

# Management of bronchopleural fistula in a patient receiving pneumonectomy for recurrent lung cancer

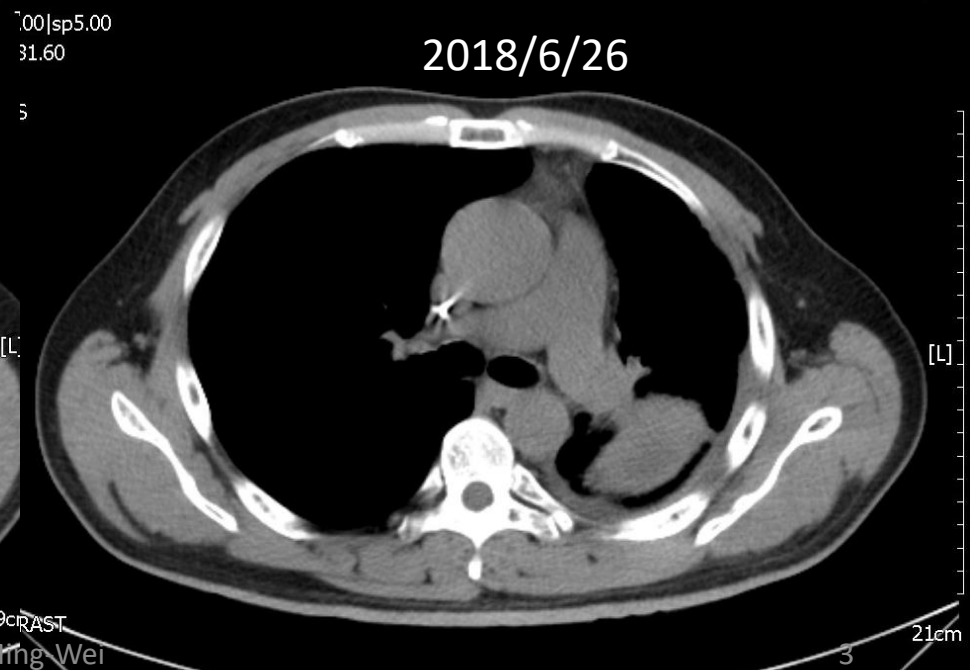
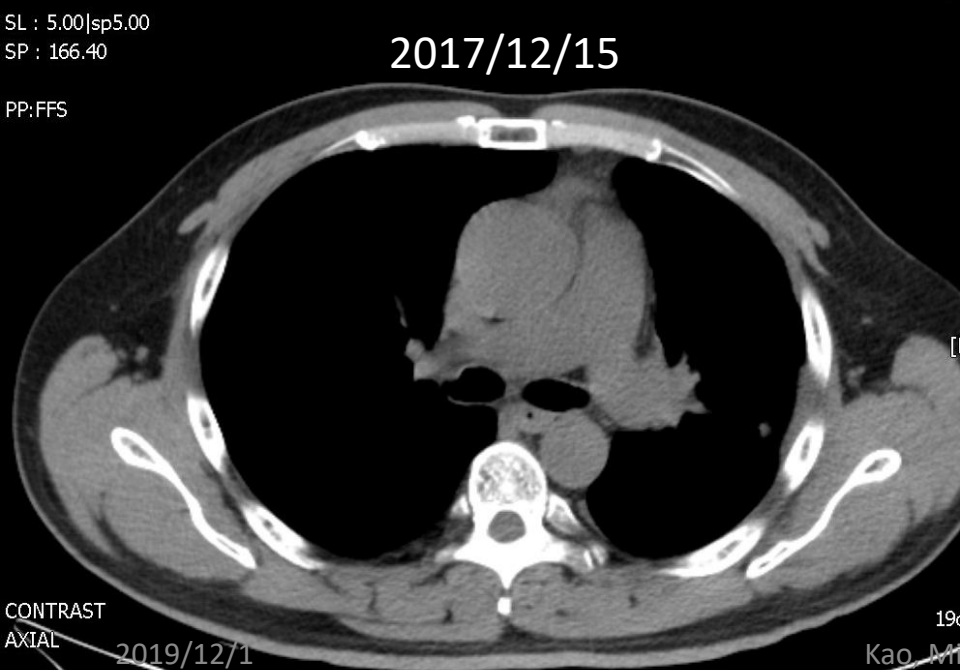
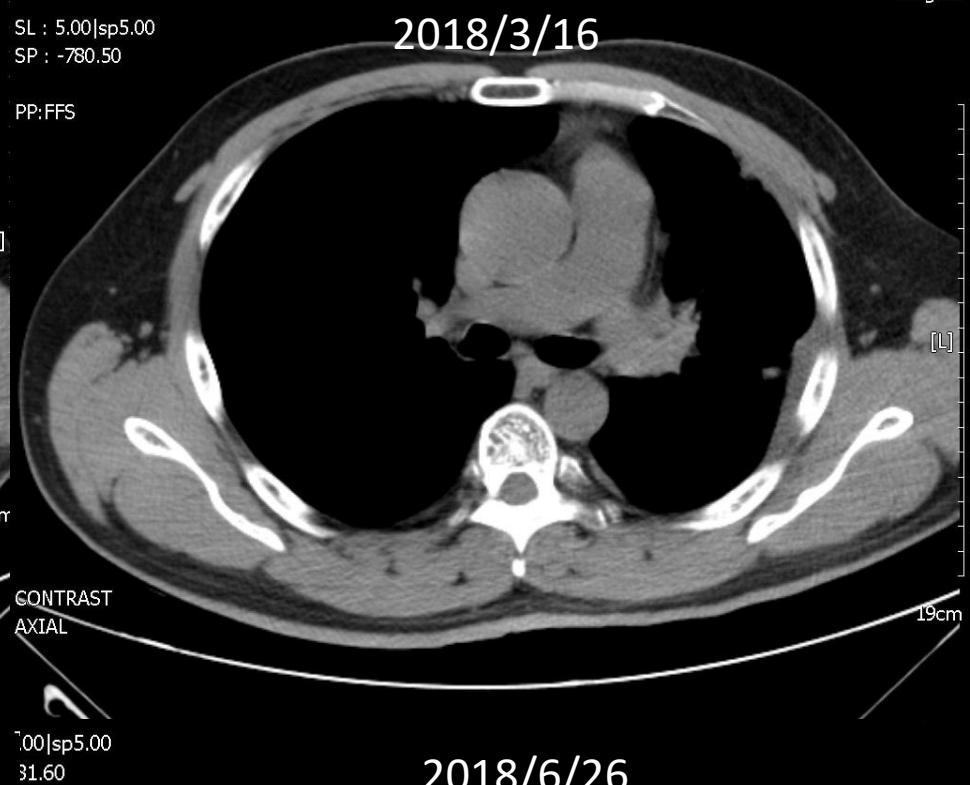
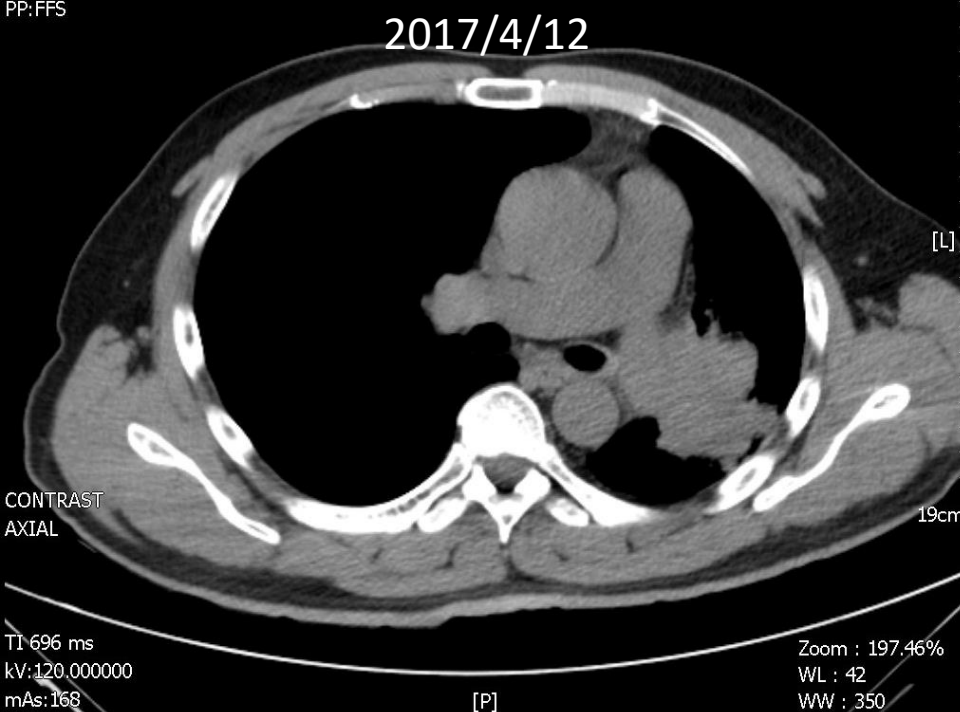
義大醫院胸腔外科 高明蔚醫師

