

Minimally Invasive Open Surgery (MIOS) Approach: A Radical Lobectomy for Lung Cancer

Hisao Asamura (JP)

Professor and Chief
Thoracic Surgery
Keio University School of Medicine
Tokyo, Japan



TOKYO 2020
APPLICANT CITY

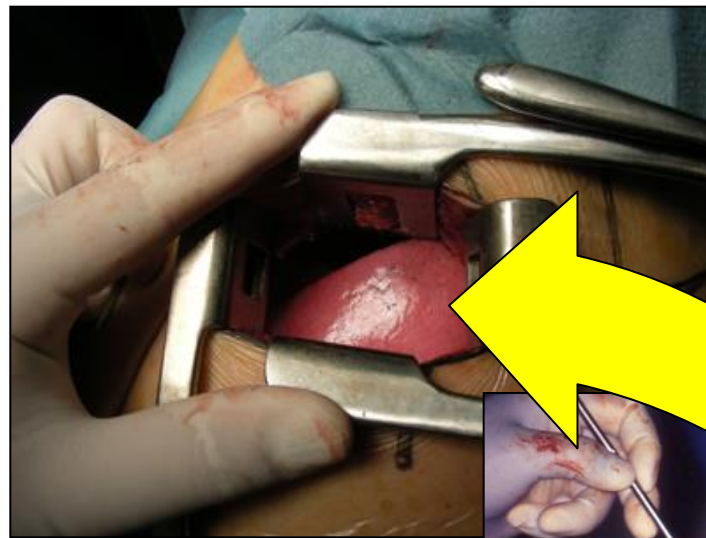


IASLC
18th World Conference
on Lung Cancer
2017, Yokohama, Japan

National Cancer Center



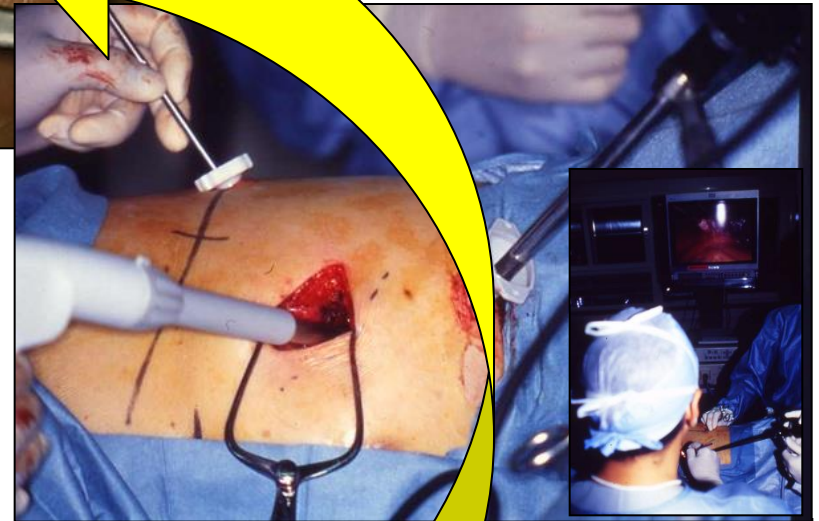
Various Incision Size



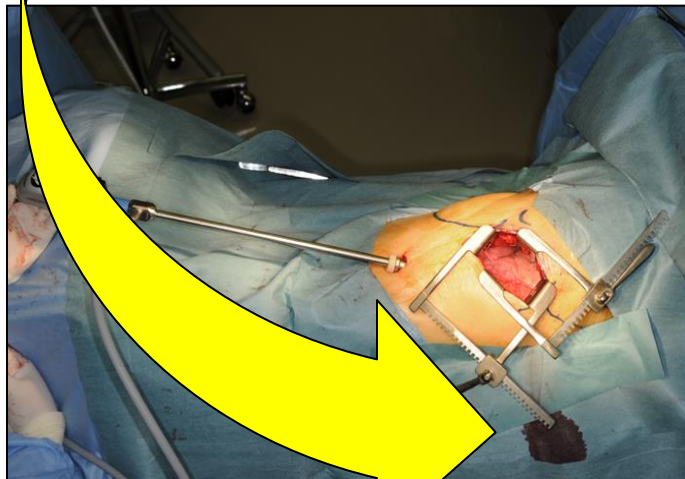
Small PL Thoracotomy



Big PL Thoracotomy



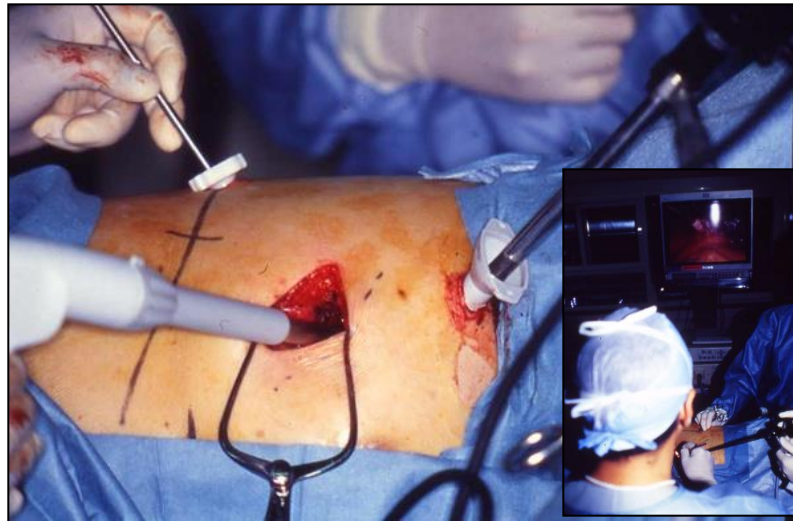
Complete V



Hybrid VATS

Recent Trends in Lung Cancer Surgery

Toward less (Minimally) invasive procedures



WHY?

- **Lower morbidity/mortality**
- **Wider indication of surgery (elderly, comobid)**
- **Better QOL after surgery**
- **Quicker recovery to normal life**
- **Less pain**
- **Patients' strong desire**

If so, “**minimally invasiveness**” needs to be scientifically documented for the approval.

Evolution of Lung Cancer Surgery

No Surgical Indication

- **Nissen**: First successful left-sided pneumonectomy as a two-stage procedure (1930)
- **Graham** and Singer: First successful en bloc left pneumonectomy for lung cancer (1933)

Pneumectomy

History of Minimization!

right
hor

Lobectomy

Cahan W. "Radical lobectomy" (1962)

30 Years

Lung Cancer Study Group (**Ginsberg** RJ). Randomized trial of lobectomy versus limited resection for T1N0 non-small cell lung cancer. (1995)

Limited resection

National Cancer Center



Evarts A. Graham

State of the Art **2015**: Surgery



Standard mode of pulmonary resection for lung cancer in **2015**

- 1) At least **LOBECTOMY**
+
- 2) Hilar and mediastinal LNS/LND
by Open/VATS approach

3 Components of Lung Cancer Surgery

Minimization!

Lymph nodes

Chest wall

**Lung
parenchyma**

Minimally Invasive Surgery in a Wide Meaning: What Could Be Minimized or Less Invasive?

**Chest wall:
thoracotomy
approach**

- Conventional PL thoracotomy
- VATS approach
- MIOS approach (Hybrid)
- Robotic approach

**Lung
parenchyma
: Extent of lung
resection**

- Lobectomy
- Limited resection
 - WWW
 - Segmentectomy

**Lymph nodes:
Extent of
dissection**

- Systematic hilar/mediastinal dissection
- Lobe-specific dissection
- (Systematic) sampling
- Selective biopsy

JCOG0802/WJOG4607: Phase III Randomized Trial between Lobectomy and Limited Resection for Small-sized carcinoma (Part-solid GGO – Solid 2cm or Less): **LOB vs. SEG**

Stratified factors:

- Institute
- Gender
- Histology (Ad vs. Non-ad)
- Solid or non-solid

Peripheral carcinoma, ≤ 2 cm
Negative hilar node
C/T ratio ≥ 0.25

Non-inferiority design

PI: Asamura H.

