VATS Lobectomy
Tecnica triportale

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UOC Chirurgia Toracica
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VATS LOBECTOMY: FIRST EXPERIENCES

MAIN CONCERNS

CLINICAL
✓ Morbidity/mortality rates comparable with open approach
✓ Not significant trend in reduction of postoperative pain
✓ Oncological safety
✓ Lack of long-term follow-up

NON CLINICAL
✓ No standardized techniques and definition
✓ Difficult technique
✓ No easy to teach
✓ Long learning curve
✓ Quality of operation (lymph-nodes dissection)
✓ Lack of dedicated devices
✓ High cost
VATS LOBECTOMY TODAY

CLINICAL PERSPECTIVES

VATS LOBECTOMY HAS BEEN ASSOCIATED WITH:

- LESS PAIN
- LESS COMPLICATIONS
- SHORTER LENGTH OF STAY
- BETTER QoL
- IMPROVED DELIVERY AND TOLERANCE TO ADJUVANT CHEMOTHERAPY
- SIMILAR (BETTER??) LONG TERM SURVIVAL
OPEN APPROACH

PROBLEM

Postoperative pain

Acute → Post-operative related complications

Chronic: post-thoracotomy pain syndrome
- 25-60% of cases
- Present still 4-5 yrs after surgery


Thoracoscopic lobectomy is associated with lower morbidity compared with thoracotomy

Nestor R. Villamizar, MD, Marcus D. Darrabie, MD, William R. Burfeind, MD, Rebecca P. Petersen, MD, Mark W. Onaitis, MD, Eric Toloza, MD, David H. Harpole, MD, and Thomas A. D’Amico, MD

Conclusions: Thoracoscopic lobectomy is associated with a lower incidence of major complications, including atrial fibrillation, compared with lobectomy by means of thoracotomy. The underlying factors responsible for this advantage should be analyzed to improve the safety and outcomes of other thoracic procedures.
Survival After Video-Assisted Thoracic Surgery Lobectomy and Physiologic Factors that May Improve Quality of Life

Available evidence (mostly category B) shows that thoracoscopic lobectomy provides equivalent (level 1) and possibly superior (level 2b) outcomes with regards to complications and survival (Table 1) [2, 4, 6–19]. If equivalent, QOL

<table>
<thead>
<tr>
<th>First Author, Year</th>
<th>No.</th>
<th>Type</th>
<th>Operative (30-day) Mortality</th>
<th>Hospital (days)</th>
<th>Stage I Survival</th>
<th>Survival Time (years)</th>
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<td>Hermansson [6], 1998</td>
<td>30</td>
<td>SSL</td>
<td>0%</td>
<td>4.4</td>
<td>NR</td>
<td>NR</td>
<td>1–4 cm tumors</td>
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<td>McKenna [7], 1998</td>
<td>212</td>
<td>VATS</td>
<td>0.5%</td>
<td>4.6</td>
<td>76%</td>
<td>4.5</td>
<td>1–9 cm tumors; no ICU care needed; 93% all stage survival</td>
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<tr>
<td>Lewis [4], 1999</td>
<td>400</td>
<td>SSL</td>
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<td>100</td>
<td>Open vs VATS</td>
<td>NR</td>
<td>NR</td>
<td>85% vs 90%</td>
<td>5</td>
<td>VATS favored ($p &lt; 0.02$)</td>
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<tr>
<td>Kaseda [9], 2000</td>
<td>204</td>
<td>Open vs VATS</td>
<td>NR</td>
<td>NR</td>
<td>79% vs 90%</td>
<td>5</td>
<td>11% complications, 85% all-stage survival</td>
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<td>Solaini [10], 2001</td>
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<td>VATS</td>
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<td>90%</td>
<td>3</td>
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<td>NR</td>
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<td>0%</td>
<td>6.3</td>
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<td>1.8%</td>
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<td>3</td>
<td>9% complications</td>
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<td>NR</td>
<td>64%</td>
<td>5</td>
<td>Patients &gt;70 did worse than younger, 70% IA survival</td>
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<td>Shigemura [2], 2005</td>
<td>145</td>
<td>aVATS vs eVATS vs open</td>
<td>0%</td>
<td>15.3 vs 11.8 vs 17.9</td>
<td>95% vs 97% vs 97%</td>
<td>5</td>
<td>Only stage IA &lt;2 cm, 6% complications, hospital stay difference $p &gt; 0.001$</td>
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<td>Shiraiishi [17], 2006</td>
<td>160</td>
<td>Open vs VATS</td>
<td>0%</td>
<td>NR</td>
<td>78% vs 89%</td>
<td>5</td>
<td>IA cases only, no difference in local recurrence rates; VATS, less bleeding</td>
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<td>500</td>
<td>Thoracoscopic</td>
<td>1%</td>
<td>85%</td>
<td>2</td>
<td>80% survival all stages</td>
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<td>McKenna [19], 2006</td>
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<td>4.8</td>
<td>−80%</td>
<td>5</td>
<td>15.3% complication</td>
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### Surgery for Early-Stage Non-Small Cell Lung Cancer: A Systematic Review of the Video-Assisted Thoracoscopic Surgery Versus Thoracotomy Approaches to Lobectomy

