



2026 World Conference on Lung Cancer

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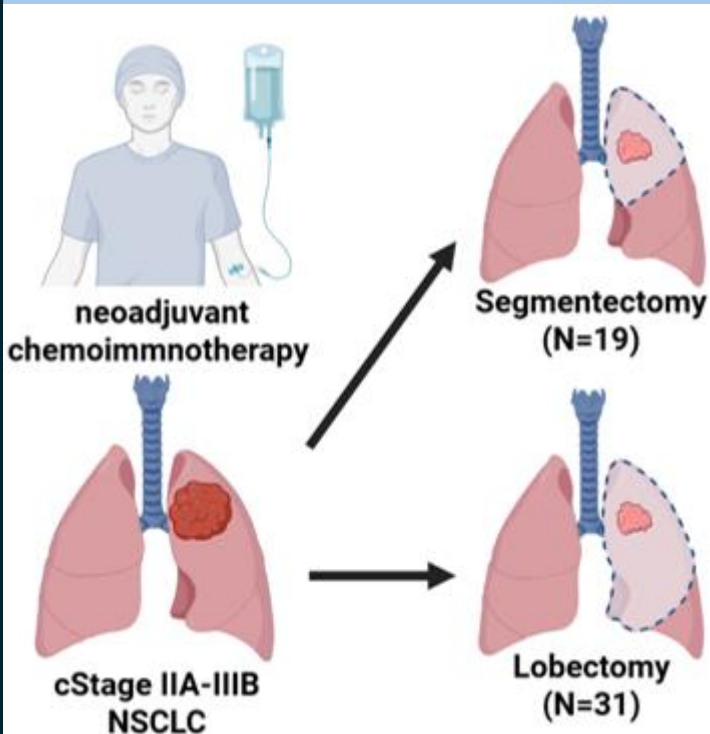
Surgical Feasibility of Segmentectomy for Non-Small Cell Lung Cancer After Neoadjuvant Chemoimmunotherapy

Hideki Ujiie, Masaoki Ito, Masato Chiba, Hana Oiki, Shota Fukuda, Mai Nishina, Shuta Ohara, Masaya Nishino, Akira Hamada, Toshiki Takemoto, Yasuhiro Tsutani

Division of Thoracic Surgery, Department of Surgery, Kindai University Faculty of Medicine, Japan

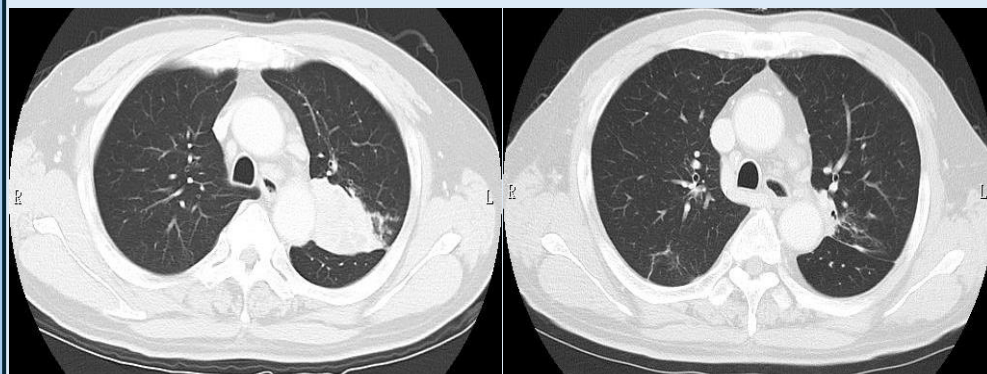
Surgical feasibility of segmentectomy for non-small cell lung cancer after neoadjuvant ICI

Concept



Assessment:
Resectability and prognosis
(Recurrence-free survival and
Overall survival)

