UNIWERSYTET JAGIELLOŃSKI W KRAKOWIE

Krakowski Szpital Specjalistyczny im. Jana Pawła II

Measures to improve outcomes after surgery

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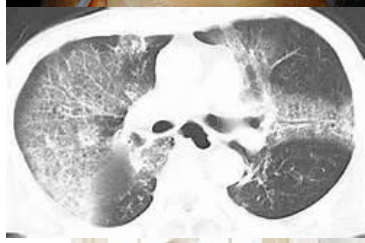
- No conflict of interest to disclose

Problems

- Severity of surgical trauma
- Effect of other treatment modalities
- Limited physiological reserve
- Smoking
- Comorbidities
- Age



Measures to improve outcomes after surgery for lung cancer

- Multidisciplinary treatment
- Minimising of invasiveness of surgical procedures
- ERAS protocols
- Reference centres

Multidisciplinary treatment

- Multidisciplinary oncological treatment
  - systemic treatment
  - radiation therapy
  - surgery
- Tumour Boards
  - including: pathologist, radiologist, anaesthesiologist

Multidisciplinary treatment

- comorbidities

- Cardiac
- Pulmonary
- Renal
- Endocrine
- Gastroenterological
- Urological
- Gynecological

Minimising of invasiveness

- VATS (4-port, 3-port, uniportal)
- RATS
- Limited thoracomies
- Sublobar resections

VATS

- Reduction of postoperative complications
- Less acute and chronic pain
- Reduction of the loss of pulmonary function
- Improved compliance with adjuvant chemotherapy regimens
- Comparable or better 5-year survival

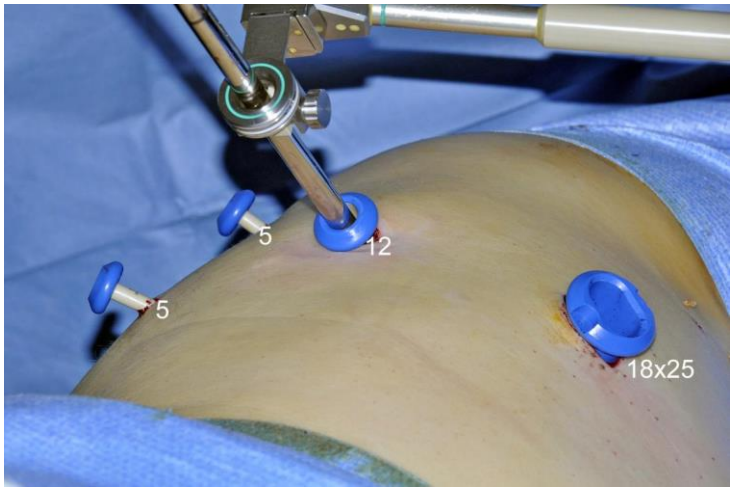
Downey at al., ISMICS Consensus Statement, 2007; Whitson et al., Ann Thorac Sur,g 2008; Yan et al., J Clin Onclo, 2009

RATS

- Potential advantages due to:
  - 7 degrees of freedom of movement
  - magnification of operative field
  - adjustment of the scale of movement
- But:
  - high cost
  - no proven advantage over VATS

Minimising of invasiveness of surgical approach

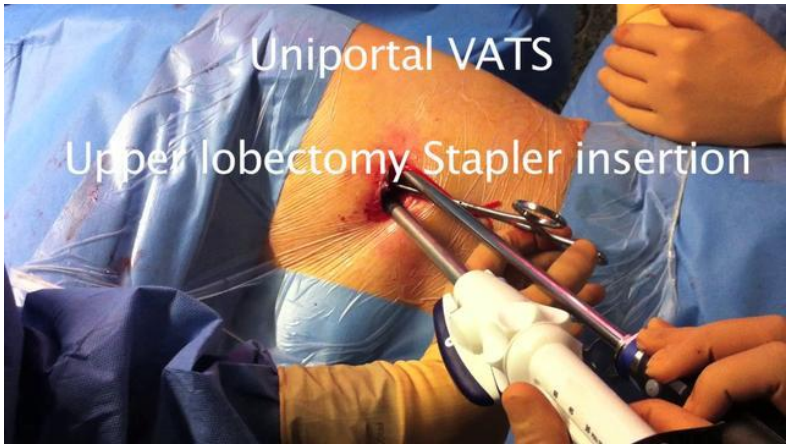
vs.



