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# Multidisciplinary Perspectives on the Current and Emerging Treatment Landscape of Lung Cancer I: What Do Your Cross- Functional Colleagues Need to Know?

Onkar Khullar MD MSC

Associate Professor of Surgery  
Emory University School of Medicine



# Why Collaborate

## 1. Complex Problems Need Diverse Perspectives

Medical issues often involve biological, psychological, social, and environmental factors. A single-discipline approach may miss key pieces of the puzzle.

## 2. Innovation Happens at the Intersections

Breakthroughs often emerge when different fields overlap. For instance:

- **AI researchers + radiologists** = powerful diagnostic tools that detect disease faster and more accurately.
- **Engineers + surgeons** = development of robotic-assisted surgeries or advanced prosthetics.

## 3. Better Data, Better Decisions

Modern medical research often involves **huge datasets**—genomics, electronic health records, wearables, etc.

Collaborations with **data scientists, statisticians, and informatics experts** are essential to analyze and interpret this data accurately

## 4. From Bench to Bedside

Translational research—the process of turning lab discoveries into clinical treatments—requires collaboration between scientists and varied clinicians

## 5. Better Patient Care



# MultiD Care in Lung Cancer



Lung Cancer patients  
require multidisciplinary  
care

Regardless of stage



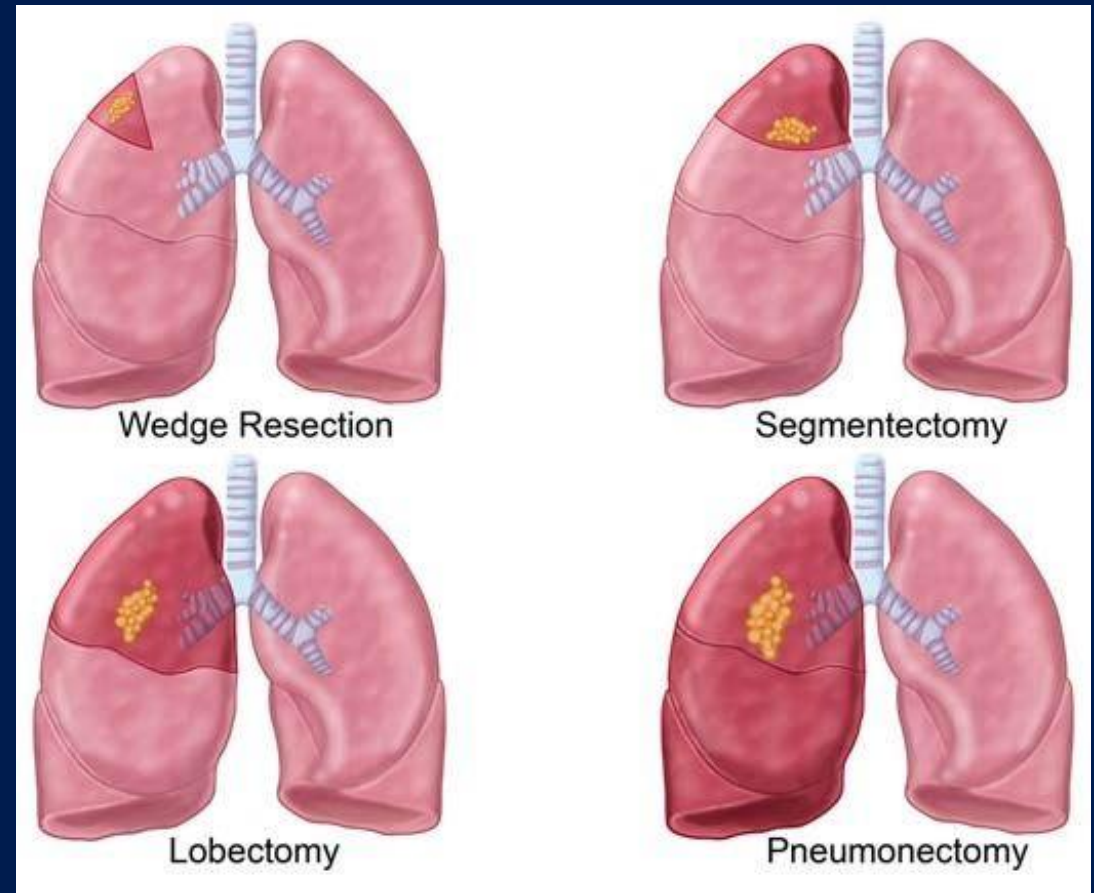
# Select Neoadjuvant/Periop IO Trials

Trial Name	Phase	Population	Treatment Regimen	Key Outcomes
NADIM	Phase 2	Stage IIIA NSCLC	Neoadjuvant paclitaxel, carboplatin, nivolumab; adjuvant nivolumab	5-year OS: 69.3%, PFS: 65.0%
NADIM II	Phase 2	Stage IIIA/IIIB NSCLC	Neoadjuvant nivolumab + chemotherapy; adjuvant nivolumab	Improved pCR, PFS, OS vs. chemotherapy alone
CheckMate 816	Phase 3	Stage IB-III A NSCLC	Neoadjuvant nivolumab + chemotherapy	Improved pCR, EFS
AEGEAN	Phase 3	Stage II-III NSCLC	Perioperative durvalumab + chemotherapy	Improved EFS, pCR
KEYNOTE-671	Phase 3	Stage IIA-IIIB NSCLC	Perioperative pembrolizumab + chemotherapy	Improved OS, EFS
CheckMate 77T	Phase 3	Stage IIA-IIIB NSCLC	Perioperative nivolumab + chemotherapy; adjuvant nivolumab	Improved EFS, pCR, OS



# Surgical Options

- Minimally invasive surgery
  - Thoracoscopic lung resections
  - Robotic Lung Resections
- Anatomic Resections
  - Segmentectomy