Bryan A. Whitson, MD, PhD, Shawn S. Groth, MD, Susan J. Duval, PhD, Scott J. Swanson, MD, and Michael A. Maddaus, MD

Department of Surgery, Division of Thoracic and Foregut Surgery, and School of Public Health, Community Health, University of Minnesota, Minneapolis, Minnesota; and Department of C School of Medicine, New York, New York

**VATS**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>VATS</th>
<th>LATS</th>
<th>VATS%</th>
<th>LATS%</th>
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<tr>
<td>Shigemura</td>
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<td>50</td>
<td>62</td>
<td>48</td>
<td>52</td>
<td>68</td>
<td>16</td>
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<td>Shiraihi</td>
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<td>81</td>
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<td>59.3</td>
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<td>49.2</td>
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</table>

Long-term survival in video-assisted thoracoscopic lobectomy vs open lobectomy in lung-cancer patients: a meta-analysis

Emanuela Taioli\textsuperscript{a,b}, Dong-Seok Lee\textsuperscript{a,*}, Martin Lesser\textsuperscript{c} and Raja Flores\textsuperscript{a}

There was an advantage in 5-year mortality for patients who underwent VATS vs patients who underwent thoracotomy (meta difference in survival: 5%; 95\% CI: 3–6\%) with large heterogeneity among studies (\(Q = 42.6\); \(P\)-value: 0.001; \(I^2 = 55.7\%\)). There was no evidence of publication bias (Fig. 2).
VATS LOBECTOMY: FIRST EXPERIENCES

MAIN CONCERNS

CLINICAL

- Morbidity/mortality rates comparable with open approach
- Not significant trend in reduction of postoperative pain
- Oncological safety
- Lack of long-term follow-up

NON CLINICAL

- No standardized techniques and definition
- Difficult technique
- No easy to teach
- Long learning curve
- Quality of operation (lymph-nodes dissection)
- Lack of dedicated devices
- High cost
VATS LOBECTOMY TODAY

NON CLINICAL PERSPECTIVES

✓ Standardized techniques and definition
✓ Reproducible technique
✓ Easy to teach and to learn
✓ Acceptable learning curve
✓ High quality standard of operation
✓ Dedicated devices
✓ Cost lower than open approach
VATS LOBECTOMY TODAY

STANDARDIZATION OF SURGICAL APPROACH

- **POSTERIOR EDINBURGH APPROACH ACCORDING WALKER:**

- **LATERAL APPROACH ACCORDING McKENNA**

- **ANTERIOR APPROACH ACCORDING COPENAGHEN**

- **TOTALLY ENDOSCOPIC APPROACH ACCORDING GOSSOT**

- **ANTERIOR APPROACH ACCORDING D'AMICO**

- **UNIPORTAL APPROACH ACCORDING GONZALES RIVAS**
- ANTERIOR APPROACH ACCORDING COPENAGHEN
TRIPORTAL VS UNIPORTAL APPROACH
OPEN QUESTIONS

➢ DOES TRIPORTAL APPROACH MUST BE CONSIDERED THE STANDARD?