Ming-Wei Kao MD, MS

Chest Surgery, E-Da Hospital

# Clinical Course -1

- 46-year-old man
- Smoking 1 PPD > 20 years, alcohol > 20 years
- Hyperglycemia, fatty liver
- Initial presentation: hemoptysis for 1 month
- Call at PTCH in 2017/3 → LUL SqCC, cT3N3M0, AJCC 7<sup>th</sup> stage IIIB → s/p CCRT (CDDP 100mg/m<sup>2</sup> + Gemzar 1000/m<sup>2</sup> \* 6 cycles, 6-3 on 2017/12/6) → nearly CR
- Thoracotomy in 2018/1 → discontinued due to severe adhesion
- Blood tinged sputum in 2018/5 → recurrent tumor noted

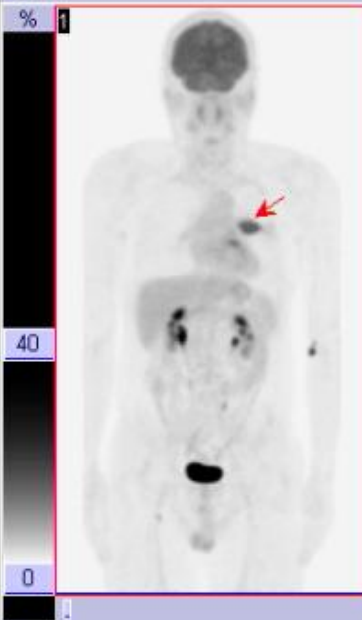


# Clinical Course -2

- Referred to EDAH in 2018/7 → Re-staging: recurrence at left hilum, with invasion of left pulmonary trunk and 2<sup>nd</sup> carina; no evidence of distant metastasis
- Palliative chemotherapy or salvage surgical excision