Randomize

Lobectomy

Segmentectomy

Endpoints:

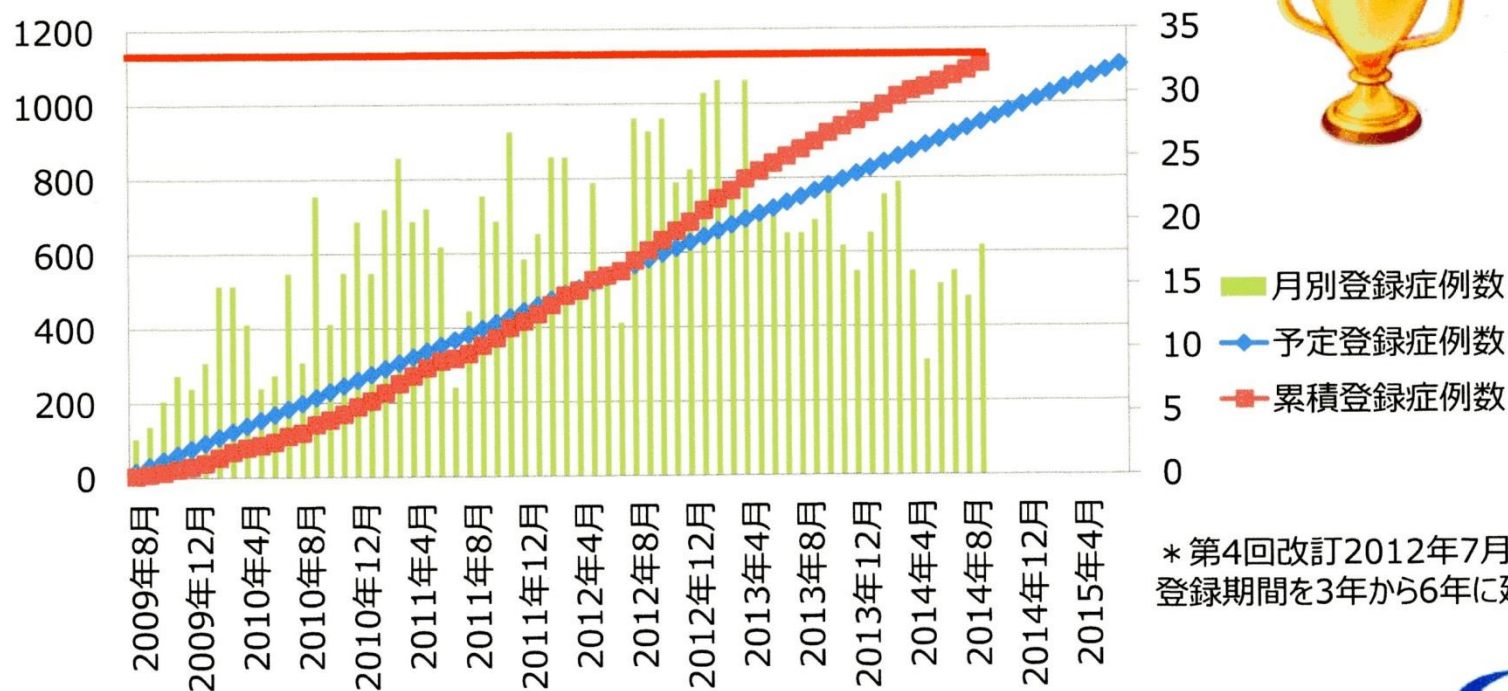
- Primary: OS
- Secondary: Postoperative pulmonary function

Sample size: 11,00

JCOG0802/WJOG4607L (Small NSCLC LB vs SG P3)登録完了!!!

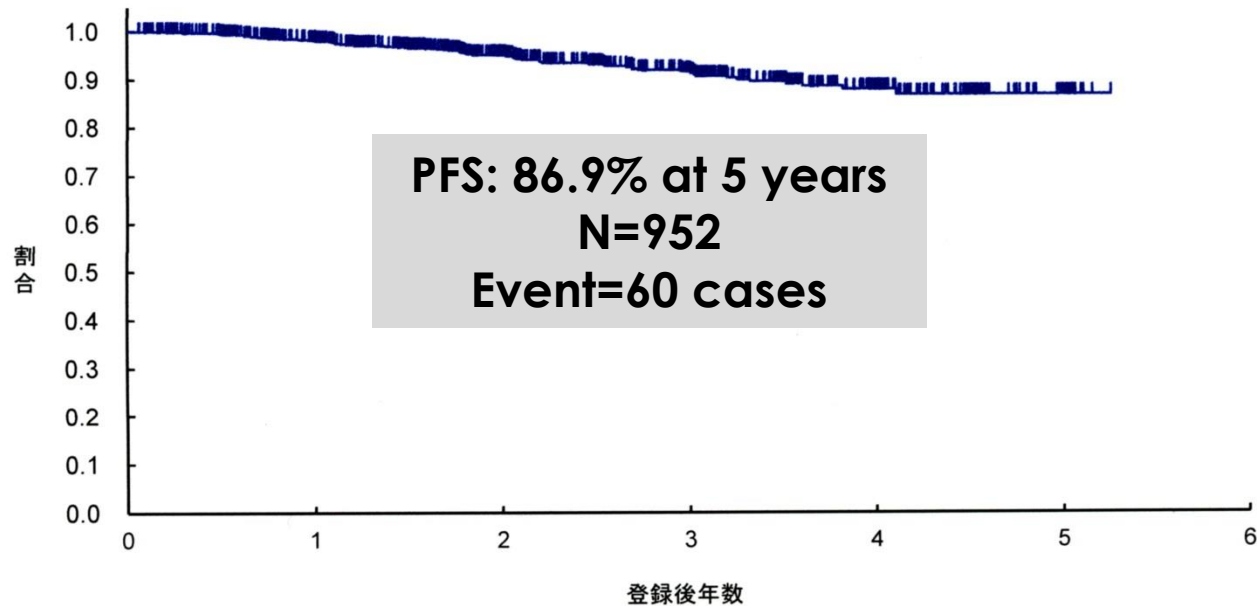
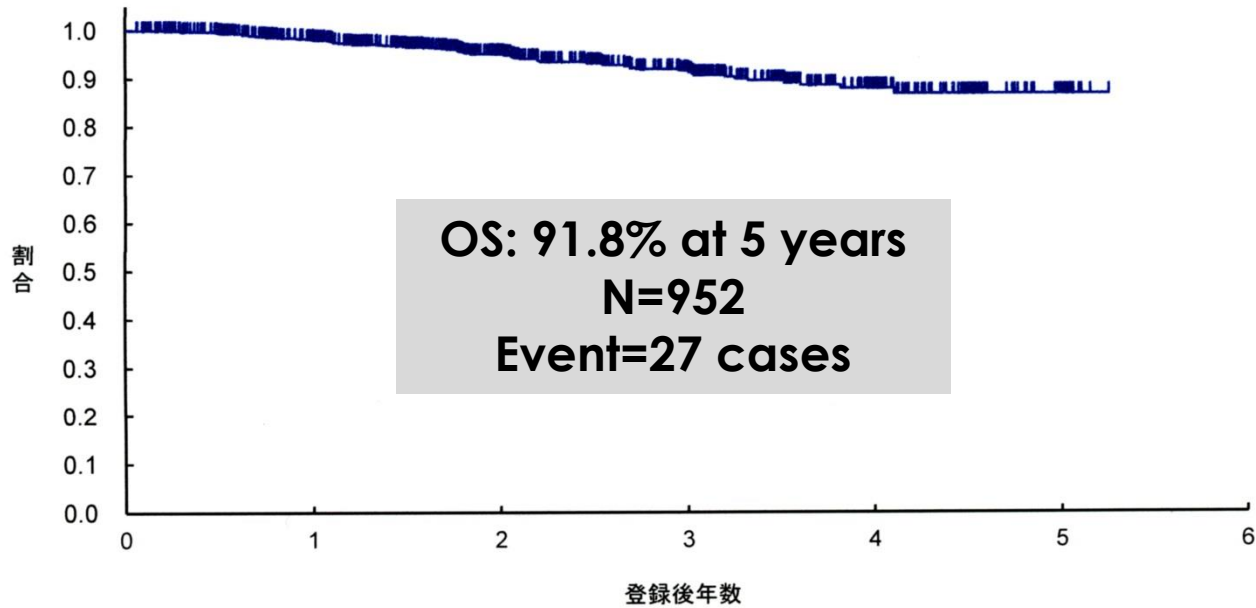
2014年9月登録数: 18例、累積登録数: 1106例