➢ IS UNIPORTAL APPROACH SUPERIOR (OR EQUAL) TO TRIPORTAL?

IN TERMS OF:

- TECHNICAL FEASIBILITY
- POSTOPERATIVE PAIN
- OUTCOME
- LEARNING CURVE
- OTHER (i.e. COSMETICS, PATIENT’S ACCEPTABILITY, SURGICAL IMPACT)

➢ IS UNIPORTAL APPROACH A “NATURAL” AND UNAVOIDABLE EVOLUTION OF TRIPORTAL?
TRIPORTAL VS UNIPORTAL APPROACH
OPEN QUESTIONS

- DOES TRIPORTAL APPROACH MUST BE CONSIDERED THE STANDARD?

- IS UNIPORTAL APPROACH SUPERIOR (OR EQUAL) TO TRIPORTAL?
  IN TERMS OF:
  - TECHNICAL FEASIBILITY
  - POSTOPERATIVE PAIN
  - OUTCOME
  - LEARNING CURVE
  - OTHER (i.e. COSMETICS, PATIENT’S ACCEPTABILITY, SURGICAL IMPACT)

- IS UNIPORTAL APPROACH A “NATURAL” AND UNAVOIDABLE EVOLUTION OF TRIPORTAL?
TRIPORTAL APPROACHES ARE THE MOST COMMON USED

MOST OF LITERATURE STUDIES ARE ON TRIPORTAL LOBECTOMY

MOST OF MODERN DEVICES FOR VATS LOBECTOMY ARE DESIGNED AND PROJECTED FOR MULTIPOINTAL APPROACH

MOST OF THE TRAINING PROGRAMS AND STUDIES ON LEARNING CURVE ARE ON TRIPOINTAL APPROACH
TRAINING PROGRAM

LEARNING CURVE: ~ 50 CASES:
- Shorter operative time
- Lower complications
- Less intraoperative blood loss
Conclusions. Video-assisted thoracic surgery major lung resection for early stage nonsmall-cell lung cancer can be taught to residents who work under the supervision of experienced VATS surgeons. Video-assisted thoracic surgery major lung resection for lung cancer should be an integral part of thoracic surgical training program.
Figure 1 Number of VATS lobectomies performed in Copenhagen 1999 to 2011 and conversions in %

Learning curve associated with VATS lobectomy

René H. Petersen, Henrik J. Hansen

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Corresponding to: René H. Petersen, MD. Department of Cardiothoracic Surgery 2.15.2, Rigshospitalet, DK 2100 Copenhagen O, Denmark. Tel: +4535450525; Fax: +4535452182. Email: rene.petersen@rh.regionh.dk.

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VATS LOBECTOMY TODAY

EVOLUTION OF DEVICES
(NEW DEDICATED INSTRUMENTS)
VATS LOBECTOMY TODAY
EVOLUTION OF DEVICES (STAPLERS)
TRIPORTAL VS UNIPORTAL APPROACH
OPEN QUESTIONS

- DOES TRIPORTAL APPROACH MUST BE CONSIDERED THE STANDARD?

- IS UNIPORTAL APPROACH SUPERIOR (OR EQUAL) TO TRIPORTAL?
  IN TERMS OF:
  - TECHNICAL FEASIBILITY
  - POSTOPERATIVE PAIN
  - OUTCOME
  - LEARNING CURVE
  - OTHER (i.e. COSMETICS, PATIENT’S ACCEPTABILITY, SURGICAL IMPACT)

- IS UNIPORTAL APPROACH A "NATURAL" AND UNAVOIDABLE EVOLUTION OF TRIPORTAL?
• Technical Considerations
• Instrumentation
• Retraction
• Exposure
• Fissures
• Management of Bleeding
• Specimen Removal
MAIN TECHNICAL LIMITATIONS OF UNIPORTAL APPROACH