12.13.03

Row B



SUV : 7.99----&gt;11.42

SUV2

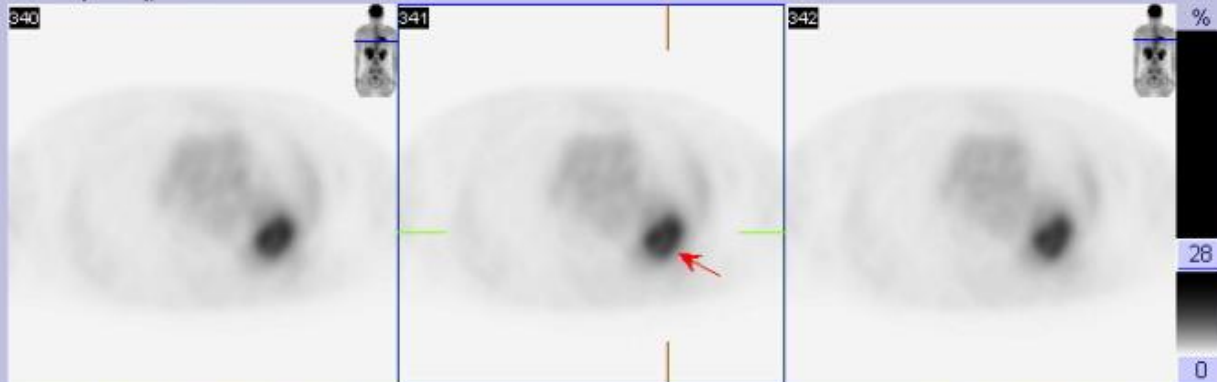
2019/12/1

CT WB 4.0 B31s [Fused], 7/18/2018

Transverse

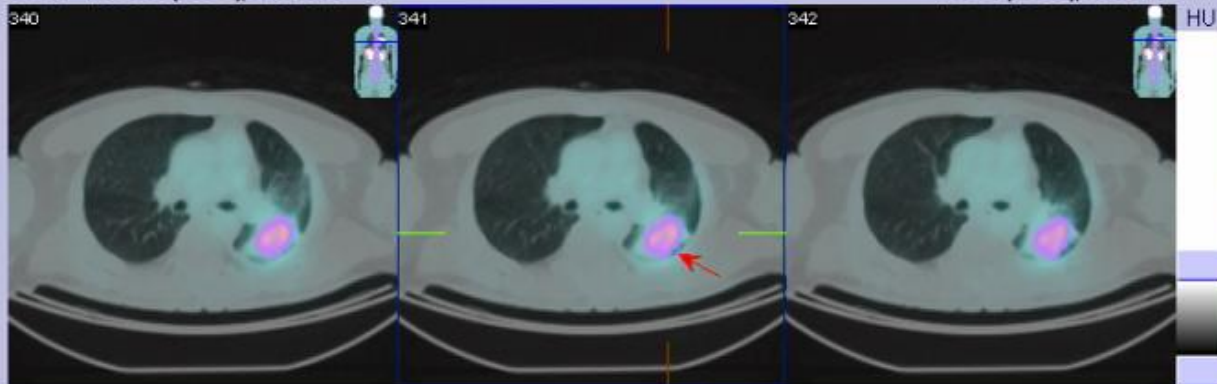


PET-F8 [Fused], 7/18/2018



CT WB 4.0 B31s [Fused], 7/18/2018

PET-F8 [Fused], 7/18/2018



Kao, Ming-Wei

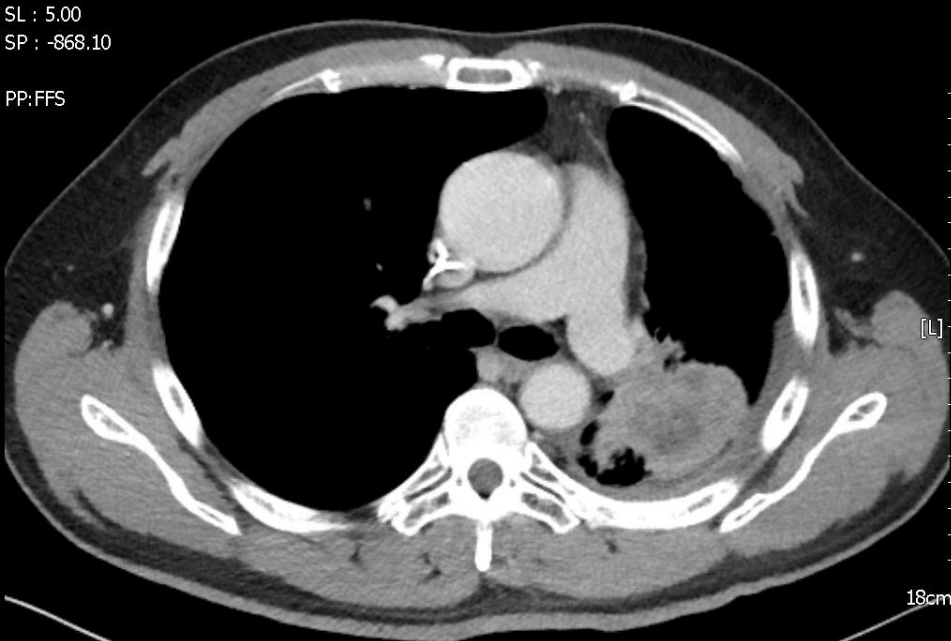
A: HU(B:-1200,T:0.000061) B: (B:0%,T:28%) C1: HU(B:-1200,T:0.000061) C2: (B:0%,T:23%)