2次登録予定症例数: 1100例 (3年間)、30.5例 (月)



* 第4回改訂2012年7月より
登録期間を3年から6年に延長。

Results as of December, 2014





90th ANNUAL MEETING
AATS
May 1-5, 2010
Metro Toronto Convention Centre, Toronto, ON, Canada



AMERICAN ASSOCIATION
FOR THORACIC SURGERY
www.aats.org

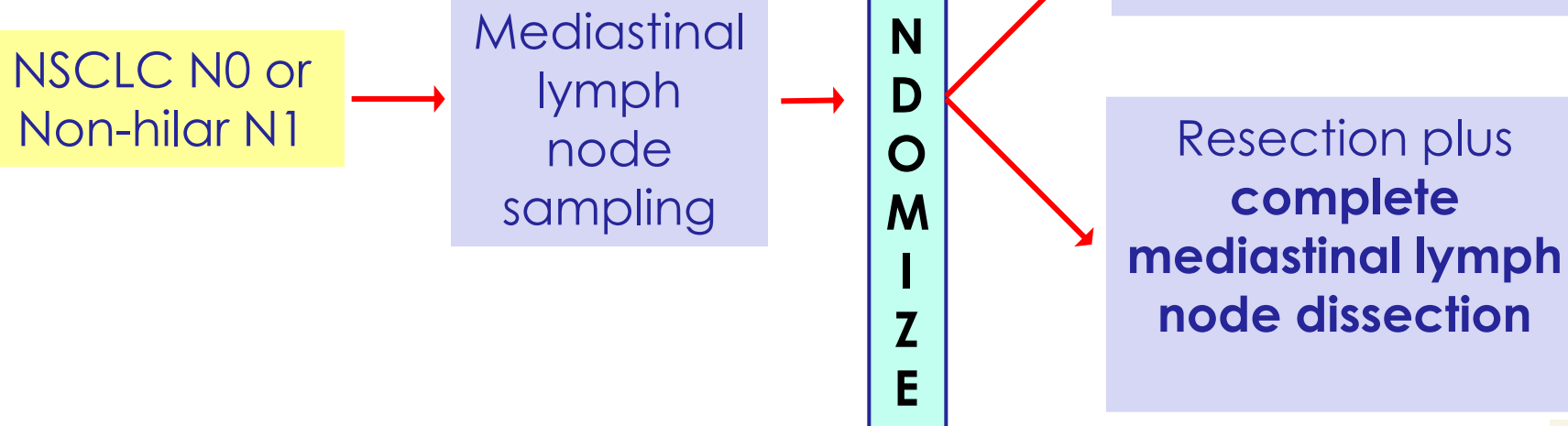


Results of the ACOSOG Z0030 Trial

**Randomized Trial of Mediastinal Lymph Node Sampling
Versus Complete Lymphadenectomy During Pulmonary
Resection in the Patient with T1 or T2, N0 or N1 (Less
Than Hilar) Non-Small Cell Carcinoma**

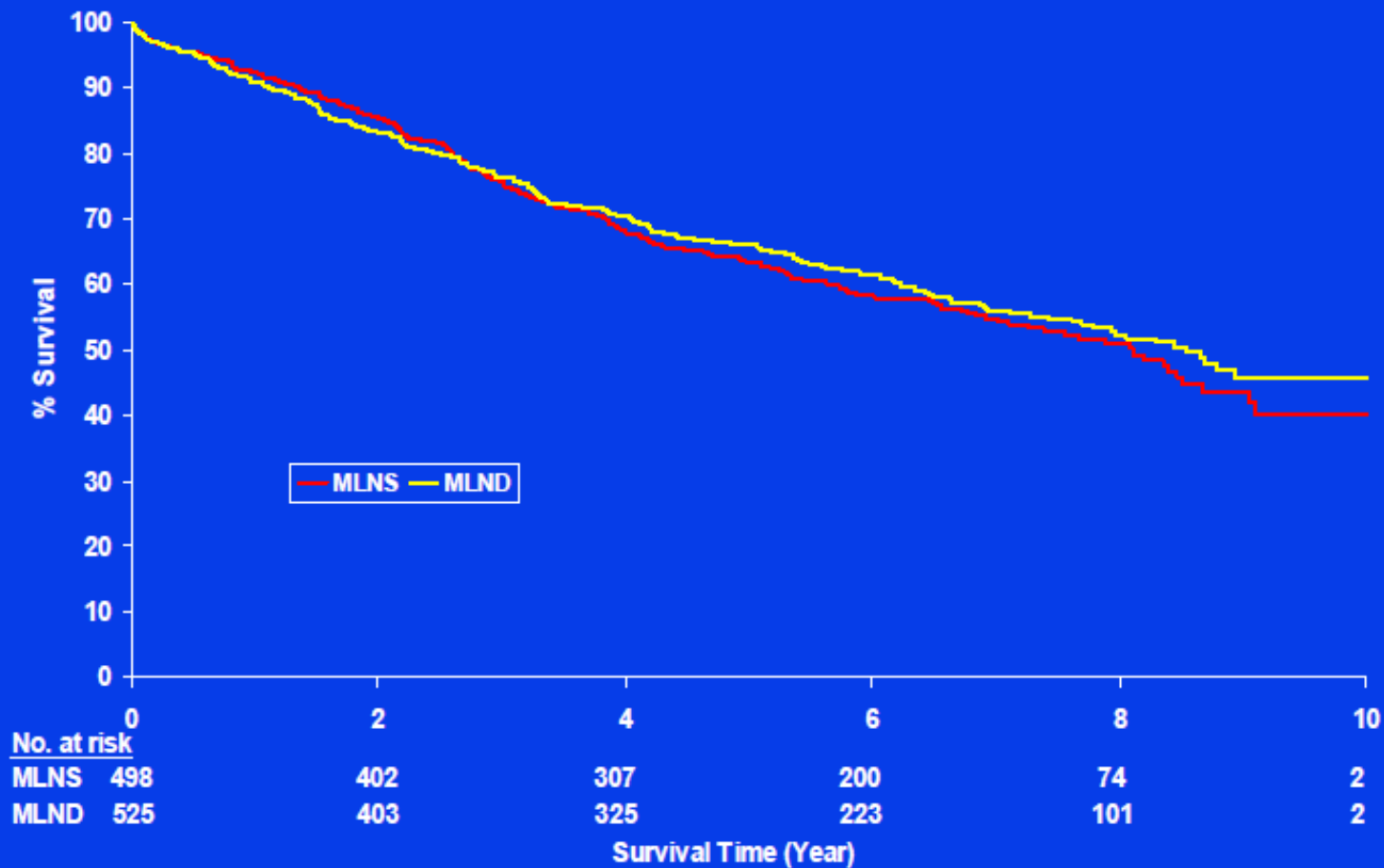
**Gail E. Darling, M.D., Mark S. Allen, M.D., Paul A.
Decker, M.S., Karla Ballman PhD, Richard A.
Malthaner, M.D., Richard I. Inculet, M.D., David R.
Jones, M.D., Robert J. McKenna, M.D., Rodney J.
Landreneau, M.D., Valerie W. Rusch M.D., Joe B.
Putnam, M.D.**