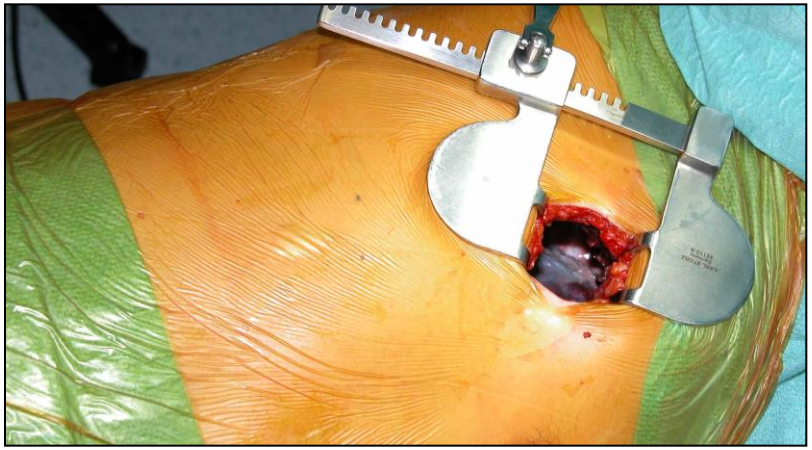
Traditional, 25 cm-long postero-lateral thoracotomy

VATS

Minimising of invasiveness of surgical approach



vs.



Uniportal VATS

mini-thoracotomy

Courtesy of Prof. G. Varela, University of Salamanca

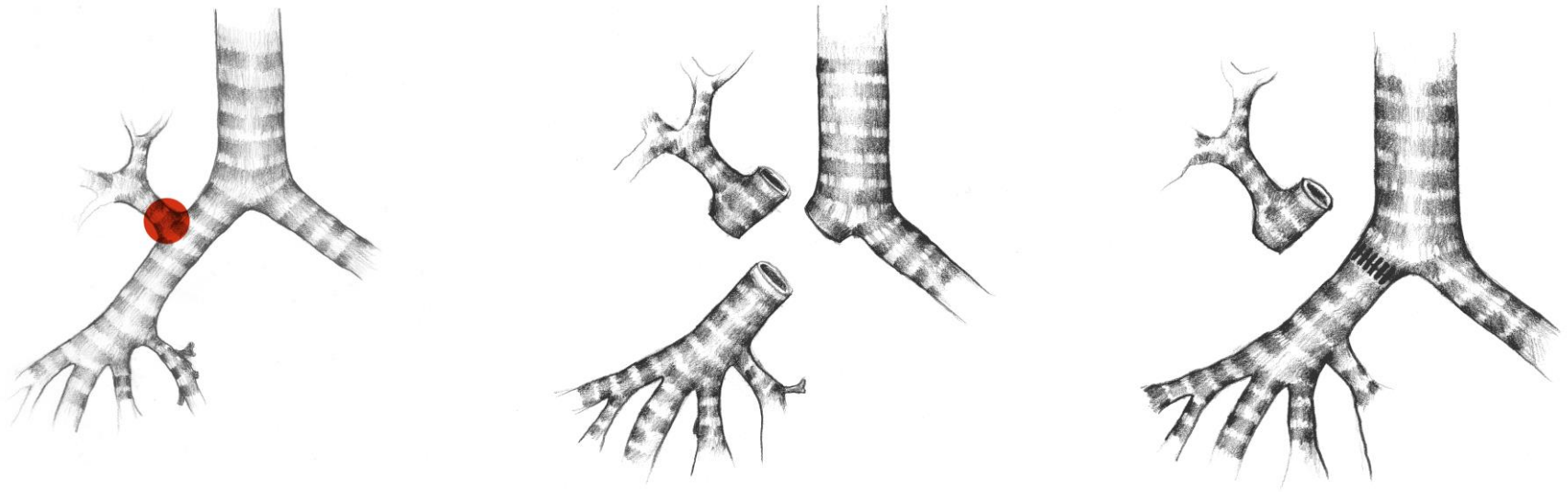
Minimising of invasiveness

Salamanca-type thoracotomy

Minimising of invasiveness

parenchyma sparing resections

- Sleeve-resections



Price Thomas, J R Coll Surg Edinb, 1955

Minimising of invasiveness

parenchyma sparing resections

- Sublobar resections
  - segmentectomies
  - bisegmentectomies
  - lingula-sparing left upper lobectomy