540PT

 Bottom  
to  
Top  
5

SL : 5.00  
SP : -868.10  
PP:FFS  
L : 5.00  
P : -858.10



SL : 5.00  
SP : -863.10  
PP:FFS  
L : 5.00  
P : -853.10



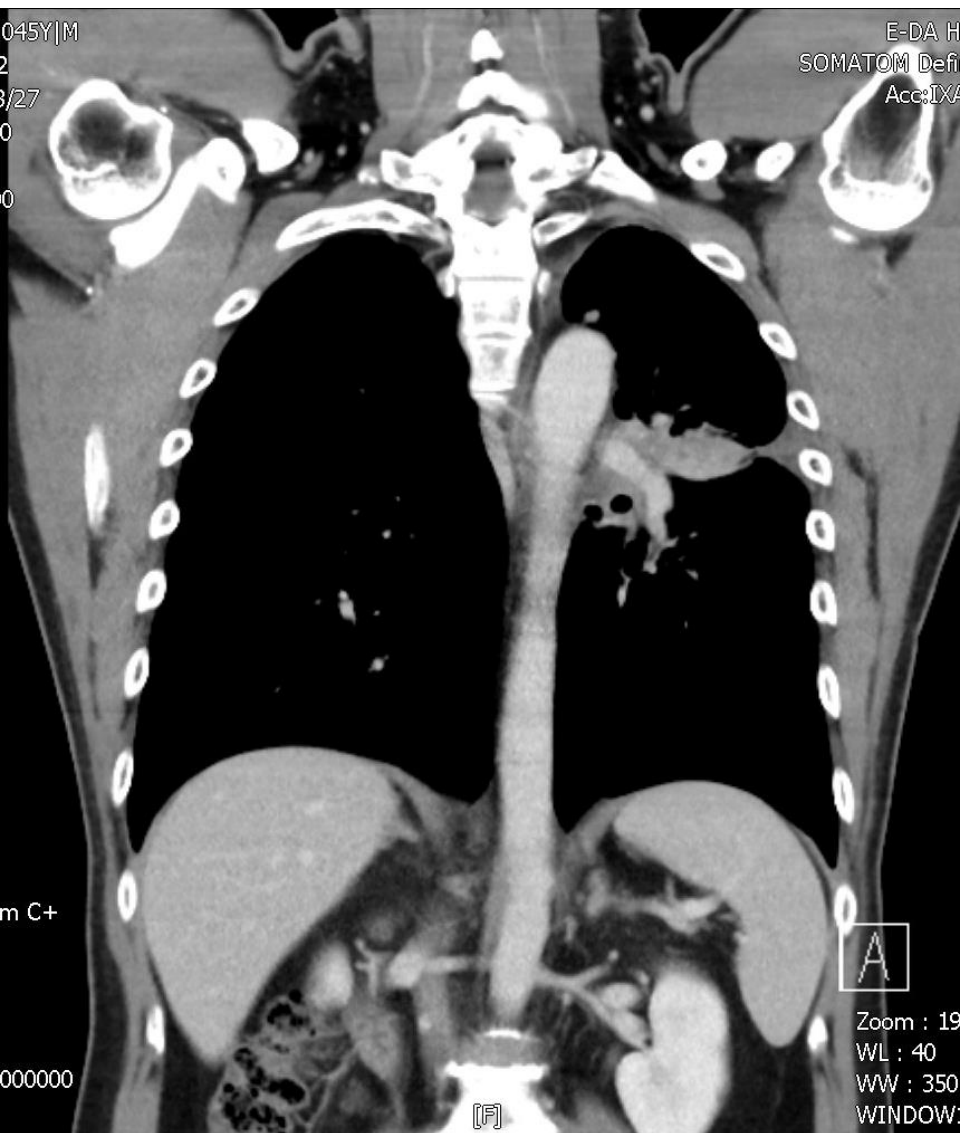
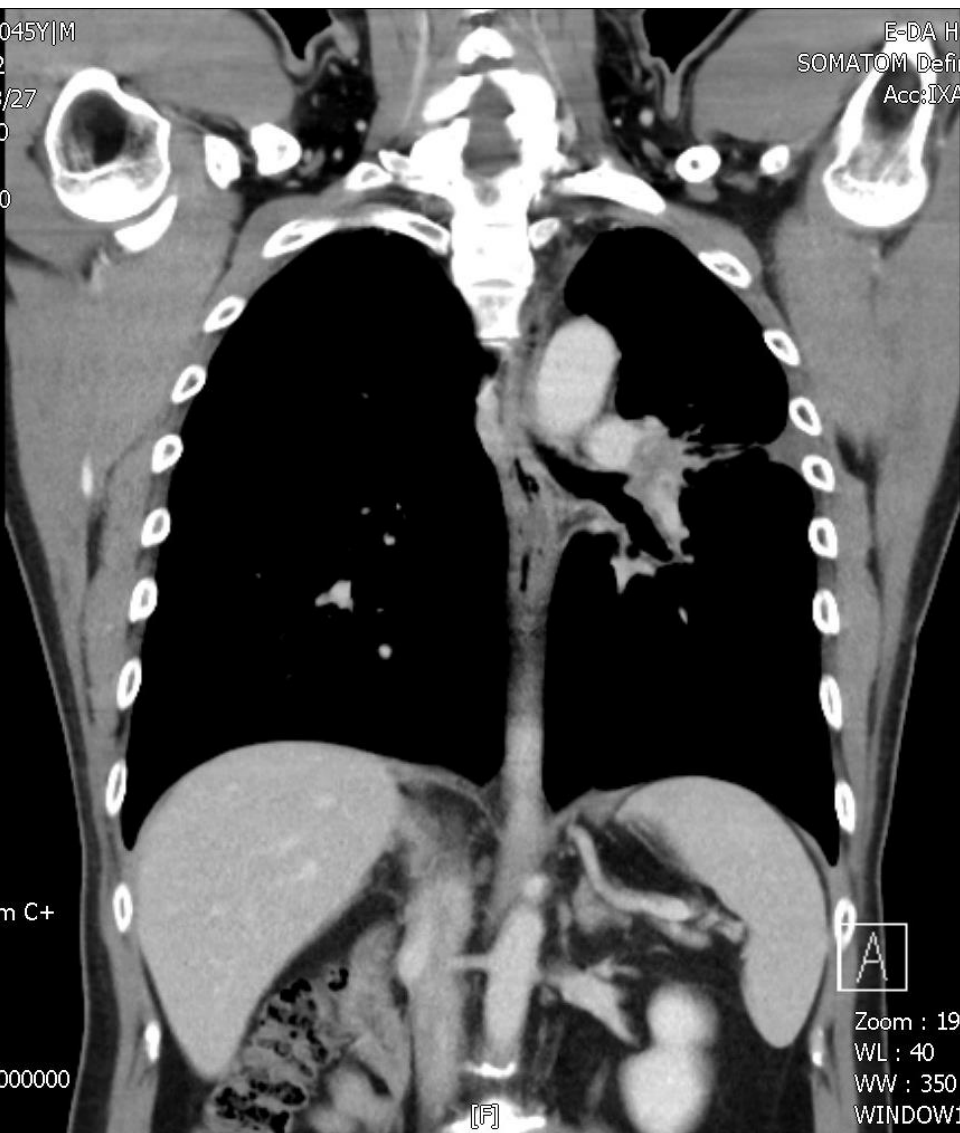
2019/12/1

