>7.5±3</td>
</tr>
<tr>
<td>2006</td>
<td>150</td>
<td>225±20</td>
<td>100±20</td>
<td>50±10</td>
<td>4±2</td>
<td>0.05</td>
<td>7.5±3</td>
</tr>
<tr>
<td>2007</td>
<td>120</td>
<td>220±20</td>
<td>95±20</td>
<td>50±10</td>
<td>4±2</td>
<td>0.05</td>
<td>7.5±3</td>
</tr>
</tbody>
</table>

VASCULAR AND ENDOVASCULAR TECHNIQUES

Peter F. Lawrence, MD, Section Editor

Bitubular graft as an adjunct for laparoscopic hybrid repair of an abdominal aortic aneurysm

Raphael Gocse, MD, Clement Candelia, MD, Olivier Gocse, Reummers, MD, PhD, and Marc Goggi, MD, Bogota-Buenaventura and Montevideo-Buenaventura, France
What’s the problem with laparoscopic vascular surgery?

It’s just too difficult!

Technology!
Telesurgery

Robot-assisted laparoscopic aortobifemoral bypass for aortoiliac occlusive disease: A report of two cases
Wino Pordick, MD, Miguel A. Zava, MD, Carlos Espitia, MD, and Alan R. Barraco, MD
Surgery, UT Southwestern Medical Center, Dallas, TX 2002

31 patients, AIOD
•ABF or
•endarterectomy

Medium term Kaplan Meyer Patency at median follow up of 36 months (range 12 to 68)

Results
• Conversion to minilaparotomy in 3 pts
• Mortality 3%
• Minor complications 9%

6 months post op
• 97.3% technical success
• 2.7% complication rate,
• anastomosis and clamp times 27 and 39 min

Literature since 2002

Robot assisted aortic surgery:
13 (thirteen!) papers
• Amsterdam (≈ 40 cases)
• Kolvenbach (≈ 40 cases)
• Städerl (> 200 cases)
• Lin

Amsterdam Robotic Aortic Program

• “competition” of endovascular surgery
• < 5-10 cases per year
• On hold

Draw backs
• Too bulky
• Cumbersome
• Depending on additional personnel
• Expensive!

Ready to conquer the world!
A first-in-man study of the role of flexible robotics in overcoming navigation challenges in the iliofemoral arteries

Jean Bisson, MD,1 Cacundy Duran, MD,2 Milenko Stankovic, MD,3 Burut Goruk, MD,3 and Alan R. Lumley, MD,4 Minnetonka, Minn, and Zadar, Croatia

"The robotic system enables precise manipulation, stable positioning, and minimum instrumentation of the aorta and its branches while minimizing radiation exposure" Cheshire et al
Conclusion

Laparoscopic vascular surgery, with or without the use of articulated robots, is a failed experiment because

- In spite of all efforts, it never became mainstream
- Lack of reproducibility and thus proof
- The ever and much faster improvement of endovascular surgery

Thank you!