

# VATS Pulmonary Resection vs. Robotic Pulmonary Resection

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# Disclosures

- Intuitive Surgical

# Objectives

- Review Differences between VATS and Robotic Approaches
- Discuss potential Future benefits of Robotic Lobectomy

# Robotics is an extension of VATS technology

- Truly not Robotic Surgery
  - Telemanipulation of robotic arms by computer control
  - Not automated (yet) for any portion of the operation
- 3-D visualization
  - Now also for VATS/Laparoscopy
- Wristed instruments
  - Flex-Dex is now a competitor



# Robotics vs VATS

## Pros

- 3-D visualization
- Wristed instruments
- Smaller instruments
- Control 3 arms and camera at once
- Complete ecosystem

## Cons

- More expensive
- Harder to Learn?
- Surgeon not at the bedside
- No haptic feedback (no touch)
- Longer time for cases

# Robotics vs VATS-Similarities

- Variable port placement
- Smaller incisions
- Similar Outcomes compared to open approaches
- Challenging Learning curve

# Future State of Robotics

- 8 potential new systems in the next 5 years
  - Medtronic
  - J&J/Google
  - Titan
  - Medsnake (CMU)
  - etc.

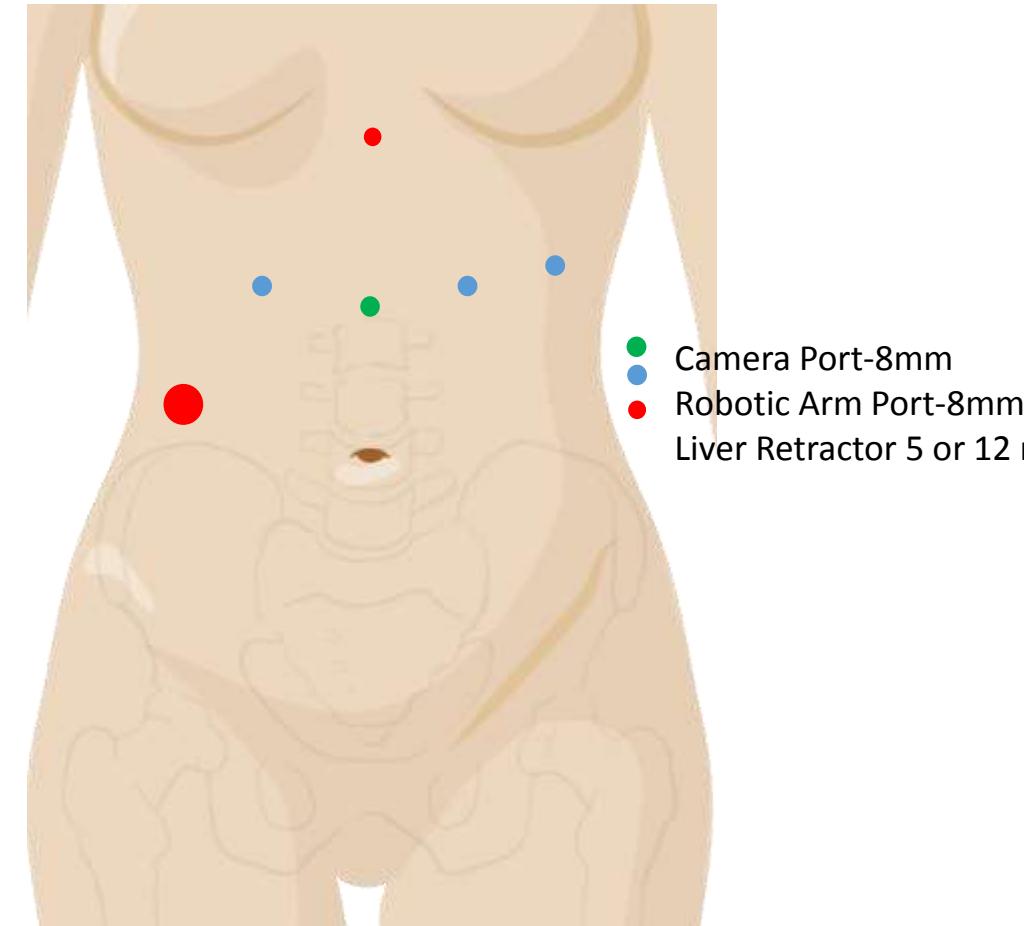


# Future State of Robotics

- Similar Limitations to Davinci system
  - Lack of Haptic feedback
  - Higher initial costs
  - New learning curve (could be lowered by expertise on Davinci platform)
  - Surgeon not at bedside