Indication for segmentectomy



Pre ICI

post ICI

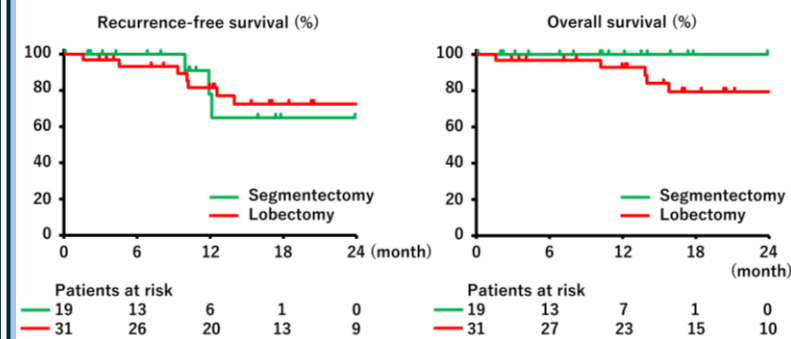
1. Segmentectomy was performed to patients who were potentially unsuitable to lobectomy because of comorbidities.

2. Technical feasibility for segmentectomy was reviewed based on preoperative CT.

Results

Complete resection (R0) was achieved in all segmentectomy cases.

Two-year RFS/OS were 64.9%/100% in segmentectomy, compared to 72.5%/79.4% in lobectomy.



Background



Neoadjuvant immune checkpoint inhibitors (nICI) Advances

Neoadjuvant immune checkpoint inhibitors (nICI) combined with platinum-doublet chemotherapy have reshaped strategies, demonstrating improved major pathologic response (MPR) and complete response (pCR) rates in NSCLC. ¹⁾⁻³⁾



Surgical Progress

Segmentectomy is increasingly validated for early-stage lung cancer to preserve pulmonary function while maintaining equivalent oncological outcomes to traditional lobectomy. ^{4),5)}



The Clinical Gap

Advanced stage patients are often frail. While significant tumor shrinkage post-nICI occurs, the feasibility of parenchyma-sparing segmentectomy for these complex cases remains unclear.

1) *N Engl J Med.* 2025;393:741-52. 2) *N Engl J Med.* 2022;386:1973-85. 3) *Lancet.* 2024;404:1240-52.

4) *Lancet.* 2022;399:1607-17. 5) *N Engl J Med.* 2023;388:489-98.

Study Objective

This study aimed to evaluate the utility of segmentectomy in this emerging clinical setting:

- ▶ Evaluate the **surgical feasibility** and **technical resectability**.
- ▶ Assess **perioperative safety** and **complication rates**.
- ▶ Examine **early oncological outcomes** including margins and response.
- ▶ Determine if parenchyma-sparing resection is valid for selected responders considered unsuitable for lobectomy.

Study Design

Retrospective Review

Conducted between August 2018 and July 2026 at Kindai University Hospital (n=55).

