Robotic Surgery: Techniques and Patient Selection

2nd World Congress on Thyroid Cancer
July 2013

Ron Kuppersmith, MD - Moderator
Woung Youn Chung, MD
Emad Kandil, MD
David Terris, MD
Neil Tolley, MD
Disclosures

- Ron Kuppersmith, MD
  - Marina Medical - royalties
- Woung Youn Chung, MD
  - None
- Emad Kandil, MD
  - None
- David Terris, MD
  - Johnson and Johnson – course director
- Neil Tolley, MD
  - None
International Advanced Thyroid Surgery Forum

October 13-14, 2013
Celebration, Florida

Course Directors:
Scott Magnuson, MD
Ron Kuppersmith, MD

Invited Faculty:
Patrick Aidan, MD (American Hospital in Paris)
Peter Angelos, MD (University of Chicago)
Woong Youn Chung, MD (Yonsei University)
Kyu Eun Lee, MD (Seoul National University)
Paolo Miccoli, MD (University of Pisa)
Jim Netterville, MD (Vanderbilt University)
Lisa Orloff, MD (UC San Francisco)
Greg Randolph, MD (Harvard)
David Terris, MD (Georgia Regents University)
Martha Zeiger, MD (Johns Hopkins)

ThyroidSurgeryForum.com
Robotic Thyroid Surgery

• Been available for several years and evolving

• Most physicians are aware of this option

• “Safe and feasible” in “well-trained hands”
Agenda

- Introductions
- Concerns about robotic surgery
- Advantages of different techniques
- Indications and patient selection
- Technical challenges
- Complications
- Training
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Why Are More Costly and More Dangerous Surgical Procedures Being Developed?

David E. Schuller, MD
Cost and Reimbursement

• Increased costs (Who benefits?)

• Reimbursement (Who actually pays?)
October 13, 2011

Dear da Vinci Surgeon,

Intuitive Surgical has recently undertaken an internal review of its da Vinci Surgical System product labeling, and we are working with the FDA to modify the indication for use with respect to thyroidectomy procedures.

During this process, Intuitive Surgical will not provide or facilitate any promotion, training, case observations, proctoring or in-case procedural support for use of the da Vinci System in conjunction with thyroidectomy procedures.

Intuitive Surgical recommends consulting your institutional policy regarding the use of approved or cleared medical devices for procedures that are not specified in the labeled indications for use prior to undertaking thyroidectomy procedures utilizing the da Vinci System.

For any additional questions, please contact Customer Service at 1-877-408-3872, option 2.

Sincerely,

Richard W. Reeves
Vice President - Regulatory
Intuitive Surgical, Inc.
1266 Kifer Rd.
Sunnyvale, CA 94086
Robotic Thyroidectomy: Must We Drive a Luxury Sedan to Arrive at Our Destination Safely?
William B Inabnet III

Why I have abandoned robot-assisted transaxillary thyroid surgery
Nancy D. Perrier, MD, FACS, Houston, TX

Is Robotic Thyroid Surgery Worth the Learning Curve?
Neil D. Gross, MD
Agenda

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### Classification of Described Techniques

<table>
<thead>
<tr>
<th>Type I: Direct midline</th>
<th>Working Space</th>
<th>Visualization</th>
<th>Instrumentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>Gasless</td>
<td>Traditional+/- Loupes</td>
<td>Manual</td>
</tr>
<tr>
<td>Small incision</td>
<td>Gasless</td>
<td>Loupes+/-Endoscopic</td>
<td>Manual</td>
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</table>

<table>
<thead>
<tr>
<th>Type II: Regional</th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Transcervical</td>
<td>Insufflation</td>
<td>Endoscopic</td>
<td>Manual</td>
</tr>
<tr>
<td>Lateral</td>
<td>Insufflation/Gasless</td>
<td>Endoscopic</td>
<td>Manual</td>
</tr>
<tr>
<td>Submandibular</td>
<td>Gasless</td>
<td>Endoscopic</td>
<td>Manual</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type III: Remote</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior Chest Wall</td>
<td>Insufflation</td>
<td>Endoscopic/Stereoscopic</td>
<td>Manual/Robotic</td>
</tr>
<tr>
<td>Circum-mammary</td>
<td>Insufflation</td>
<td>Endoscopic/Stereoscopic</td>
<td>Manual/Robotic</td>
</tr>
<tr>
<td>ABBBA</td>
<td>Insufflation/Gasless</td>
<td>Endoscopic/Stereoscopic</td>
<td>Manual/Robotic</td>
</tr>
<tr>
<td>Postauricular-axillary</td>
<td>Insufflation</td>
<td>Endoscopic</td>
<td>Manual</td>
</tr>
<tr>
<td>Transaxillary</td>
<td>Insufflation/Gasless</td>
<td>Endoscopic/Stereoscopic</td>
<td>Manual/Robotic</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Type IIIm: Transmucosal</th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Transoral</td>
<td>Insufflation</td>
<td>Endoscopic/Stereoscopic</td>
<td>Manual/Robotic</td>
</tr>
</tbody>
</table>