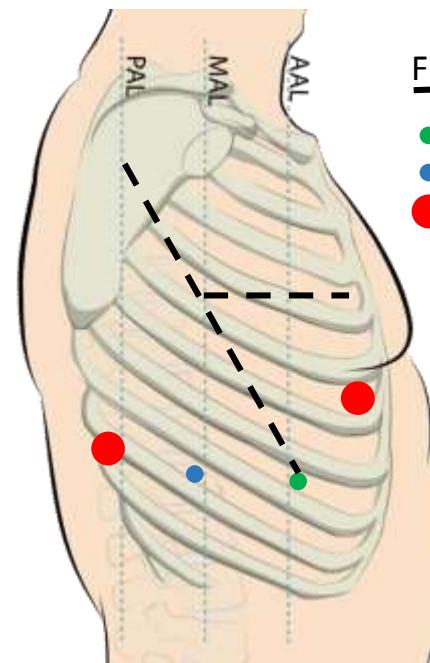
# Future State of Robotics

- Eliminating the need for Surgical Assists
  - No Camera holding
  - No retracting
- Single Surg Tech for Foregut cases
  - Pass and Remove Sutures
- Automated “parts” of operation
  - Port Placement
  - Short Gastic Ligation
  - Crural Closure



# Future State of Robotics

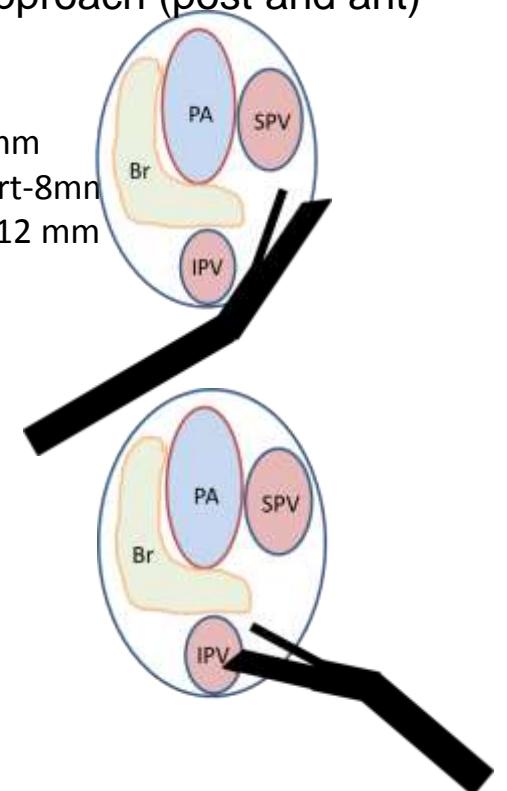
- Favor bedside assist for Lobes
- 4-port-no assistant technique
- Suction and Stapling controlled by Surgeon at console
- Automated “parts” of operation
  - Port Placement
  - Mobilization and Ligation of Vessels



## Fissures

- Camera Port-8mm
- Robotic Arm Port-8mm
- Robotic/Staple 12 mm

Right Hilum Staple Approach (post and ant)



# The Cost and Quality of Life Outcomes in Developing a Robotic Lobectomy Program, Worrell S, et al.

- Presented as a poster at the 2017 GTSC
- We reviewed the first 100 minimally invasive lobectomies performed from beginning the robotics program, including 75 VATS and 25 Robotic lobectomies.
- Compared outcomes, costs