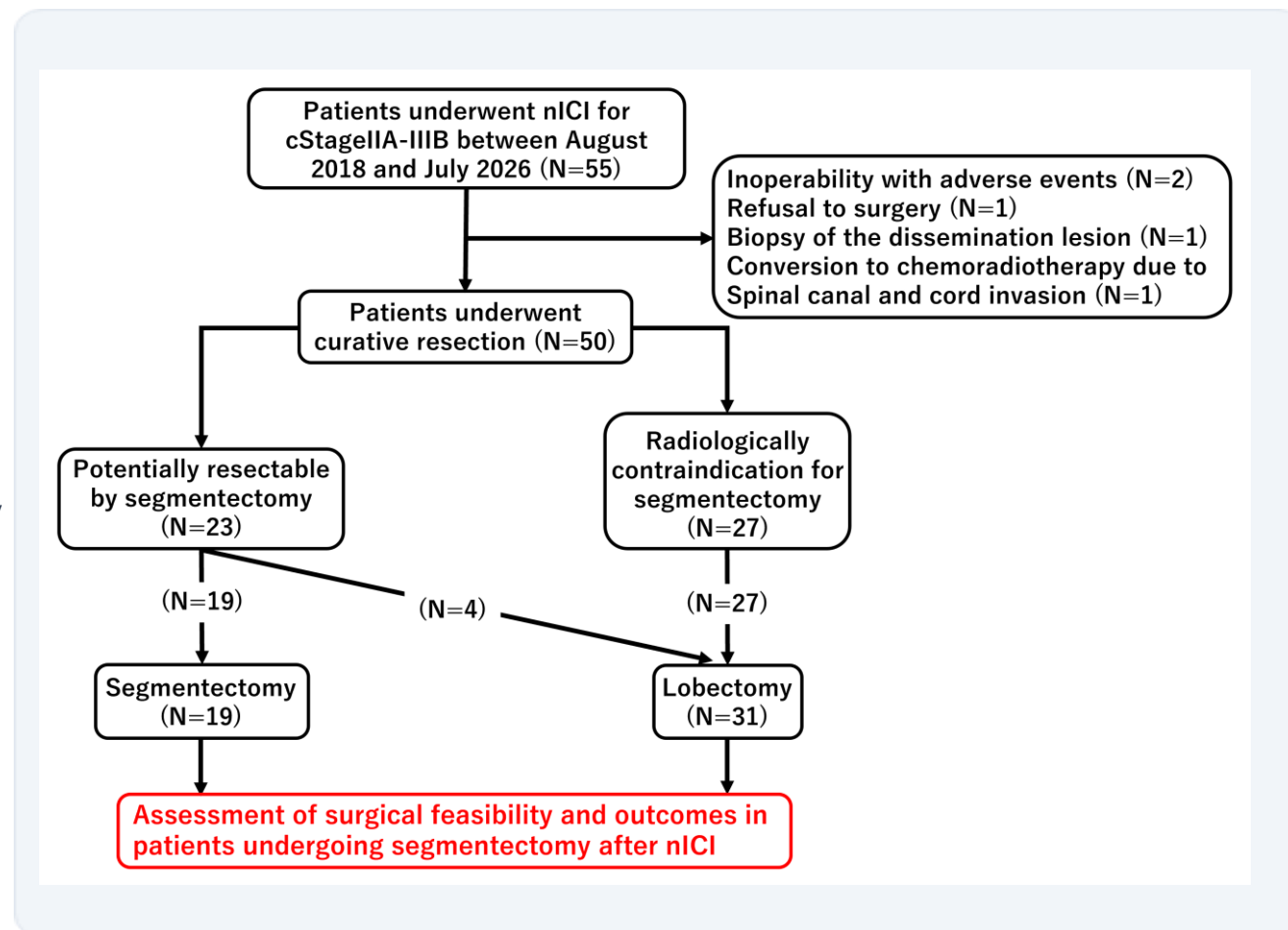
- ✓ Analyzed **50** consecutive NSCLC patients who underwent curative-intent resection after nICI.
- ✓ Segmentectomy was considered for patients displaying deep therapeutic response suggestive of MPR/pCR, combined with severe comorbidities.
- ✓ Outcomes measured included microscopic resectability, pathological response, and early prognosis.

Patient Selection

Of 55 consecutive patients treated with nICI, 50 underwent curative surgery. Based on clinical factors, the cohort was divided into surgical procedures:

- ▶ **Lobectomy:** 31 patients (62%)
- ▶ **Segmentectomy:** 19 patients (38%)

Patients selected for segmentectomy were deemed potentially unsuitable for standard lobectomy due to significant comorbidities, low pulmonary function, or immune-related adverse events.



Preoperative Patient Characteristics (N=50)

