

Robotic Resection of Lung Cancer

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March 15, 2016

Annual APACVS Winter Meeting

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

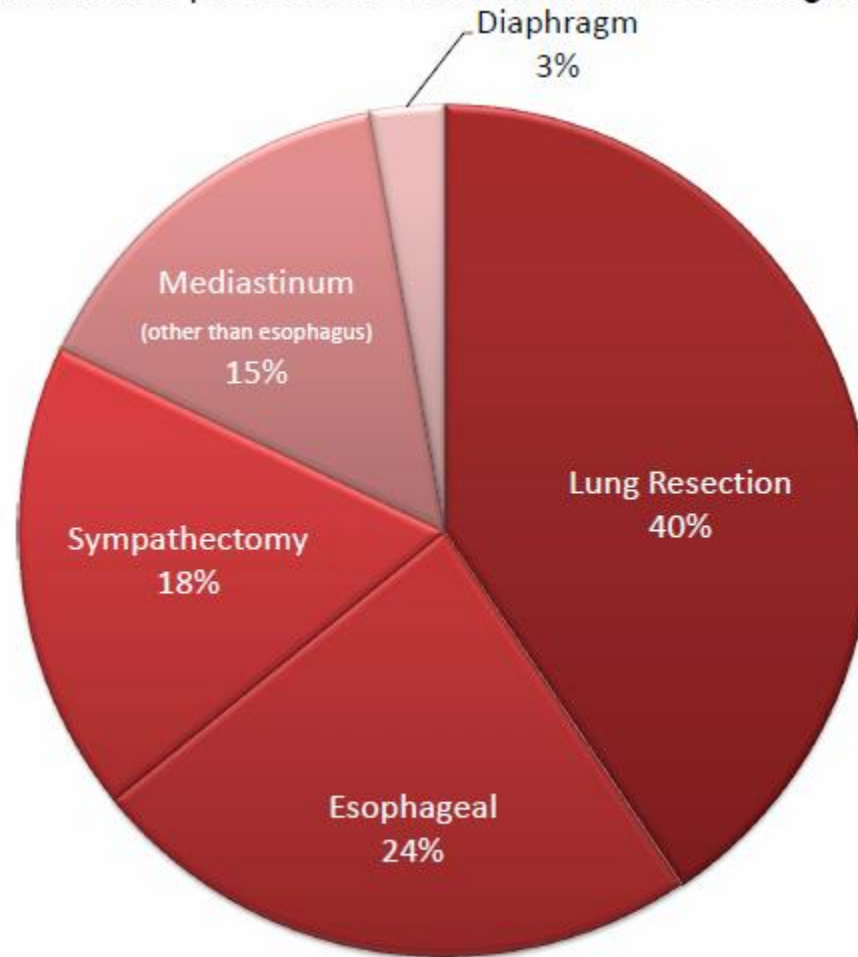


Figure 2. Robotic Thoracic Surgeries by Case Type (n = 106)