Holsinger FC, Kuppersmith RB, Chung WY. Surgical Approaches to the Thyroid and Parathyroid Glands: A Modern Classification Scheme. *Surgery of the Thyroid and Parathyroid Glands.* Edited by Greg Randolph. 2012.
Transaxillary

- Started at Yonsei University in Seoul by Dr. Chung
- Over 6000 cases performed at over 100 sites
Bilateral Axillary Breast

- Developed at Seoul National University Hospital
Facelift

Robotic Facelift Thyroidectomy: II. Clinical Feasibility and Safety

David J. Terris, MD; Michael C. Singer, MD; Melanie W. Seybt, MD
TRANSORAL ROBOTIC-ASSISTED THYROIDECTOMY: A PRECLINICAL FEASIBILITY STUDY IN 2 CADAVERS

Jeremy D. Richmon, MD, Kavita M. Pattani, MD, Tahar Benhidjeb, MD, Ralph P. Tufano, MD

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Indications and Patient Selection

- Thyroid disease specific factors
- Patient-related factors
- Surgeon-related factors
Indications and Patient Selection

- Thyroid disease specific factors
  - Size of mass
  - Extent of disease
  - Thyroiditis
Indications and Patient Selection

• Patient-related factors
  • Patient size (BMI, other)
  • Shoulder or cervical spine injuries
  • Breast implants
  • Others?
Indications and Patient Selection

• Surgeon-related factors
  • Experience/learning curve
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Technical Challenges

Table 2. Comparison of surgical outcomes in robotic and conventional open thyroidectomy.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Robotic thyroidectomy (n = 75)</th>
<th>Open thyroidectomy (n = 226)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative time, min</td>
<td>168 ± 42.5 (range, 110-295)</td>
<td>133.8 ± 46.6 (range, 60-310)</td>
<td>.001</td>
</tr>
<tr>
<td>Lobectomy with isthmusectomy</td>
<td>151 ± 38.4</td>
<td>102.4 ± 27.1</td>
<td>.001</td>
</tr>
<tr>
<td>Total thyroidectomy (TT)</td>
<td>194 ± 36.4</td>
<td>137.2 ± 47.1</td>
<td>.001</td>
</tr>
<tr>
<td>Number of removed lymph nodes</td>
<td>4.40 ± 2.40 (range, 1-11)</td>
<td>7.76 ± 5.50 (range, 2-31)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Ipsilateral CCND</td>
<td>4.30 ± 2.38</td>
<td>5.52 ± 3.29</td>
<td>.059</td>
</tr>
<tr>
<td>Bilateral CCND</td>
<td>6.33 ± 2.08</td>
<td>8.79 ± 6.00</td>
<td>.482</td>
</tr>
<tr>
<td>Central neck metastasis in CCND</td>
<td>26/57 (45.6%)</td>
<td>64/153 (41.8%)</td>
<td>.311</td>
</tr>
<tr>
<td>Amount of drainage, mL</td>
<td>272 ± 118</td>
<td>130 ± 75</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Postoperative hospital stay, days</td>
<td>6.1 ± 1.8</td>
<td>5.9 ± 2.6</td>
<td>.328</td>
</tr>
<tr>
<td>TSH-stimulated serum thyroglobulin at first RAI</td>
<td>12.70 ± 15.01 (median, 8.8; range, 0.1-62.6)</td>
<td>4.90 ± 8.57 (median, 1.9; range, &lt;0.1-65.8)</td>
<td>.031</td>
</tr>
<tr>
<td>TSH-stimulated serum thyroglobulin after RAI</td>
<td>1.73 ± 3.87 (median, 0.2; range, &lt;0.1-11.8)</td>
<td>1.55 ± 4.92 (median, 0.3; range, &lt;0.1-38.5)</td>
<td>.661</td>
</tr>
</tbody>
</table>
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Complications

• Standard thyroid surgery complications

• New complications
Complications

• Standard thyroid surgery complications
  • Recurrent laryngeal nerve injury
  • Superior laryngeal nerve injury
  • Hypoparathyroidism
  • Compressive hematoma
Complications

- New complications
  - Brachial plexus neuropraxia
  - Conversion to an open procedure
  - Others?
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Training

• Which surgeons should learn these approaches?

• What is the best method to learn these techniques?
Thanks!