Robotic Resection of Lung Cancer

Rishindra M. Reddy, MD
University of Michigan
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Disclosures

• Glaxo-Smith Kline
• Intuitive
• Covidien
Obligatory robot picture
Objectives

• Understand indications of Minimally invasive approaches to lung cancer
• Review development of robotics program at UM
• Understand current state of Robotic Surgery
• Review technical pitfalls of lobectomy
• Review optimal bedside assist techniques
Background

- Performing Minimally invasive surgery for 9 years
- Performing robotic surgery for 5 years
- Intuitive teaching site at Univ. of Michigan
- Chair-UM Comprehensive Robotic Surgery Program
Lung Lobectomy

- Pulmonary Artery ligation
- Pulmonary Vein ligation
- Bronchial ligation
- Lymph node dissection
Lung Cancer Resections

• Traditional Thoracotomy

• Video Assisted Thoracoscopic Surgery (VATS)

• Robotic Lobectomies
Traditional Thoracotomy

- 5th interspace (in between the 5th and 6th ribs)
- Posterolateral or Axillary/anterolateral
- 6th Rib resection optional
- Fissure dissection and PA control 1st
- Ligation of vessels by ties, suture ties, or staplers
- En bloc lymph node resection (!)
- Can place muscle/fat pedicle flap over bronchus if needed
VATS approach

• 3-5 incisions, no “standard”
• Duke (D’Amico) vs McKenna methods
• Anterior to posterior dissection (start with the Pulmonary veins)
• No rib resection, no spreading of the ribs
• Can do a good lymph node dissection
Red-VATS, Green-Si Robotic
Robotics approach

- 3-5 incisions, no “standard”, YET
- S vs Si vs Xi machine will change approach
- Anterior to posterior dissection (start with the Pulmonary veins)
- No rib resection, no spreading of the ribs
- Can do a good lymph node dissection (?)
Red-VATS, Green-Si Robotic
Open versus Minimally Invasive?

• VATS=Robotics
• Would approach most lung resections by an MI approach
• Open reserved for
  – Central tumors (requiring sleeve resections, etc.)
  – Concerns about lymph node resections
  – Inability to ventilate single lung
UM-Thoracic Robotics Program

- 400 + robotic surgeries since 2013
- Lung resections, Mediastinal Mass resections, Esophagectomy, and Esophageal hernias
- Teaching site for Intuitive
- Focus on Resident Education, Patient Safety
Initial Training

- Online training
- Proctored Simulation time
- Cadaver Lab
- Observing a High volume surgeon
- Proctoring of first 5 cases by Robotic surgeon
Program Building

• Not just about the Surgeon
• OR Nursing
• Anesthesia Staff
• Resident involvement
  – No resident involvement vs Graduated exposure
Case Selection

- Walking
  - Simple VATS procedures
  - Laparoscopic foregut cases
- Jogging
  - Mediastinal Resections
- Running
  - Lobectomies
  - Esophagectomies
Review of 1st 106 cases

Figure 2. Robotic Thoracic Surgeries by Case Type (n = 106)
Increasingly Complex Cases

Figure 3. Robotic-assisted lobectomies increased from 6% (1st cohort) to 27% (last two cohorts) of robotic lung resections.
Developing a Core OR Team
Development of a Thoracic Surgery Robotic Program

• Entire OR staff training program

• Resident training during program development is possible

• Case Selection is key
Current State of Robotics

Si Platform

Xi Platform
Xi Advantages

• Rotating central docking system
• Stapler
• Extra joint
• Longer instruments
Pitfalls of Lobectomies

- Visualization
- Bleeding
- Retraction
Pitfalls of Lobectomies

• Visualization
  – Moving Camera in and Out
  – Troubleshooting Insufflation
• Bleeding
• Retraction
Pitfalls of Lobectomies

• Visualization

• Bleeding
  – Minor bleeding, suctioning
  – Major bleeding, Spongestick and conversion to open

• Retraction
Pitfalls of Lobectomies

• Visualization
• Bleeding
• Retraction
  – Extra port placement
  – Scanlan grasper or other to hold lung
Bedside Assist

- Port Placement
- Docking
- Placing instruments
- Troubleshooting Camera
- Removing specimens
- Suctioning/advancing staplers
Robotic Lobectomy

• Video-approx 30 min
Questions?

- Rishindra M. Reddy, MD, FACS
  - (cell) 734-834-1399
  - reddyrm@med.umich.edu
  - (off) 734-763-7337
  - (fax) 734-615-2656