  - Lobectomy
  - Pneumonectomy
- Non-anatomic resection
  - Wedge Resection





# Sublobar Resection versus Lobectomy

**CALGB 140503**

Lobectomy

Sublobar  
Resection

Overall survival: **HR 0.95,**  
95% CI **0.72-1.26**  
Noninferior  
Disease-free survival  
Noninferior  
**HR 1.01, 90% CI 0.83-1.24)**

**R**

**JCOG 0802**

Lobectomy

Sublobar  
Resection

Overall survival: **HR 0.66,**  
95% CI **0.47-0.93**  
Noninferior  
Recurrence-free  
survival:  
Noninferior  
**HR 0.998,**  
95% CI **0.75-1.32**



# Surgical Outcomes: Checkmate 816

	Nivolumab plus Chemotherapy (N = 179)	Chemotherapy (N = 179)
Patients with definitive surgery* — no. (%)	149 (83.2)	135 (75.4)
Time from last neoadjuvant dose to definitive surgery — wk		
Median (IQR)	5.3 (4.6–6.0)	5.0 (4.6–5.9)
Patients with cancelled definitive surgery — no. (%)	28 (15.6)	37 (20.7)
Disease progression	12 (6.7)	17 (9.5)
Adverse event	2 (1.1)	1 (0.6)
Other†	14 (7.8)	19 (10.6)
Patients with delayed surgery‡§ — no. (%)	31 (20.8)	24 (17.8)
Administrative reason	17 (11.4)	8 (5.9)
Adverse event	6 (4.0)	9 (6.7)
Other	8 (5.4)	7 (5.2)
Length of delay in surgery — wk		
Median (IQR)	2.0 (0.6–3.0)	2.4 (1.0–3.7)
Of patients with delayed surgery, proportion no. (%) with delay of¶		
≤2 wk	17 (54.8)	11 (45.8)
>2 and ≤4 wk	8 (25.8)	8 (33.3)
>4 and ≤6 wk	3 (9.7)	2 (8.3)
>6 wk	3 (9.7)	3 (12.5)





# Surgical Outcomes: Checkmate 816

Duration of surgery <sup>l</sup> — min		
Median (IQR)	185.0 (133.0–260.0)	213.5 (150.0–283.0)
Surgical approach <sup>s</sup> — no. (%)		
Thoracotomy	88 (59.1)	85 (63.0)
Minimally invasive <sup>**</sup>	44 (29.5)	29 (21.5)
Minimally invasive to thoracotomy	17 (11.4)	21 (15.6)
Type of surgery <sup>s,††</sup> — no. (%)		
Lobectomy	115 (77.2)	82 (60.7)
Sleeve lobectomy	2 (1.3)	10 (7.4)
Bilobectomy	3 (2.0)	4 (3.0)
Pneumonectomy	25 (16.8)	34 (25.2)
Other	24 (16.1)	21 (15.6)
Completeness of resection <sup>s</sup> — no. (%)		
R0 (no residual tumor)	124 (83.2)	105 (77.8)
R1 (microscopic residual tumor)	16 (10.7)	21 (15.6)
R2 (macroscopic residual tumor)	5 (3.4)	4 (3.0)
Rx (unknown)	4 (2.7)	5 (3.7)
Sampled lymph nodes — median (IQR)	19 (12–25)	18.5 (10–26)
Median length of hospital stay — days (IQR)	10.0 (7.0–14.0)	10.0 (7.0–15.0)
Median length of hospital stay by surgery type — days (IQR)		
Lobectomy	10.0 (7.0–15.0)	9.0 (6.0–14.0)
Pneumonectomy	10.0 (8.0–13.0)	11.0 (9.0–16.0)
Other <sup>††</sup>	8.5 (4.0–13.0)	9.0 (7.0–14.0)