and the ACOSOG thoracic coinvestigators

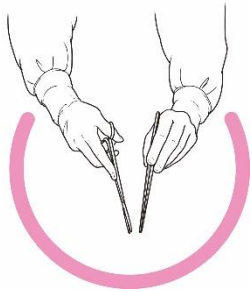




Survival - Overall

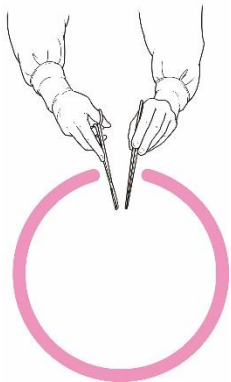


Minimising Chest Wall Incisions



**Intrathoracic
surgery**

**Conventional
Posterolateral
Thoracotomy**



**Extra-thoracic
surgery**

**Hybrid VATS
Minimally invasive
Open (MIOS)**

VATS Lobectomy

VATS vs. Open

+ An oncological issue? **No!**

+ A pulmonary function issue? **No!**

AN INCISIONAL ISSUE

VATS vs. Open

Video-Assisted Thoracic Surgery Lobectomy: Report of CALGB 39802—A Prospective, Multi-Institution Feasibility Study

Scott J. Swanson, James E. Herndon II, Thomas A. D'Amico, Todd L. Demmy, Robert J. McKenna Jr, Mark R. Green, and David J. Sugarbaker

- **Feasibility study** of VATS lobectomy: One 4-8cm access and two 0.5-cm port incision, videoscopic guidance and a traditional hilar dissection without rib spreading mandatory.
- 128 patients with peripheral lung nodules ≤ 3 cm
- Conclusion: **A standardized approach to VATS lobectomy as specifically defined with avoidance of rib spreading is feasible.**

VATS vs. Open

Table 1. Randomized Control Trials of Video-Assisted Thoracic Surgery Major Lung Resections

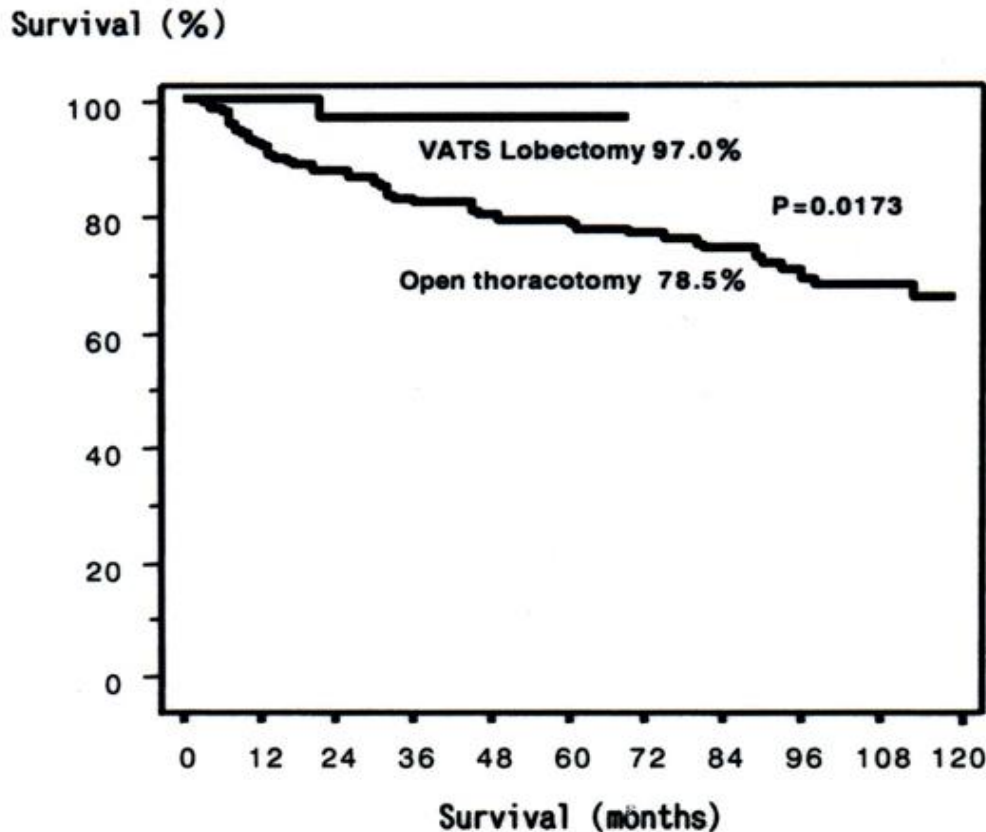
Study (first author)	Patients	Outcomes	Results	Comment
Kirby [3], 1995	25 VATS; 30 Open	LOS, OR time, complications	Fewer complications in VATS, no other differences	Stage I tumors, 3 VATS excluded due to conversion
Sugi [4], 2000	48 VATS; 52 Open	Survival, recurrences	No differences	All patients had MLND
Craig [5], 2001	22 VATS; 19 Open	Acute phase reactants	Lower CRP and IL-6 in VATS	
Shigemura [6], 2004	18 cVATS; 16 aVATS	OR time, LOS, pain, complications, markers	Longer OR, shorter LOS, lower CRP with cVATS	Complete VATS—no rib-spreading

aVATS = assisted VATS; CRP = C-reactive protein; cVATS = complete VATS; IL-6 = interleukin-6; LOS = length of stay; MLND = mediastinal lymph node dissection; OR = operating room; VATS = video-assisted thoracic surgery.

