Robotic Aortic Surgery May Be A Failed Experiment But Robotically Directed Catheters Have A Bright Future In Vascular Surgery: Why

H.M.E. Covelliers, MD, MBA
VU University medical center Amsterdam

No Disclosures
Hans Covelliers, MD, MBA

Status of Laparoscopic Robotic Aortic Surgery: is it Gimmick?

VEITH, New York, 2005

WHY IS THAT?
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TOO DIFFICULT: Steep learning curve

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TOO DIFFICULT: Steep learning curve
TOO LONG: not faster than full laparoscopy
TOO BULKY: cumbersome robot installation
WRONG INDICATIONS

All cases suitable for simple endovascular intervention

Antoniou et al. JVS Feb 2011

Only reports from 4 centres worldwide with a total of 162 cases.
(avoidable) fatality

Antoniou et al. JVS Feb 2011

Benefits and limitations

The da Vinci robot is indicated for delicate dissections in a confined space

Antoniou et al. JVS Feb 2011

Table III. Benefits and limitations of robot-assisted laparoscopic vascular surgery

<table>
<thead>
<tr>
<th>Robotic advantages</th>
<th>Robotic disadvantages</th>
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</thead>
<tbody>
<tr>
<td>Solid maneuverability</td>
<td>Extreme degree of freedom</td>
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<tr>
<td>Improved visualization</td>
<td>Unpredictable movement</td>
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<tr>
<td>High precision</td>
<td>Inability to perform retrograde dissections</td>
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<tr>
<td>Minimal blood loss</td>
<td>Limited ability to handle unusual angles</td>
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</tbody>
</table>

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Antoniou et al. JVS Feb 2011

Laparoscopic Robotic Aortic Surgery Is Another Gimmick!

VEITH, New York, 2015

Endovascular Robotic Aortic Surgery has a bright future!

VEITH, New York, 2015
WHY?
Focus shift from robot aided arterial anastomosis to endovascular techniques

Complex endovascular aneurysm repair requiring advanced catheterization skills

Treatment of complex thoraco-abdominal aneurysms can be technically challenging and time consuming.

Especially vessel cannulation leading to:
- Risk of embolism
- Long fluoroscopy times
- High radiation doses
- High contrast volumes

Robotically directed catheter systems
- Improve vessel cannulation
- Simplify complex EVAR cases
- Potentially reduce fluoroscopy time
- Reduce radiation doses for patient and operator
- Reduce contrast volumes

Benefits and limitations

Potential advantages
- Accurate positional control
- Enhanced catheterization through complex anatomy
- Reduced catheter exchanges
- Enhanced catheter stability
- Reduced contrast/fluoroscopy time
- Shorter learning curve
- Reduced fluoroscopy exposure for operator

Potential disadvantages
- Cost for system and disposable catheters
- Longer set-up time
- Greater technical backup
- No stent-grafts
Conclusion

Although the current systems have shown their potential in phantom and animal studies, clinical trials are too limited to conclude that these systems can improve EVAR outcomes.

Nevertheless the future looks bright for robotically steering catheters in vascular surgery, especially in extremely complex cannulation tasks.

Thank you for your attention