### Perioperative cost data for VATS and robotic lobectomy cases

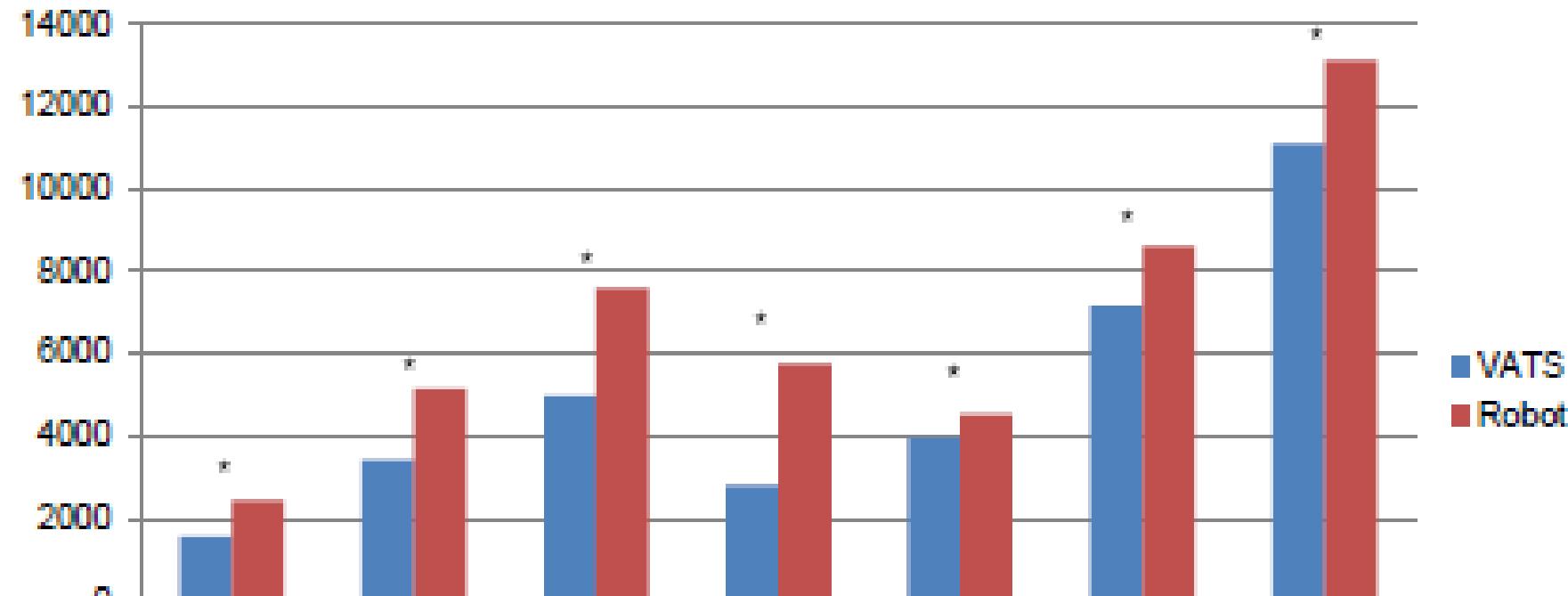


Figure 1-The cost in dollars for both fixed and variable OR charges and both fixed and variable total hospital stay charges are compared in the table. \* reflects statistically significant differences in costs, p<0.05.

# Cost and Quality of Life Outcomes, Worrell S

- The robotic resection took significantly longer with an average increase in time of 48 minutes with no significant improvement in speed with experience over the study period.
- The robotic resections had significantly higher operative and total hospital cost, however, although this difference was only a 20% higher in cost overall for the first 25 lobectomies
- The global health status and symptom scale median scores were similar to the general population and did not significantly differ between groups.

# Robotic-Assisted, VATS and Open Lobectomy: Propensity-Matched Analysis of Recent Premier Data, Oh D, et al

- Manuscript under review
- PMA of almost 2800 Open and Robotic Lobectomies
- PMA of almost 3000 VATS and Robotic Lobectomies
- Data favored Robotics in conversion rates, complication rates and LOS

# Robotic Versus VATS Lobectomies: Propensity Matched Comparison Of Outcomes From High Volume Surgeons Utilizing The Premier Perspective Database, Reddy RM, et al

- Presented at GTSC 2017
- Focus on surgeons performing >20 VATS or RL per year from 2001-2015
- With PMA, comparing 1,166 cases (by 65 Robotic surgeons and 81 VATS surgeons)
- OR time greater in Robotic cases (24 minutes,  $p<0.0001$ )
- Conversion rate lower in Robotic cases (4.7% vs 7.7%,  $p=0.0035$ )
- Lower 30 day complication rates in Robotic cases (32.6 % vs 38.4%,  $p=0.0037$ )

# Limitations

- Administrative database
- Unclear on coding for “placing a camera first” giving a higher conversion rate to VATS?

# Conclusions

- Robotics and VATS have better outcomes than Open Surgery
- Robotics can be the equal of VATS
- Can Robotics be better than VATS?
- Increased volume of Robotic cases reduces costs (approaching VATS?)
- Does the lower complication rate and conversion to open rate negate the higher costs with robotics?