✚ Better perioperative parameters

✚ Fewer recurrence, better prognosis

VATS vs. Open

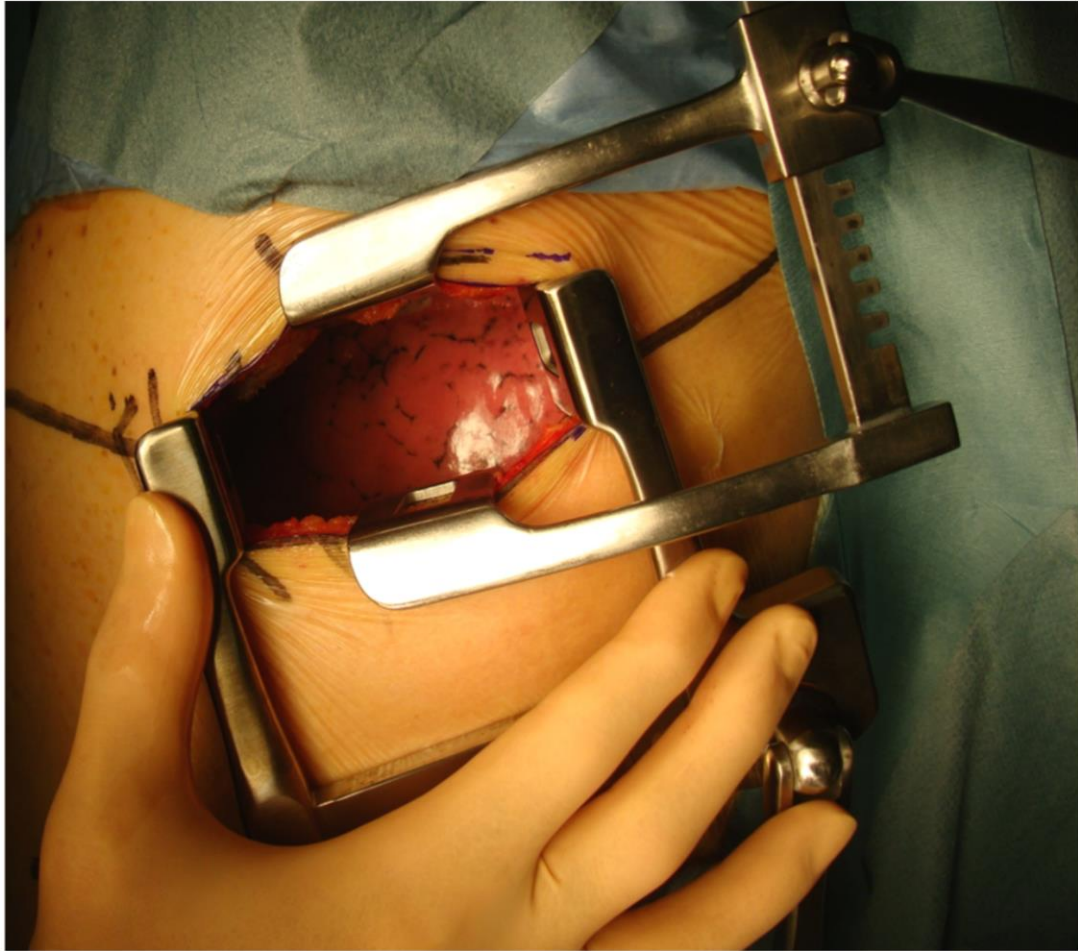


Better postoperative prognosis for VATS?

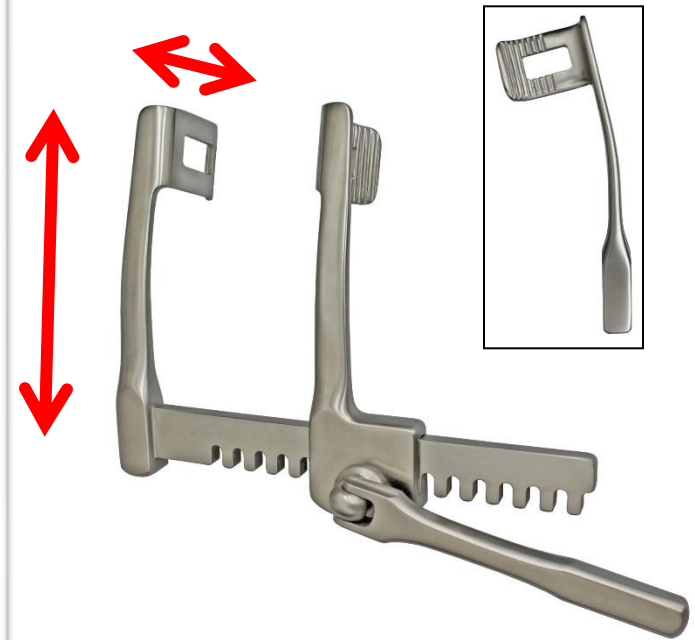
- Less perioperative immunological suppression?
- Selection bias?

Fig 4. Survival of patients with stage I lung cancer undergoing video-assisted thoracic surgery lobectomy and open thoracotomy.

Minimally Invasive Open Surgery (MIOS) Approach



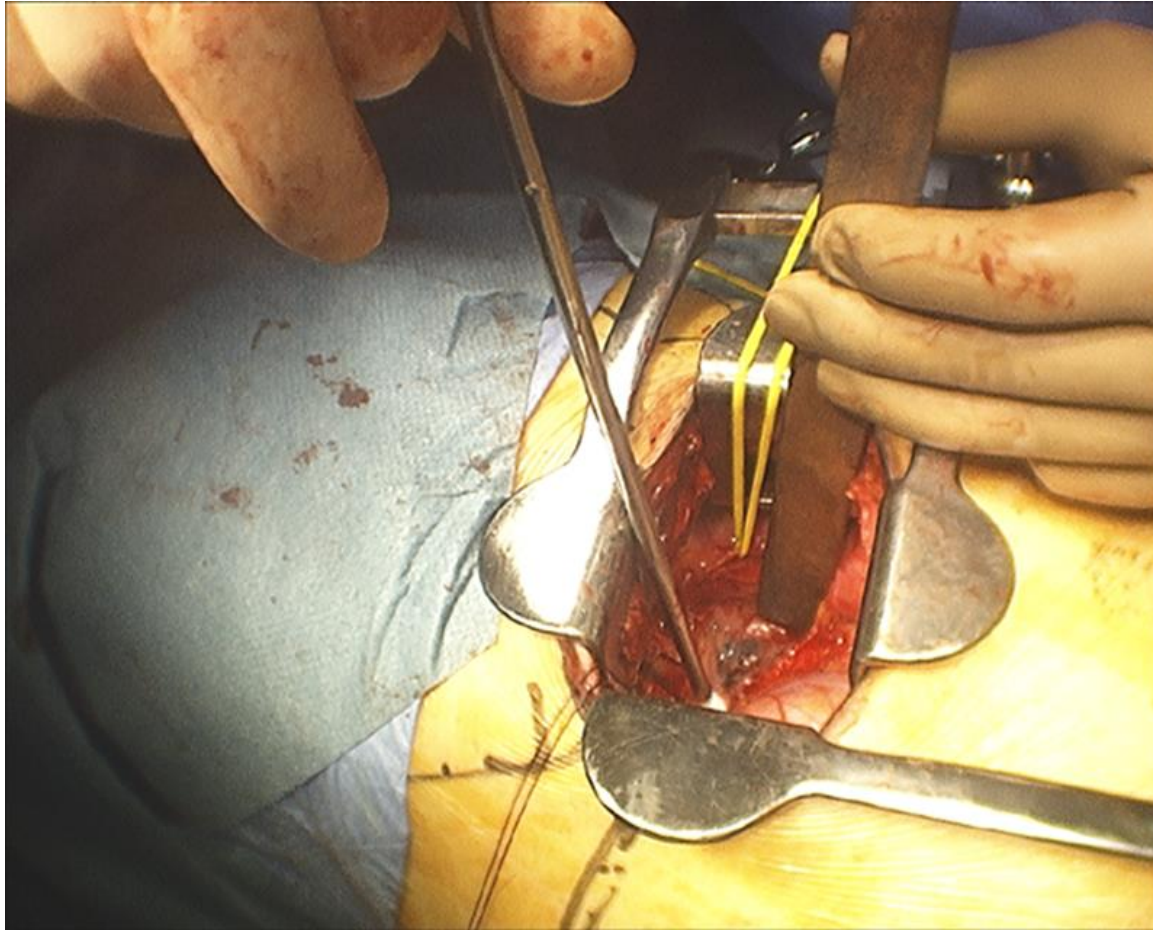
**NCC-MITO (Minimally
Invasive Thoraco-
Opener)** ↔