Kao, Ming-Wei

6

Zoom : 197.46%

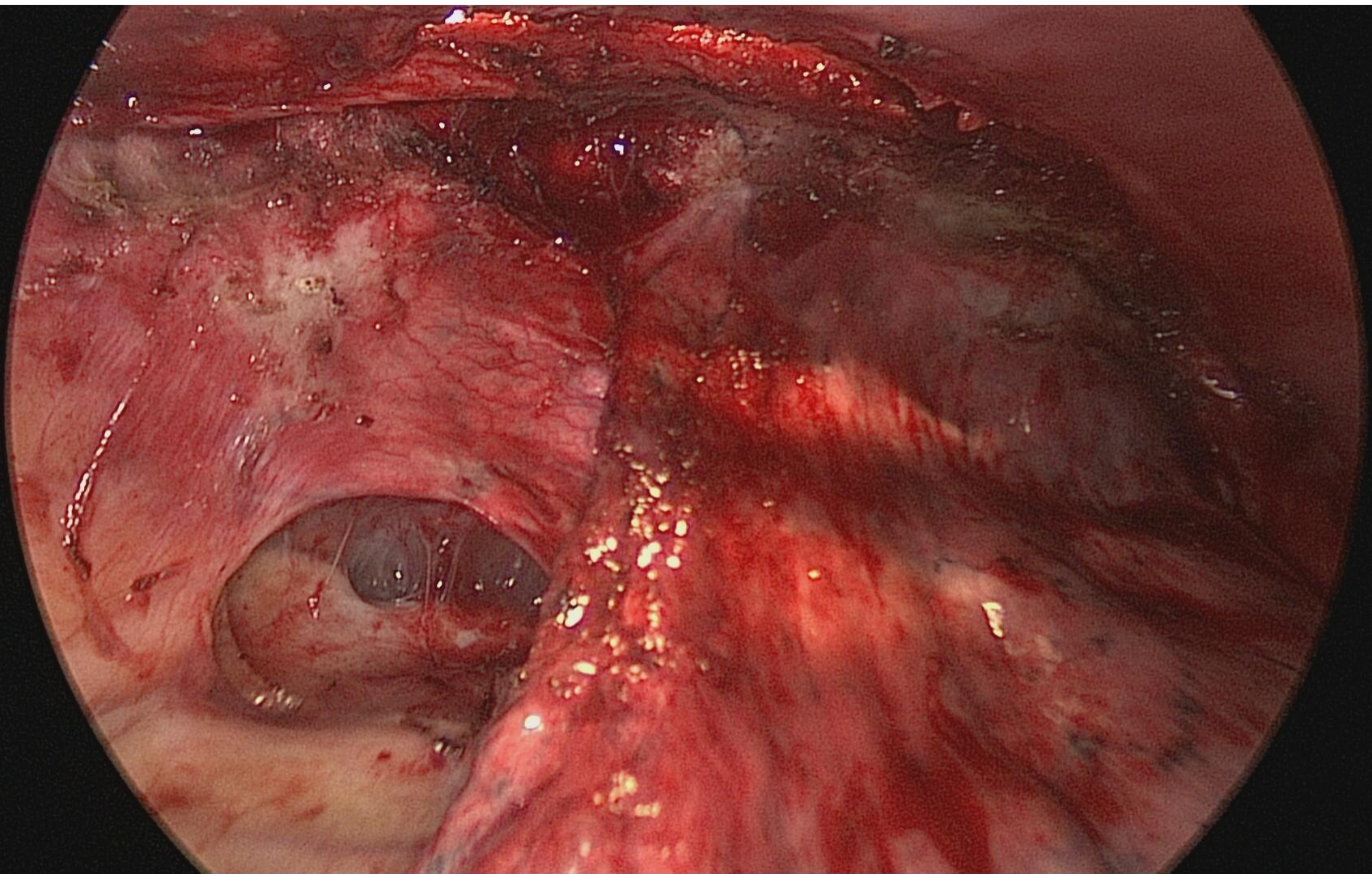
Zoom : 197.46%



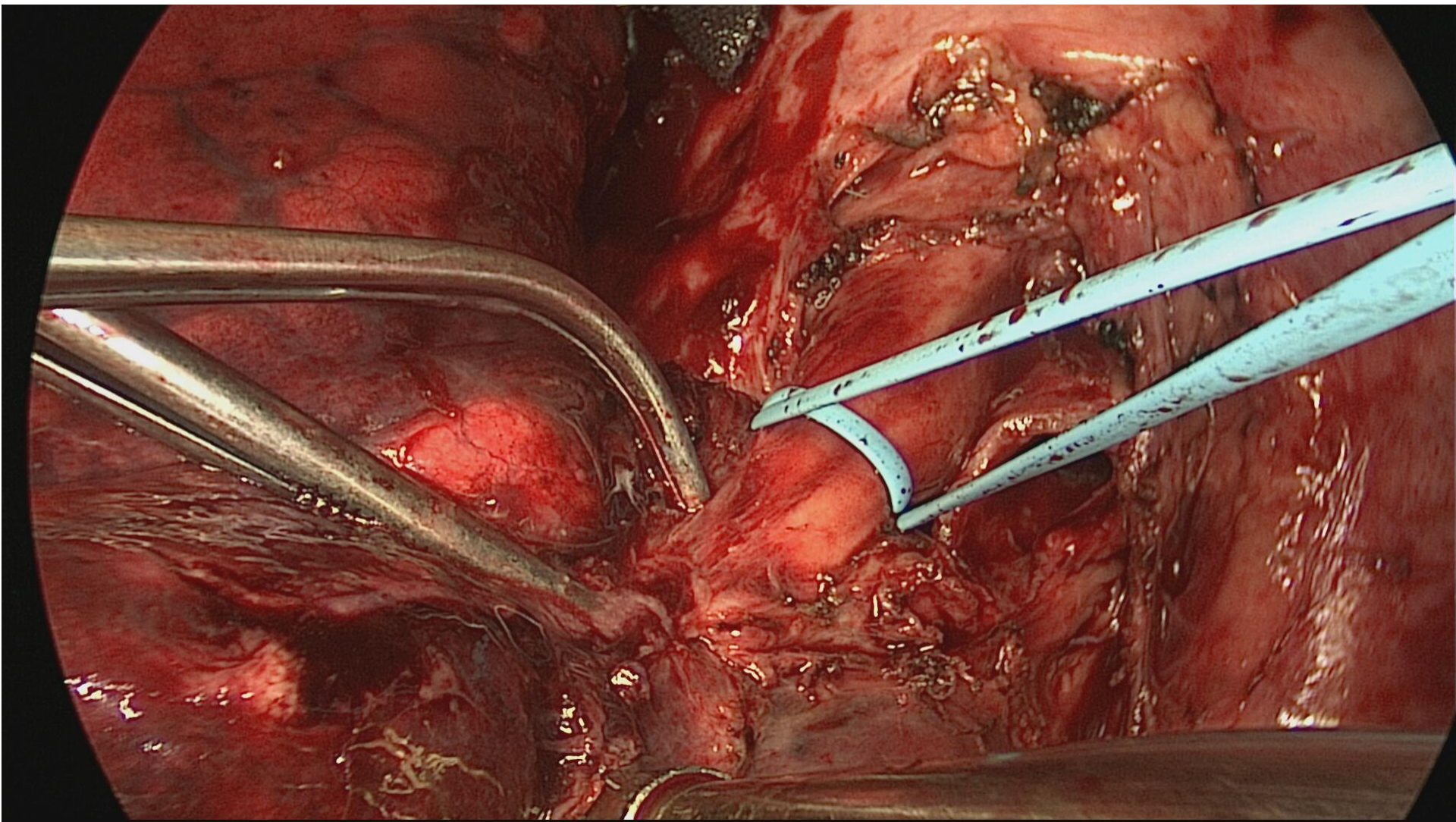
# Clinical Course -3

- 2019/8/28 left thoracotomy pneumonectomy
- Left hilar tumor involving fissure, left upper and lower bronchus (2nd carina) and pulmonary artery bifurcation.
- Bronchial stump by 3-0 prolene interrupted sutures, reinforced by intercostal muscle flap