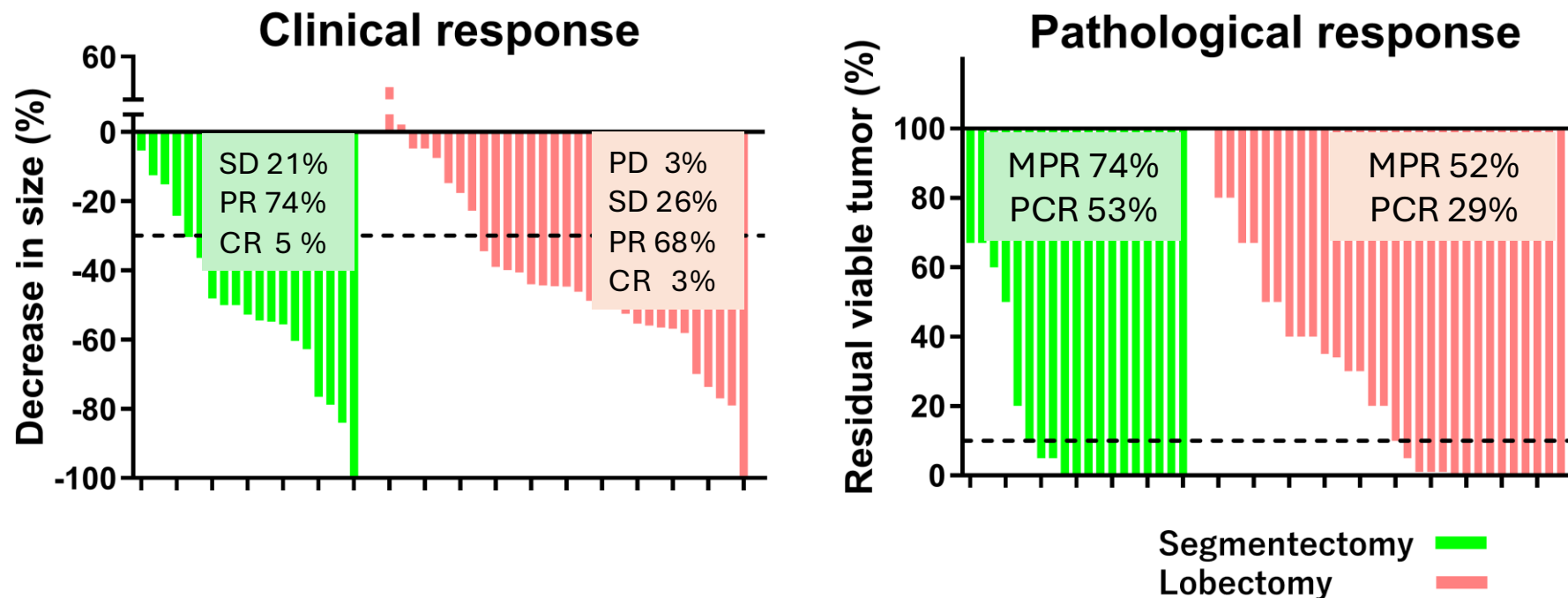
Characteristic	Segmentectomy (N = 19)	Lobectomy (N = 31)
Median Age (Range)	76 (58-85)	68 (45-80)
Male Sex	94.7%(18)	80.6%(25)
cStage IIA-IIIB	53% (10)	23% (7)
cStage IIIA-IIIB	47% (9)	77% (24)
Histology, N(%) Adenocarcinoma/Squamous cell carcinoma/ Other	26%(5) / 37%(7) / 37%(7)	39%(12) / 42%(13) / 13%(6)
PD-L1 status (TPS), N(%) <1% / 1-49% / ≥ 50%, Unknown	11%(2) / 26%(5) / 42%(8) / 21%(4)	13%(4) / 32%(10) / 35% (12) / 2%(5)
ICI regimen Nivolumab/Pembrolizumab/Durvalumab	90%(17) / 5%(1) / 5%(1)	71%(22) / 26% (8) / 3% (1)
RECIST PD/SD/PR/CR	0%(0) / 21%(4) / 74%(14) / 5%(1)	3%(1) / 26% (8) / 68%(21) / 3%(1)

Postoperative Patient Characteristics (N=50)

Characteristic	Segmentectomy (N = 19)	Lobectomy (N = 31)
Surgical Approach Thoracotomy/VATS/RATS	5%(1) / 21%(4) / 74% (14)	39%(12) / 32%(10) / 29%(9)
Extended resection	Sleeve 5%(1) / Chest wall 11%(2)	Bilobectomy 3%(1) / Sleeve 20% (6) / Chest wall 10%(3) / Rib 3%(1) / Aorta 3%(1) / Adjacent lung 13%(4)
Postoperative complication Grade3/ Grade 4/ Grade 5	21% (4)/ 0% (0)/ 0% (0)	23% (7)/ 7% (2)/ 3% (1)
ypStage, N(%)		
0	53%(10)	29%(9)
IA1-IB	26%(5)	26%(8)
IIA-IIB	11%(2)	26%(8)
IIIA-IIIB	5%(1)	19%(6)
IVA	5%(1)	0%(0)
Pathological Response		
Non-MPR	26%(5)	48%(15)
MPR	74%(14)	52%(16)
Pathological Complete Response (pCR)	53%(10)	29%(9)

Tumor Response

The segmentectomy cohort exhibited profound clinical and pathological responses to neoadjuvant chemoimmunotherapy:



- ▶ **Major Pathological Response (MPR):** Achieved in **74%** of segmentectomy cases vs. **52%** of lobectomy cases.
- ▶ **Pathological Complete Response (pCR):** Achieved in **53%** of segmentectomy cases vs. **29%** of lobectomy cases.
- ▶ **Complete Resectability:** R0 resection was successfully achieved in **100%** of segmentectomy patients.
- ▶ **Margin Distance:** Median margin distance for segmentectomy was a robust 2.65 cm.