Enhanced Recovery Protocol

- Conception of Enhanced Recovery after Surgery (ERAS), or fast-track surgery, was introduced in 1990s (Kehlet and Wilmore, Ann Surg, 2008)
- 'series of evidence-based practices, serving to optimise the patient before surgery, minimise the physical and psychological stress associated with the procedure and promote restoration of function' (UK Dept. of Health, 2010)

Enhanced Recovery Protocol

- Aims
  - shortening of hospital stay
  - optimisation of use of hospital resources
  - reduction of complication rate
  - speeding up restoration of normal activity

Enhanced Recovery Protocol

- Preoperative preparation
- Intraoperative strategies
- Postoperative care

Enhanced Recovery Protocol
- preoperative preparation

- Pre-optimisation
  - Anaemia - diagnosed and treated
  - Nutrition – screening and nutritional support
  - Smoking – support to stop
  - Medical therapy - optimisation
  - Physiotherapy - pulmonary rehabilitation

Jones at al., Anaesthesia, 2013; Loop, Cur Opin Anestesiol, 2016

Enhanced Recovery Protocol

- preoperative preparation

- Preoperative assessment

  - Pre-operative clinic: detailed assessment to facilitate same-day admission and reduce unnecessary cancellations

  - Risk calculation: to facilitate appropriate allocation of resources

  - Education: detailed information regarding hospital stay, the recovery process and discharge for patients and their families

Jones at al., Anaesthesia, 2013; Loop, Cur Opin Anestesiol, 2016

Enhanced Recovery Protocol

- preoperative preparation

- Admission

  - Same-day admission: to minimise hospital stay

  - Fasting: minimise ‘nil-by-mouth’ and consider carbohydrate beverage 2 h preoperatively

  - DVT prophylaxis: anti-embolism stockings or mechanical devices

Jones at al., Anaesthesia, 2013; Loop, Cur Opin Anestesiol, 2016

Enhanced Recovery Protocol

- intraoperative strategies

- Anaesthesia
  - Choice of agents: use of short-acting agents
  - Ventilation: limited tidal volumes
  - Fluids: avoidance of fluid overload
  - Normothermia: use of warming devices
  - Atrial fibrillation: prophylaxis in at-risk patients
  - Tracheal extubation: at the end of surgery

Jones at al., Anaesthesia, 2013; Loop, Cur Opin Anestesiol, 2016

Enhanced Recovery Protocol

- intraoperative strategies

- Surgery
  - Approach: minimally invasive
  - Drains: one chest tube preferred
- Analgesia
  - Technique: paravertebral analgesia preferred over epidural

Jones at al., Anaesthesia, 2013; Loop, Cur Opin Anestesiol, 2016

Enhanced Recovery Protocol

- postoperative care

- DVT prophylaxis: heparins
- Nausea/Vomiting: pharmacological prevention
- Analgesia: paravertebral preferred
- Drain: non-suction preferred, early removal
- Mobilisation: as soon as possible
- Physiotherapy: kinetic therapy and incentive spirometry
- Nutrition: early enteral nutrition

Jones at al., Anaesthesia, 2013; Loop, Cur Opin Anestesiol, 2016

Reference centres

Source	Database	Results
Bach, NEJM, 2001	SEER, USA n = 2118	↓ complications, ↓ mortality
Birkmeyer, NEJM, 2003	Medicare, USA n = 400 000	↓ complications, ↓ mortality
Bilimoria, J Clin Oncol, 2008	Cancer Data Base, USA n = 243 000	↓ complications, ↓ mortality
Yung, An Thorac Surg, 2007	National, Taiwan n = 4800	↓ mortality

Reference centres

Lung resections per year	Hospital Mortality
1-15	7.2
16-30	5.8
31-50	3.9
51-75	4.7
76-100	3.9
101-180	3.1
>180	2.4

Passlick B. Requirements for a thoracic oncology centre. Multidisciplinary conference in Thoracic Oncology, Lugano, 2011

Reference centres

Danish experience

The Netherlands
18 mln. inhabitants
55 Thoracic Surgery Units
i.e. 1 Unit/0.37 mln

Denmark
5.5 mill. inhabitants
Past: 12 Thoracic Surgery Units, i.e. 1/0.45 mln
Now: to 4 units, i.e. 1/ 1.37 mln

Reference centres in Denmark

- Waiting list guaranties for evaluation and treatment of cancer
- 28 days for work up
- 14 days for surgery
- Recommendations for unit size
- Multimodality setting/treatment
- Data registration and national audits