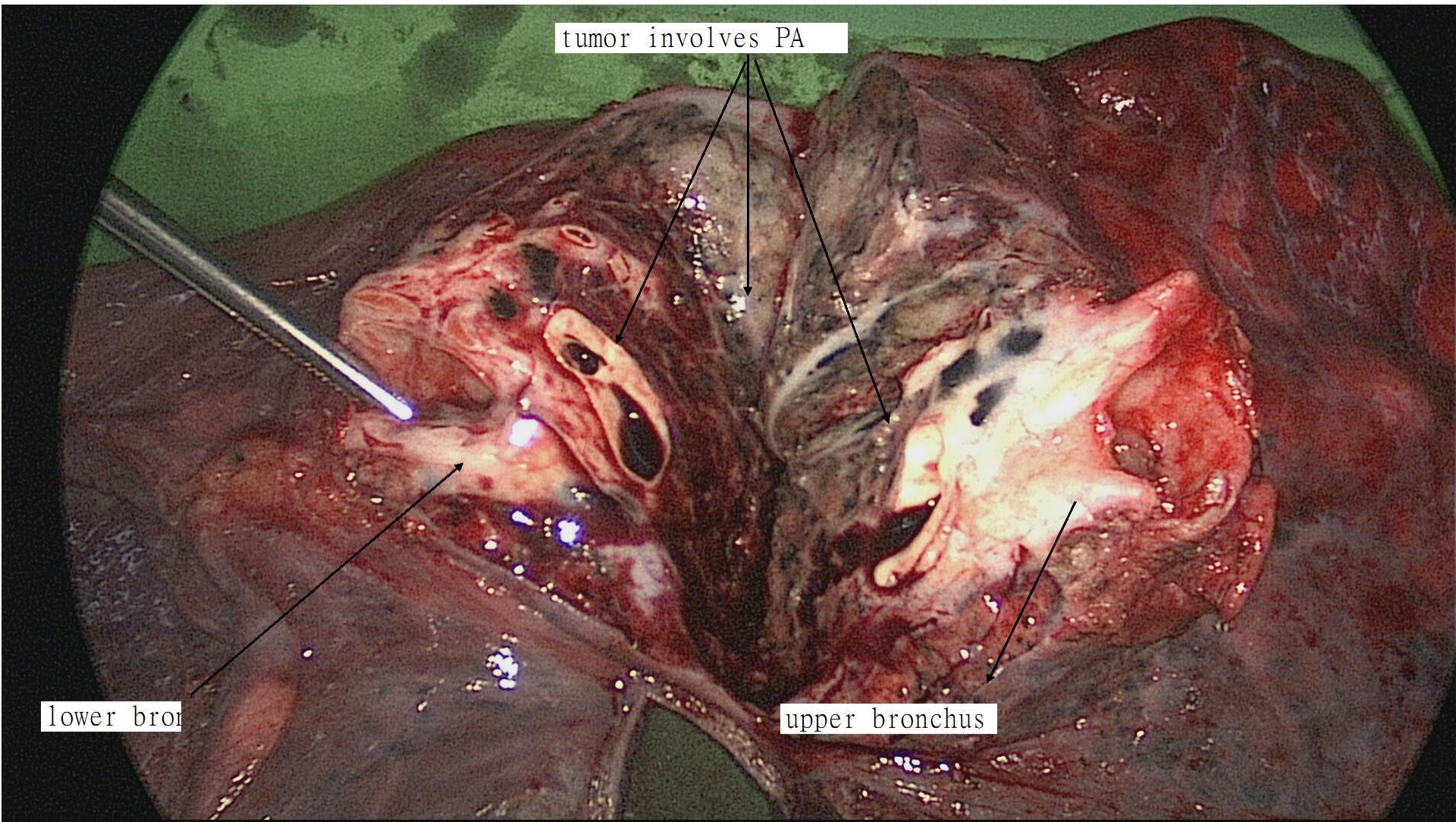






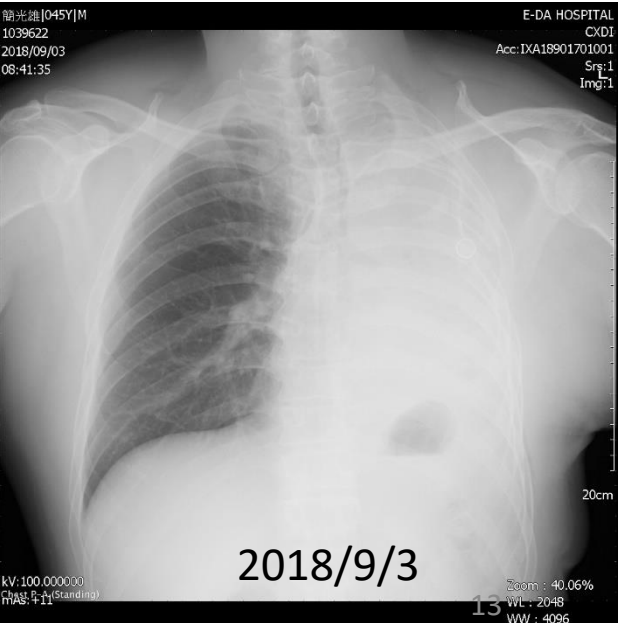