Surgical Safety



Perioperative Specs

In the segmentectomy group, the median operation time was 302 minutes, with minimal median blood loss of 150 ml. Median hospital stay was 9 days.



Complications

Any grade complication occurred in 7 patients (37%). The maximum severity was Clavien-Dindo Grade 3a in 4 patients (21%: air leak, ILD). No Grade 4/5 events or reoperation in segmentectomy cases.

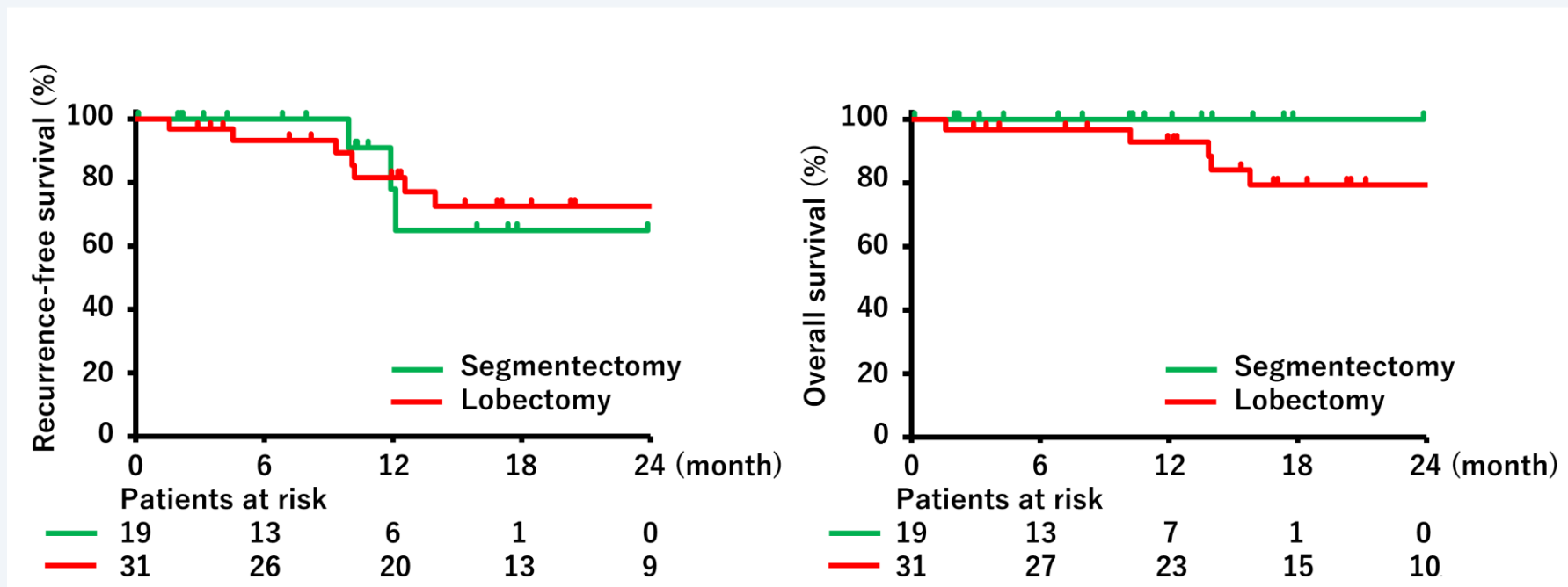


Surgical Approach

Minimally invasive techniques (RATS/VATS) were actively utilized in 95% (18/19) of segmentectomy cases, facilitating precise dissection and reducing overall surgical trauma.