# Surgical Outcomes: Checkmate 816

	Nivolumab + chemo	Chemo alone
Delayed Surgery due to treatment AE	3.4%	5.1%
Cancelled Surgery due to treatment AE	1.1%	0.6%
All Surgical Adverse Events	41.6%	46.7%
Grade Surgical 3-4 AEs	11.4%	14.8%
Grade Surgical 5 AEs	1.3%	0



# Minimally Invasive Lobectomy after Immunotherapy

## Safety and feasibility of minimally invasive lobectomy after neoadjuvant immunotherapy for non-small cell lung cancer

Camille Mathey-Andrews, MD,<sup>a</sup> Meghan McCarthy, BS,<sup>a</sup> Alexandra L. Potter, BS,<sup>a</sup> Jorind Beqari, MD,<sup>a</sup> Sean C. Wightman, MD,<sup>b</sup> Douglas Liou, MD,<sup>c</sup> Vignesh Raman, MD, MPH,<sup>d</sup> and Chi-Fu Jeffrey Yang, MD<sup>a</sup>

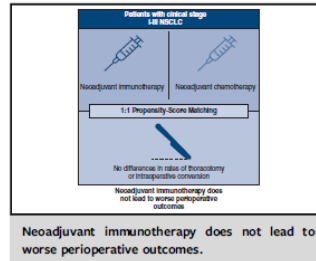
### ABSTRACT

**Objective:** The objective of this study was to evaluate the feasibility of minimally invasive surgery (MIS) and perioperative outcomes following neoadjuvant immunotherapy for resectable non-small cell lung cancer (NSCLC).

**Methods:** Patients with stage I to III NSCLC treated with immunotherapy with or without chemotherapy or chemotherapy alone prior to lobectomy were identified in the National Cancer Database (2010-2018). The percentage of operations performed minimally invasively, conversion rates, and perioperative outcomes were evaluated using propensity-score matching. Propensity-score matching was also used to compare perioperative outcomes between patients who underwent an open lobectomy and those who underwent an MIS lobectomy after neoadjuvant immunotherapy.

**Results:** Of the 4229 patients identified, 218 (5%) received neoadjuvant immunotherapy and 4011 (95%) received neoadjuvant chemotherapy alone. There was no difference in the rate of MIS lobectomy among patients who received immunotherapy compared with those who received chemotherapy alone in propensity score-matched analysis (60.8% vs 51.6%;  $P = .11$ ). There also were no significant differences in the rate of conversion from MIS to open lobectomy (14% vs 15%,  $P = .83$ ; odds ratio, 1.1; 95% confidence interval, 0.51-2.24) or in nodal downstaging, margin positivity, 30-day readmission, and 30- and 90-day mortality between the 2 groups. In a subgroup analysis of only patients treated with neoadjuvant immunotherapy, there were no differences in pathologic or perioperative outcomes between patients who underwent open lobectomy and those who underwent MIS lobectomy.

**Conclusions:** In this national analysis, neoadjuvant immunotherapy for resectable NSCLC was not associated with an increased likelihood of the need for thoracotomy, conversion from MIS to open lobectomy, or inferior perioperative outcomes. (J Thorac Cardiovasc Surg 2023; ■:1-9)



### CENTRAL MESSAGE

Induction immunotherapy for stage I-III non-small cell lung cancer is not associated with increased rate of thoracotomy, increased rate of conversion, or worse perioperative outcomes.