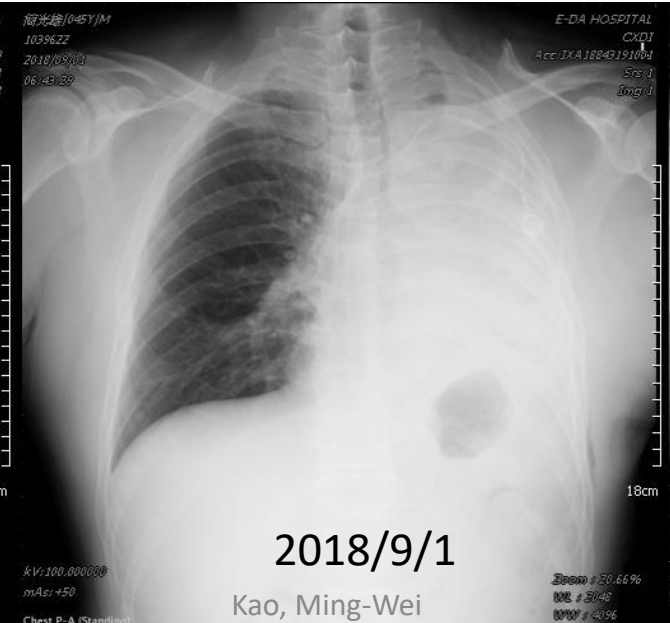
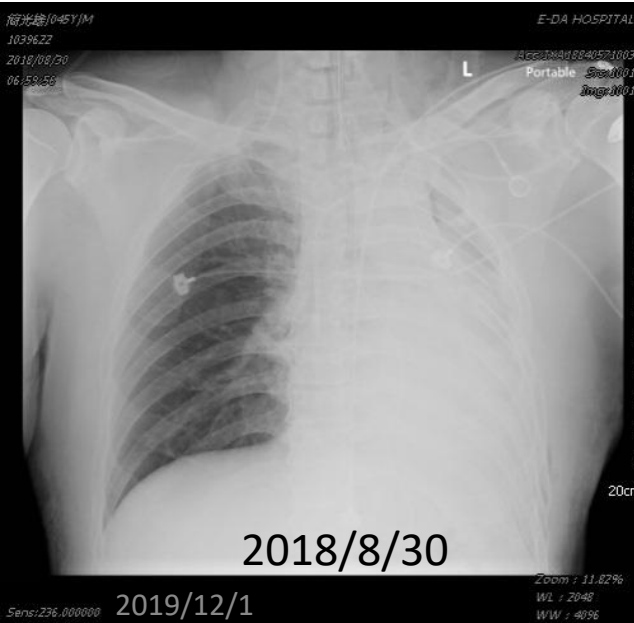
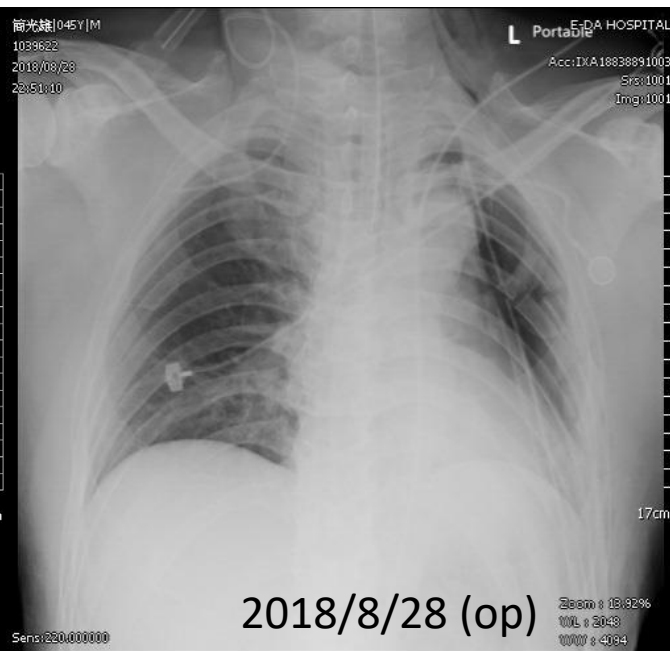