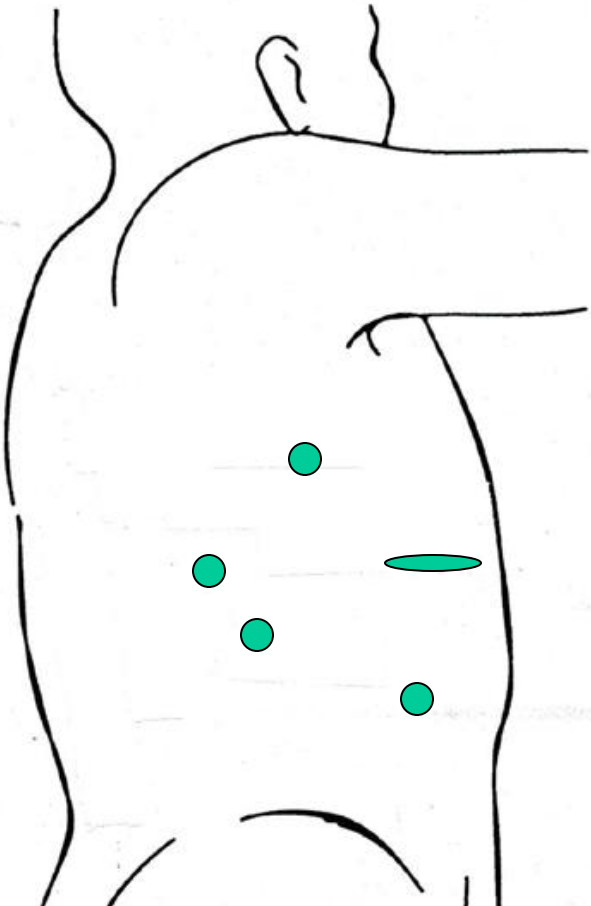
Minimally Invasive Open Surgery (MIOS) Approach as a Radical Resection for Lung Cancer

1. **A direct vision, direct approach** with thoracoscopic assistance.
2. **Individual isolation and division technique** of intrathoracic structures with endostaplers.
3. **Shorter operative time** than VATS.
4. **Low morbidity/mortality.**
5. Similarly **short hospital stay** as VATS.
6. Better opportunity for **education** to resident.

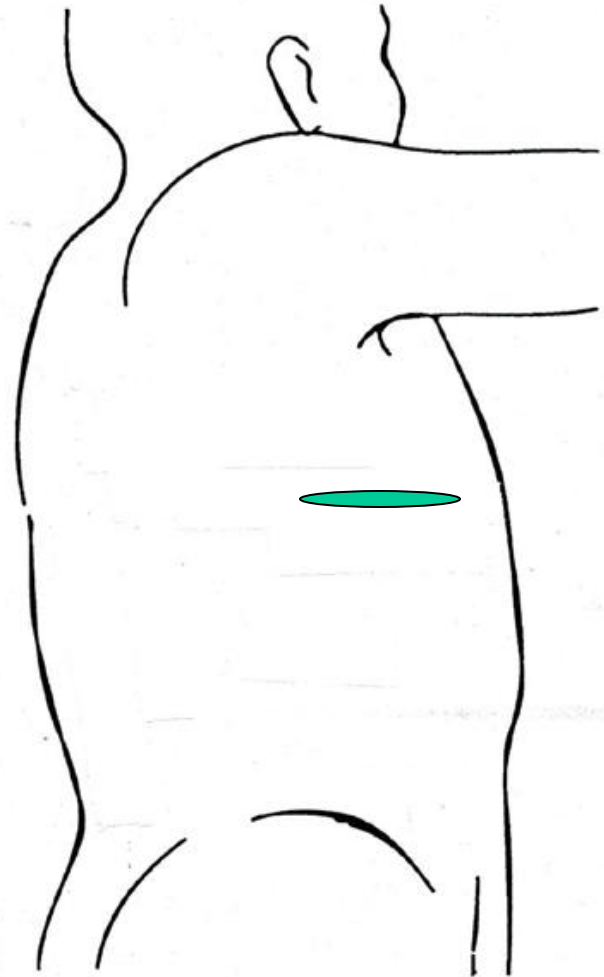
Minimally Invasive Open Surgery (MIOS) Approach



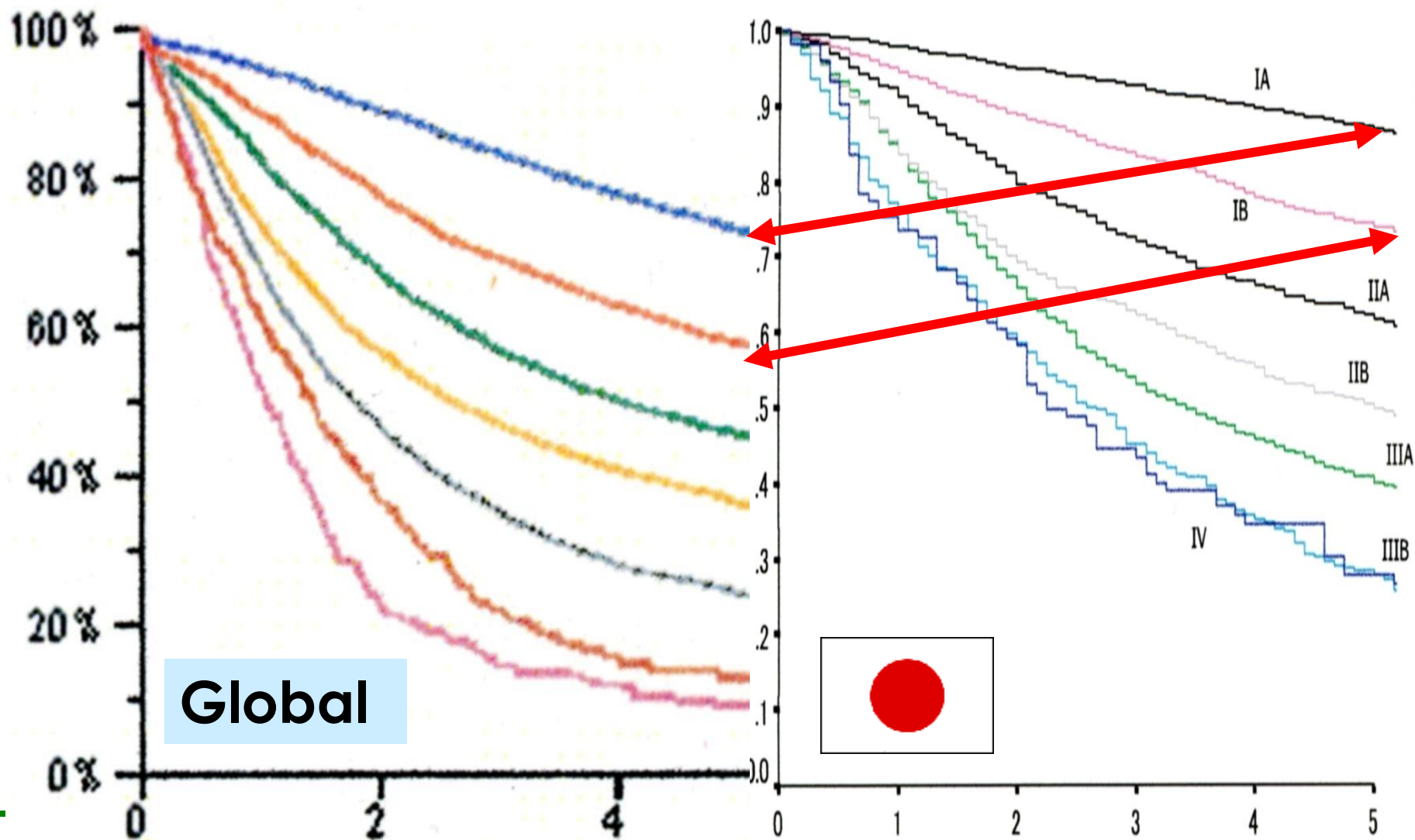
Which is More Painful?