- CROWDING OF INSTRUMENTS
- DIFFICULT MANIPULATION OF THE LUNG
- LACK OF DEDICATED DEVICES (STAPLERS WITH WIDE ANGULATION)
- UPPER LOBECTOMY MORE DIFFICULT
- ASSISTANT WITH CAMERA IN AN UNCOMFORTABLE POSITION
- MORE DIFFICULT TO LEARN
THORACOSCOPIQUE UPPER LOBECTOMY

- Represents clear majority of VATS lobectomy
- Greatest degree of anatomic variation
- Higher likelihood of conversion to thoracotomy
- Higher likelihood of becoming pneumonectomy
- Mastery of VATS Upper Lobectomy is essential to success
ROLE OF POSTERIOR ACCESS IN UPPER LOBECTOMY
Uniportal video-assisted thoracoscopic lobectomy: an alternative to conventional thoracoscopic lobectomy in lung cancer surgery?

Jae Ho Chung, Yong Soo Choi, Jong Ho Cho, Hong Kwan Kim, Jhingook Kim, Jae Il Zo and Young Mog Shim

CONCLUSIONS: The similar perioperative results of uniportal VATS lobectomy compared with conventional VATS lobectomy suggest that uniportal VATS is a viable alternative approach to the conventional VATS approach in selected patients, especially in patients with early peripheral lung cancer with good anatomy and in good general condition.

In minor and major thoracic procedures is uniport superior to multiport video-assisted thoracoscopic surgery?

Farhana Akter, Tom Routledge, Levon Toufektzian and Rizwan Attia

Department of Cardiothoracic Surgery, Guy’s Hospital, London, UK

stay or other thoracic complications. We conclude that, although uniport access may offer improved pain scores, the current evidence reveals no differences in most postoperative outcomes between uniport and multiport approaches to VATS in either minor or major thoracic procedures.
TRIPORTAL VS UNIPORTAL APPROACH
OPEN QUESTIONS

- DOES TRIPORTAL APPROACH MUST BE CONSIDERED THE STANDARD?

- IS UNIPORTAL APPROACH SUPERIOR (OR EQUAL) TO TRIPORTAL?
  
  IN TERMS OF:

  - TECHNICAL FEASIBILITY
  - POSTOPERATIVE PAIN
  - OUTCOME
  - LEARNING CURVE
  - OTHER (i.e. COSMETICS, PATIENT’S ACCEPTABILITY, SURGICAL IMPACT)

- IS UNIPORTAL APPROACH A “NATURAL” AND UNAVOIDABLE EVOLUTION OF TRIPORTAL?
Evolving from conventional video-assisted thoracoscopic lobectomy to uniportal: the story behind the evolution

Diego Gonzalez-Rivas¹,², Eva Fieira¹, Maria Delgado¹, Lucía Mendez¹, Ricardo Fernandez¹,², Mercedes de la Torre¹,²

Tips and tricks: the uniportal approach can be adopted following two different ways

(I) Learning from conventional VATS to uniportal (our evolution)
(II) Learning from open approach to uniportal (uniportal mimics the open maneuvers)
Padua experience (220 cases)
THE TRIPORTAL APPROACH FOR VATS LOBECTOMY IS THE MOST COMMON USED APPROACH.

IT HAS SEVERAL RECOGNIZED ADVANTAGES: EASY AND SAFE TO DO, LEARN AND TEACH, MORE ANATOMICAL AND MORE ADAPTABLE TO THE CURRENT INSTRUMENTATION, EASIER THAN UNIPORTAL FOR UPPER LOBECTOMY.

DATA ARE STILL LACKING ON THE EFFECTIVE COMPARISON BETWEEN TRIPORTAL AND BI- OR UNIPORTAL APPROACHES.

THE ANTERIOR TRIPORTAL COPENAGHEN APPROACH SEEMS THE BEST FOR ALL SITUATIONS.
Thank you