Survival Outcomes

Early prognostic indicators demonstrated excellent oncological efficacy for the parenchyma-sparing approach:



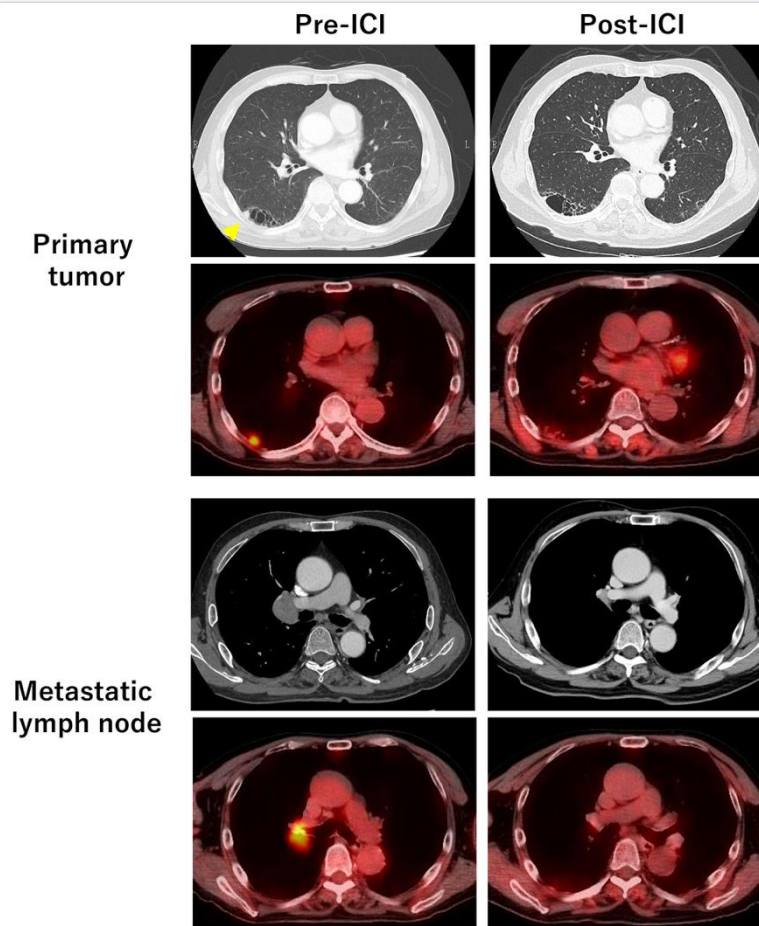
- ▶ **Segmentectomy Survival:** the 2-year RFS is 64.9% in Segmentectomy vs. 72.5% in Lobectomy.
The 2-year OS is 100% in Segmentectomy vs. 79.4% in Lobectomy (median follow-up 423 days).
- ▶ **Clinical Significance:** Despite high-risk profiles and older age in the segmentectomy group, **100% OS** was maintained.
- ▶ **Parenchyma-Sparing Benefit:** Lung function preservation enabled effective 2nd-line local/systemic treatments post-recurrence.

Case 1: pCR with RATS

Patient: 73-year-old male (cT1bN1M0, Stage IIA)

History: Emphysema, steroid therapy for collagen disease.

- ▶ Tumor expressed 100% PD-L1 TPS.
- ▶ Treated with 3 cycles of nivolumab + carboplatin + paclitaxel.
- ▶ Primary tumor and bulky nodes entirely resolved on imaging (ycT0N0M0, ycStage 0).
- ▶ Underwent RATS Rt. S6 segmentectomy.
- ▶ **Result:** Pathological complete response (pCR) achieved with an uneventful post-operative course.