Multiple intercostal injury



COMPARISON BETWEEN IASLC-GLOBAL AND JAPANESE SURVIVAL CURVES: P-STAGE



A COMPARISON BTWN : SURVIVAL OF NSCLC BY P-STAGE (UICC 7)

IASLC

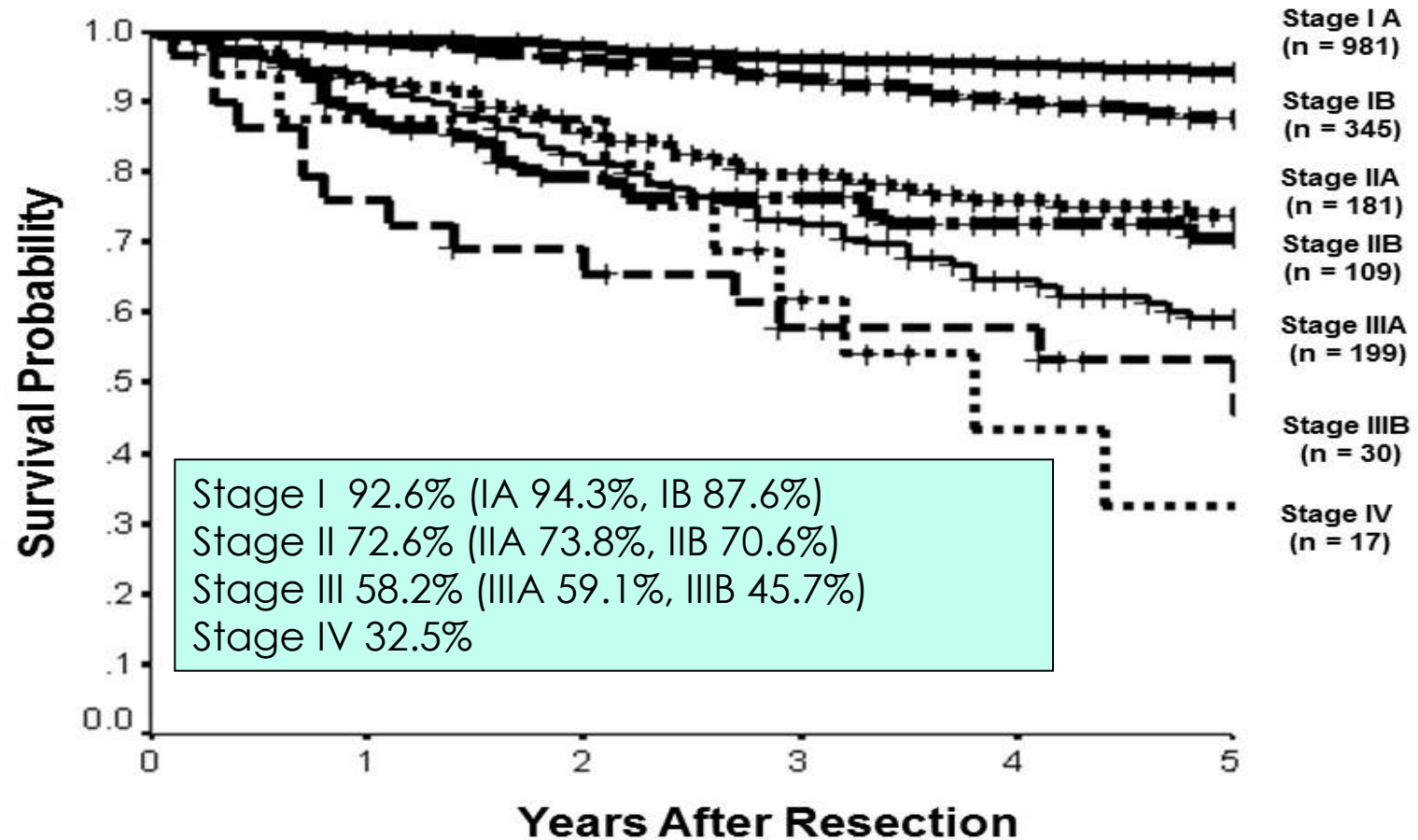
c-Stage	5-YSR (%)
IA	73
IB	58
IIA	46
IIB	36
IIIA	24
IIIB	9
IV	13

JAPAN (2009)

c-Stage	5-YSR (%)
IA	86.8
IB	73.9
IIA	61.6
IIB	49.8
IIIA	40.9
IIIB	27.8
IV	27.9

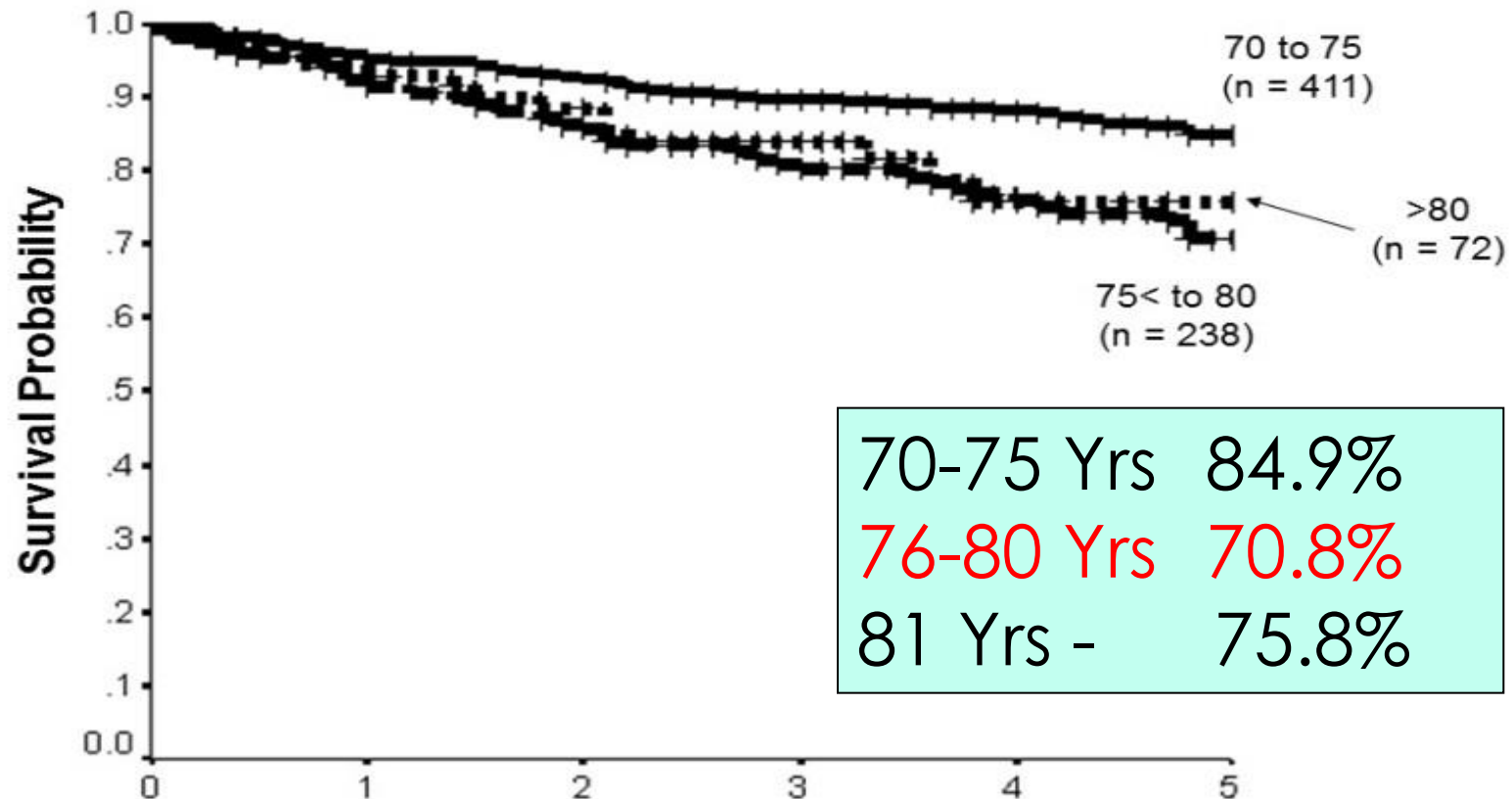
Survival Curve of 1,865 Resected Lung Cancers **by STAGE** (2007-2011)