Increasingly Complex Cases

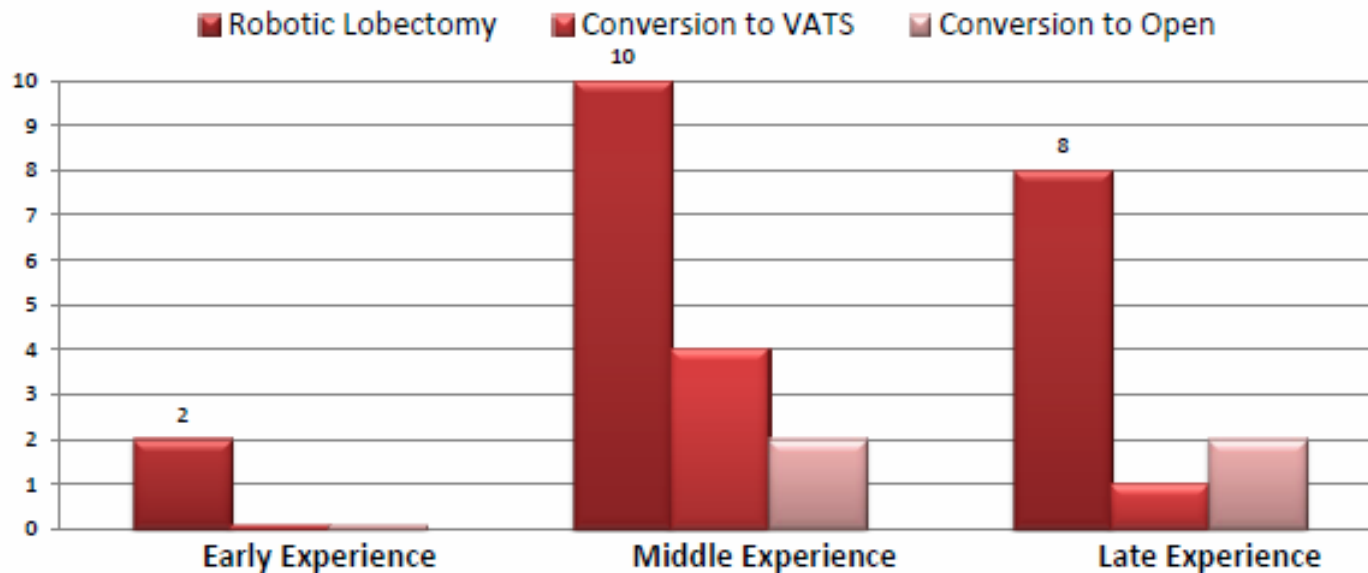
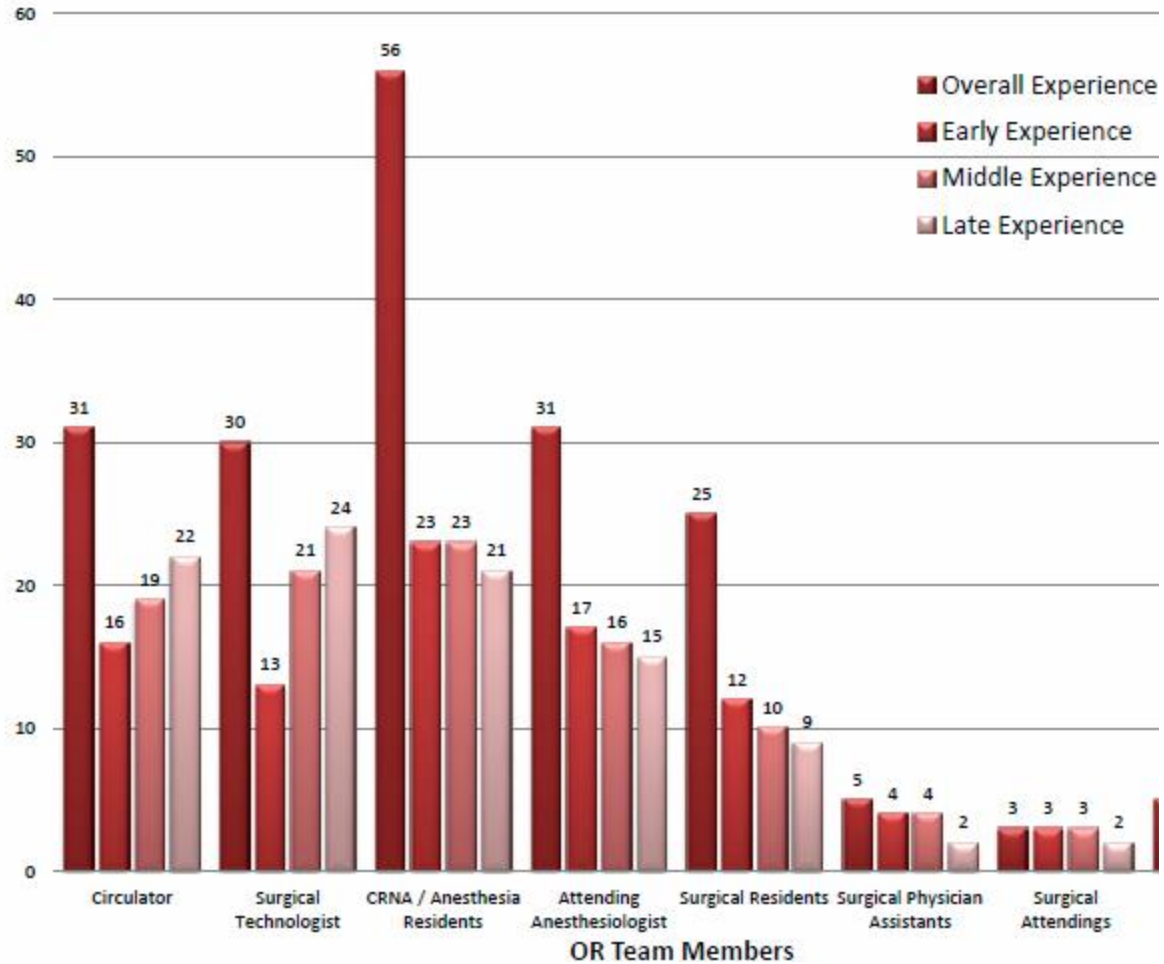


Figure 3. Robotic-assisted lobectomies increased from 6% (1st cohort) to 27% (last two cohorts) of robotic lung resections.

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, Spongystick and conversion to open
- Retraction

Pitfalls of Lobectomies

- Visualization
- Bleeding
- Retraction
 - Extra port placement
 - Scanlan graspers 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?

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