Learning and Teaching Robotic Thoracic Surgery

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Learning and Teaching Robotics

Relevant Disclosures

• Intuitive Surgical: Honoraria
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Key Elements

1. Program development and growth
2. Training and accreditation
3. Case selection and learning curve
4. Technical Considerations
PROGRAM DEVELOPMENT

“Teaching the Teachers”
Critical Program Elements

- Overall high volume robotic surgical multispecialty practice (GYN, GU, GENERAL, ENT, THOR)
- Institutional commitment
- Operating room steering committee
NEED AS A STARTING POINT: HIGH VOLUME ROBOTIC SPECIALTIES
High Volume Subspecialties

• Urology
  – Prostatectomy
  – Nephrectomy
  – Cystectomy
• Gynecology
  – Hysterectomy
  – Myomectomy
• Colorectal Surgery
  – Colectomy
  – Low anterior resection
Robotic Surgery Adoption in the US

2001
- Lap: 1.8%
- dV: 0.2%
- Open: 98%

Prostatectomy
- 2001: Lap 1.8%, dV 0.2%, Open 98%
- 2012: Lap 0.75%, dV 86%

2005
- Lap: 14%
- Vag: 22%
- Open: 64%

Hysterectomy
- 2005: Lap 14%, Vag 22%, Open 64%
- 2012: Lap 16%, Vag 14%, dV 35%

- 2005: ~50,000/year
- 2012: ~600,000/year
Program Development

Benefit of High Volume

- Maximal utilization of the robotic system
- Facilitates proficiency of clinical team: surgeons, assistants, nursing, anesthesia, turnover
- Maximizes patient safety and good clinical outcomes
- Critical in becoming a center of excellence
WITHOUT INSTITUTIONAL COMMITMENT THE PROGRAM CANNOT GROW
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Institutional Commitment

- System acquisition/maintenance
- Evaluation of new technology
- Dedicated robot rooms
  ✓ Results in maximal utilization of systems
- Service priority time
  ✓ Protected time for lower volume services
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Institutional Commitment

- MSKCC purchases standard robot in early 2002
- No dedicated urologist
- The MIS general surgical oncologist leaves
- Thoracic service performs first robotic lobectomy in November 2002
## Volume of Cases at MSKCC

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
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<tbody>
<tr>
<td>2002</td>
<td>14</td>
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<td>2006</td>
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<tr>
<td>2007</td>
<td>172</td>
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<td>2008**</td>
<td>80</td>
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<tr>
<td>Total</td>
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**All services through March**

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Thoracic Volume at MSKCC

- 11/02 – 7/08: 79 cases (76 lobectomies)
- 7/08: MSKCC acquires 2 da Vinci S systems (total of 3)
- 7/08 – 6/10: 126 cases (62 lobectomies)
- Other cases: 11 segmentectomies, 10 thymectomies, 3 esophagectomies, 7 resections of mediastinal masses
O.R. STEERING COMMITTEE IS CRITICAL TO PROGRAMMATIC SUCCESS
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Steering Committee

• Oversees program development
• Establishes priority utilization
• Monitors quality and outcomes
• Evaluates new technology
TRAINING AND CREDENTIALING
ESTABLISH A FORMAL, STEPWISE PLAN FOR OBTAINING TRAINING AND CREDENTIALING
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Training

• Intuitive online didactic course

• Two-day clinical training module
  ✓ Dry lab
  ✓ Simulation
  ✓ Animal and cadaver models

• Case observation
  ✓ Concentrate on one type of case during a specific observation event
  ✓ Ideal to observe a surgeon whose technique most closely approximates what you will do
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Credentialing

- Required elements vary between institutions
- Intuitive training module
- Case proctoring
  - Same-specialty should be mandatory
  - Formal feedback/evaluation of candidate surgeon by proctor
  - Number and type of cases varies
- Formal candidate review prior to granting privileges is ideal
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Ideal Proctor

- Someone you have observed
- You have chosen
- Proctor’s approach/technique similar to one you want to develop
- Published/acknowledged in the field of thoracic surgery and robotics
- Comfortable/collegial relationship – able to give constructive feedback
- Invested in your success
INITIAL CASE SELECTION
AS WITH EVERYTHING IN SURGERY, CAREFUL PATIENT SELECTION AND PROPER INDICATIONS ARE KEY
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 Patient Selection and Indications
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Patient Selection and Indications

• Early experience:
  – Patients with good cardiopulmonary status
  – Early stage disease or isolated lesions

• Mature experience:
  – High risk patients
  – Locally advanced disease
  – Post induction cases
  – Reoperative cases
  – Bronchoplasty or sleeve
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Team Building and Communication

• Discuss the operative plan with the team (nursing, anesthesia, surgical assistants) PRIOR to the case

• Nursing
  – Plan for the procedure
  – Position of the surgical cart
  – Equipment/instruments needed

• Anesthesia
  – Patient positioning
  – Potential use of CO2 insufflation

• Assistants
  – Conduct of the procedure (steps)
  – Event of emergency
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Learning Curve

- Devise a strategy of learning
- Begin with simple cases
- Be willing to perform learn in phases and stages
- Set a time limit
- Minimize complications early in your experience
TECHNICAL CONSIDERATIONS
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Choosing an Incision Strategy

• There are many options – do not be tied down to one only. Be flexible
• Be aware of spacing (not as much of concern with Xi system)
• You want the final position of the arms (surgical cart) to cover the range of the planned surgical field
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4-arm Robot-assisted type

3-arm completely portal

4-arm completely portal
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Port Placement and Docking

• The camera position is chosen first
• Be aware of spacing (not as much of concern with Xi system)
• Instruct cart driver (circulating nurse) to move slowly
• Once all arms docked, make sure there are no conflicts and full range of motion
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Docking

4-arm Si right lung resection
DISSECTION
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Robotic Dissection

• Just like traditional surgical dissection – exposure and knowledge of anatomy key
• Must rely more heavily on visual cues – pseudo-tactile sensation
• Utilize bimanual dissection
• Minimize tearing – use energy and gentle blunt dissection
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Robotic Dissection

• Pulmonary hilar dissection – perform hilar lymphadenectomy to ease isolation of the vessel

• For larger tumors minimize holding tissue and instead simply push for retraction
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Robotic Dissection
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Stapling
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Robotic Stapling
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Hemorrhage

- BEST STRATEGY: AVOIDANCE
- Do not panic!
- Get control
  - Robotic instrument
  - Sponge stick
- Low threshold for conversion
POSTOPERATIVE MANAGEMENT
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Postoperative Management

• Patient postoperative care similar to other MIS procedures
• Debriefing with the team
  – What went well – thank and encourage the team
  – Areas of improvement
  – Elicit suggestions/feedback
• Video review
  – Record every case
  – Download and review
Thank You!