Survival Function



Survival Curve of Resected Lung Cancers of the Elderly (over 70 Years) (2007-2011)

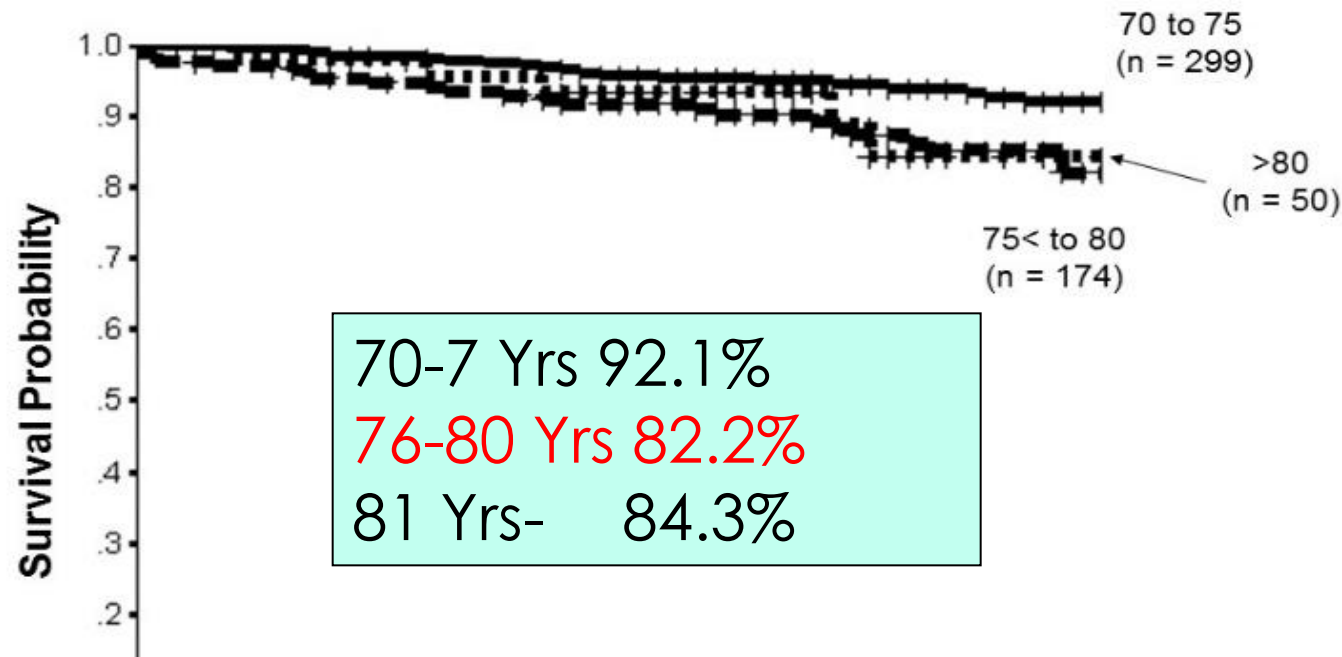
Survival Function



- In NCC population, age was significantly prognostic.
- Those older between 76 and 80 had the worst prognosis.

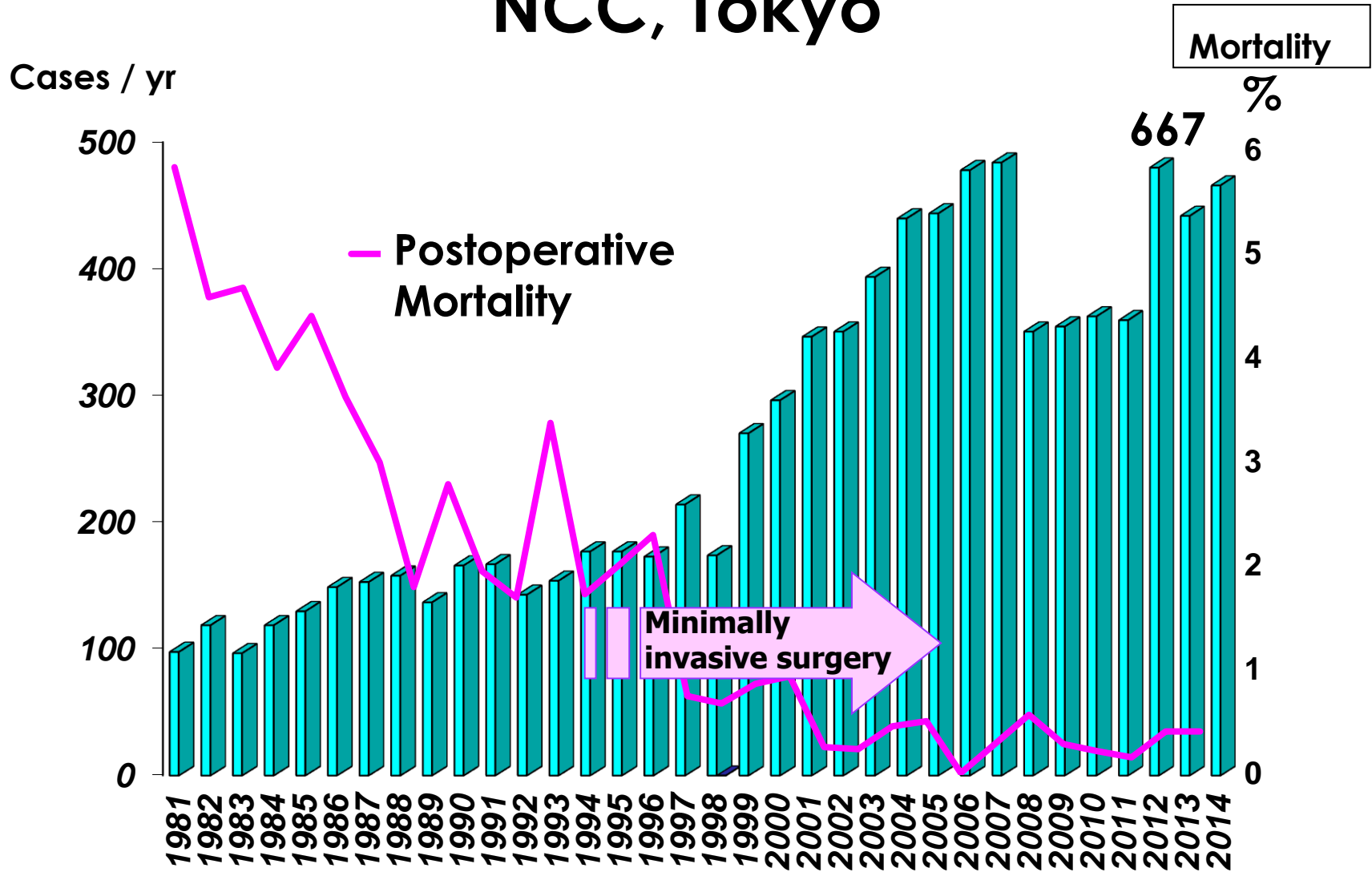
Survival Curve of **Stage I Resected Lung Cancers of the Elderly (over 70 Years)** (2007-2011)

Survival Function



- In NCC population, age was significantly prognostic.
- Those between 76 and 80 had worst prognosis than others.

Number of Resections and Mortality: NCC, Tokyo



Future Surgery: Minimally Invasive?

Conventional



OR

Robotic



Master's hand-made Sushi



Sushi making Robot

SNS-RFA/SNS-LFA



- シャリを練らず固めず、究極のふんわりしたシャリ玉を握ります
- カン数指定ができ、欲しい数だけシャリ玉が生産できます

Which Sushi bar do you prefer?