Courtesy of Dr R. Petersen, Rigshospitalitet, Copenhagen

Reference centres in Denmark

30-day mortlity for lobectomy

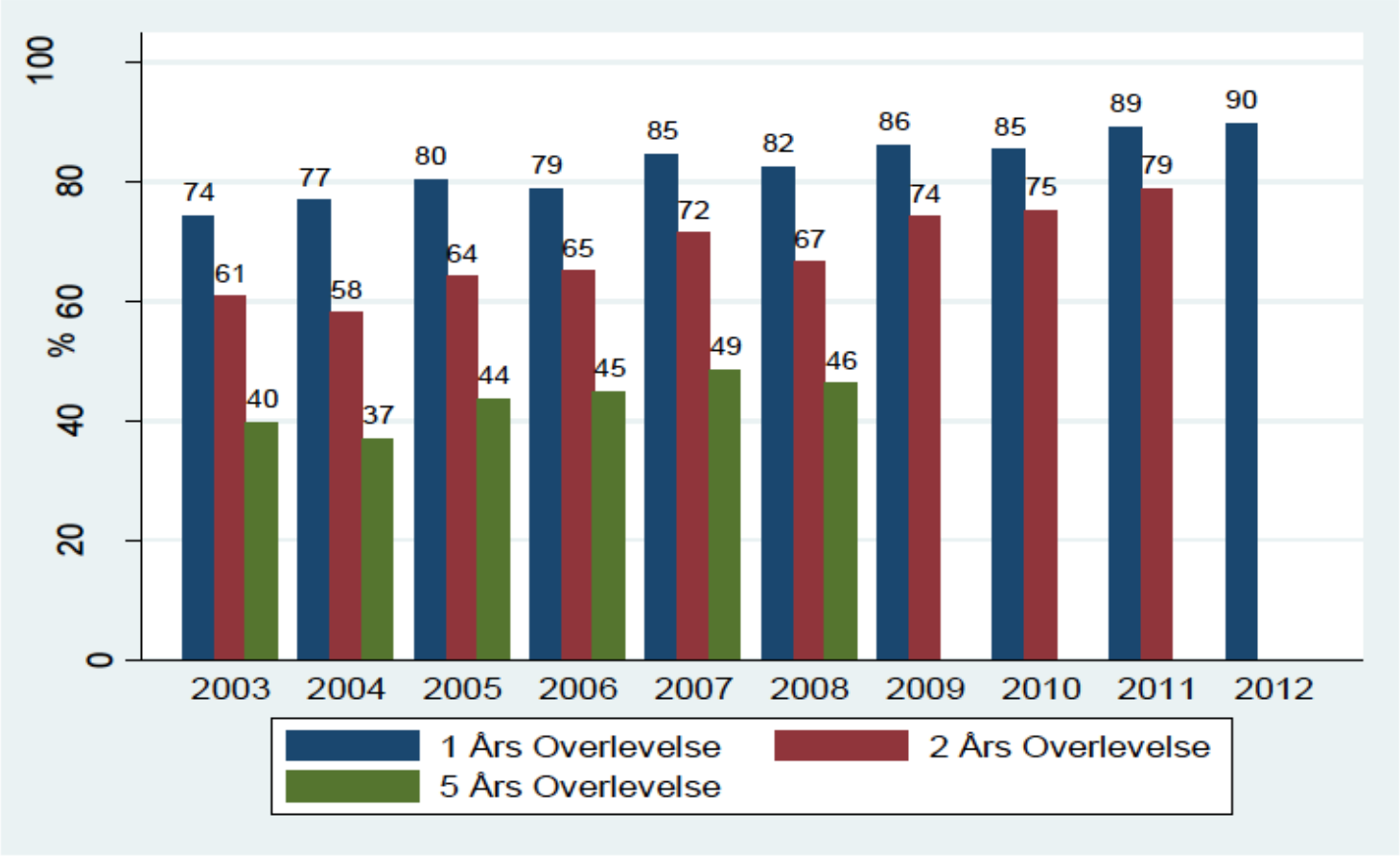
Period	Mortality (%)
2000-2004	3.6
2005-2009	2.5
2010	1.5
2011	0.7