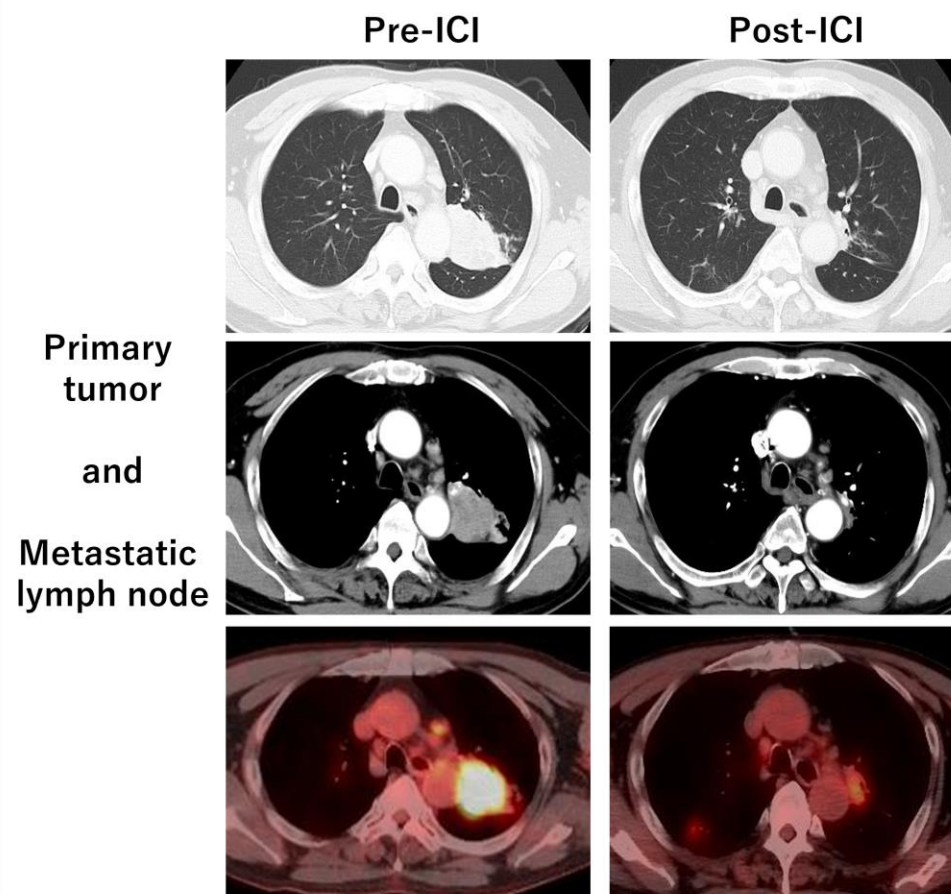


Case 2: Preserved Pulmonary Function

Patient: 67-year-old male (cT3N2bM0, Stage IIIB)

History: Heavy smoker with compromised lung functions.

- ▶ Treated with 2 cycles of pembrolizumab + chemotherapy halted due to suspected interstitial lung disease.
- ▶ Underwent RATS S1+2 segmentectomy instead of lobectomy to preserve critical lung function.
- ▶ **Result:** Achieved Major Pathological Response (ypT0N2aM0).
- ▶ Pulmonary function successfully preserved and maintained at 1-year follow-up (%VC 98.1%, %FEV1.0 78.0%).



Conclusions

Feasibility & Safety

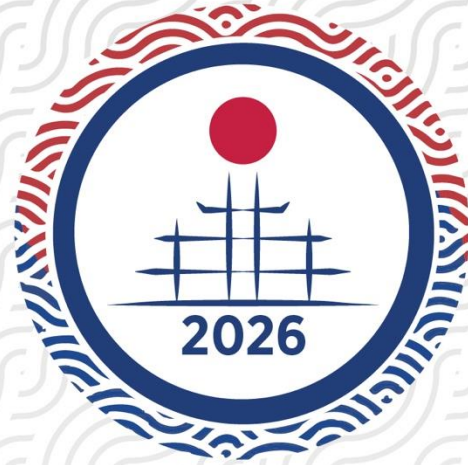
Segmentectomy is a safe and technically feasible option for selected NSCLC patients treated with nICIs who are considered unsuitable for lobectomy due to comorbidities or low pulmonary function.

Microscopically complete (R0) resection can be reliably achieved with acceptable, low-severity complication rates in this high-risk population.

Future Perspectives

The combination of high MPR rates and the adoption of minimally invasive techniques (like RATS) supports parenchyma-sparing surgery without compromising early oncological control.

Careful patient selection remains paramount. Prospective clinical trials evaluating segmentectomy after nICI are warranted for definitive validation. (jRCT1050260081)



Thank You.●

Hideki Ujiie, MD, PhD, FACS, FCCP, ATSF Hideki.Ujiie.MD@gmail.com