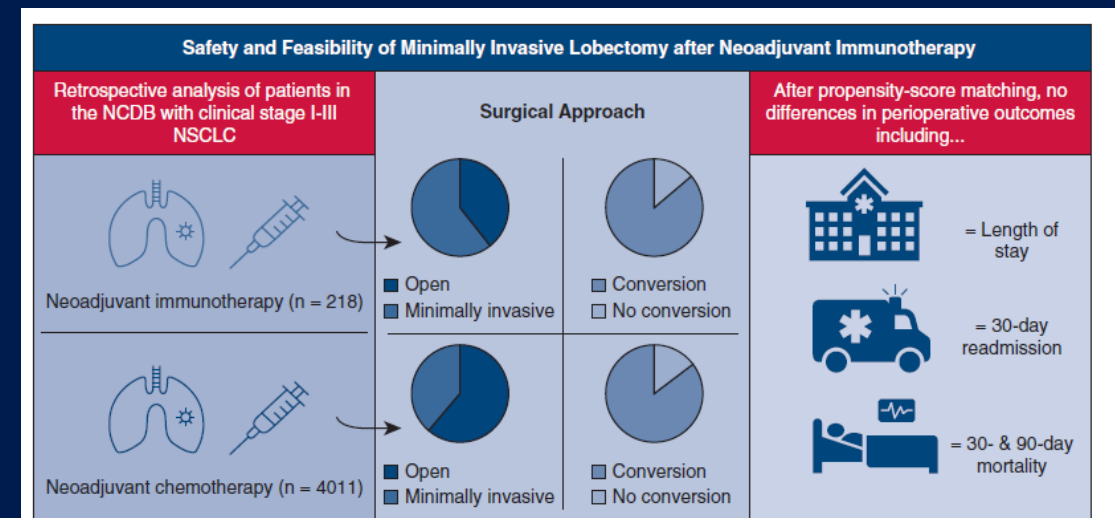
### PERSPECTIVE

Although there is growing enthusiasm for induction immunotherapy in the treatment of resectable non-small cell lung cancer, some fear that this may increase the difficulty and morbidity of subsequent surgical resection. Here we report that induction immunotherapy is not associated with increased rates of thoracotomy, conversion, or worse perioperative outcomes relative to induction chemotherapy.

See Commentary on page XXX.

THOR

- NCDB analysis
- No difference in:
  - Use of MIS (60% vs 51%)
  - Conversion to open (14% vs 15%)
- No difference in:
  - Length of stay
  - Readmission
  - 30 and 90 day mortality





# LCMC3 Surgical Complications

- 5 operative injuries 3.1% (5/159)
  - 4 vascular
  - 1 bronchial
- Prolonged air leak 2.5% (4/159) – 3 grade 3
- Atrial fibrillation 6.25 (10/159) – 7 grade 2, 2 grade 3, 1 grade 4
- Length of stay: median 7.5 days
- 2 mortalities: one at 30 days from cardiac arrest, one at 2.5 months from pneumonitis
- Pneumonectomy (n=10): 14 AE, 3 grade 4 AE, 1 grade 5 AE
- No pneumonectomy (n=145): 6.9% grade 4 AE, 2.8% grade 5 AE

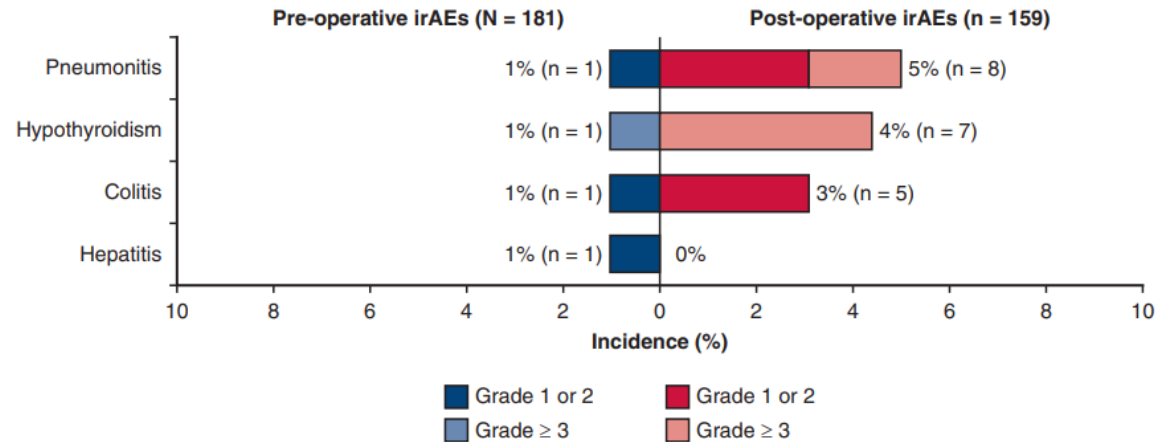


# LCMC3 Complications

**TABLE E2. Reasons for surgery being performed outside of protocol window**

Surgery window	N = 159
Within $\pm 10$ d protocol window, n (%)	140 (88)
Outside $\pm 10$ d window, n (%)	19 (12)
Treatment related, n	4
Other medical reasons, n	6
Patient or surgeon logistical reason, n	9
Median time outside window, d (range)	8 (1-45)
Median time from end of cycle 2 (d 22) to surgery* (range)	22 (11-74)

\*n = 152.





In summary, multidisciplinary collaboration breaks down silos, accelerates innovation, and ensures that medical research is more comprehensive, accurate, and impactful.

Lung cancer care continues to innovate and evolve, becoming more multidisciplinary in the process.