Courtesy of Dr R. Petersen, Rigshospitalitet, Copenhagen

Reference centres in Denmark

survival after pulmonary resection

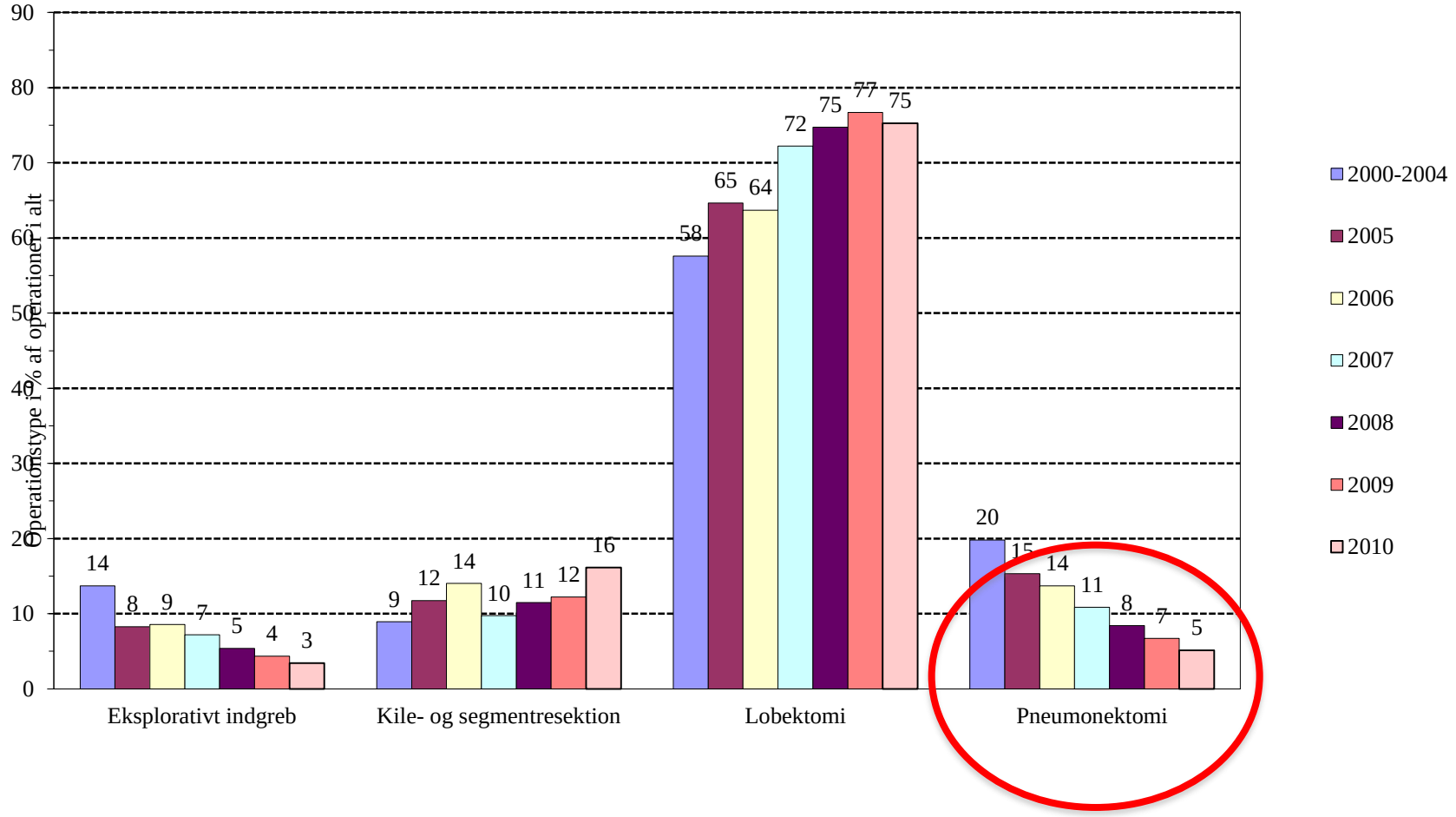
7.2.5.1 Figur Overlevelse 1, 2 og 5 år fordelt på indberettede per år



Courtesy of Dr R. Petersen, Rigshospitalitet, Copenhagen

Reference centres in Denmark

Types of resections



Courtesy of Dr R. Petersen, Rigshospitalitet, Copenhagen

Reference centres

- European Guidelines on Structure and Qualification of General Thoracic Surgery (European Society of Thoracic Surgeons, European Association for Cardio-Thoracic Surgery and the European Board of Thoracic Surgery)
- Guidelines for clinical competence, the institution, surgeons, theatres, ICU, ward, other facilities, education and number of cases.

Brunelli et al., Eur J Cardiothorac Surg, 2014

Thank you for your attention!