# Clinical Course -4

- Operation: 2018/8/28
- SICU: 3 days (8/28-8/31)
- Hospital stay: 6 days (discharged on 2018/9/3)
- Pathology: ypT4N0Mx
  - Tumor size: 4.8 × 4.0 × 3.0 cm
  - Extend to the visceral pleural surface (PL2)
  - Direct Invasion of 2nd Carina
  - Resection margin: Free of malignancy, 2.5 cm away from the resection margin





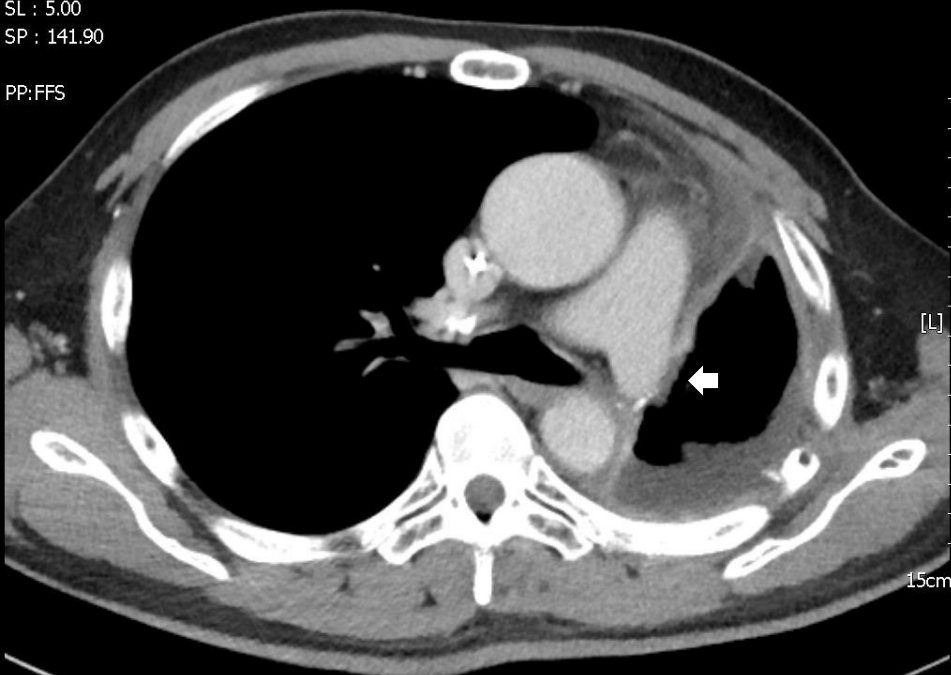
# Clinical Course -5

- ypT4N0Mx → post-operative chemotherapy
  - Taxotere on 2018/9/27 (4 weeks after operation);  
Gemzar on 2018/10/14, 10/11, 10/18
  - fever and purulent sputum on 2018/11/1



SL : 5.00  
SP : 141.90

PP:FFS



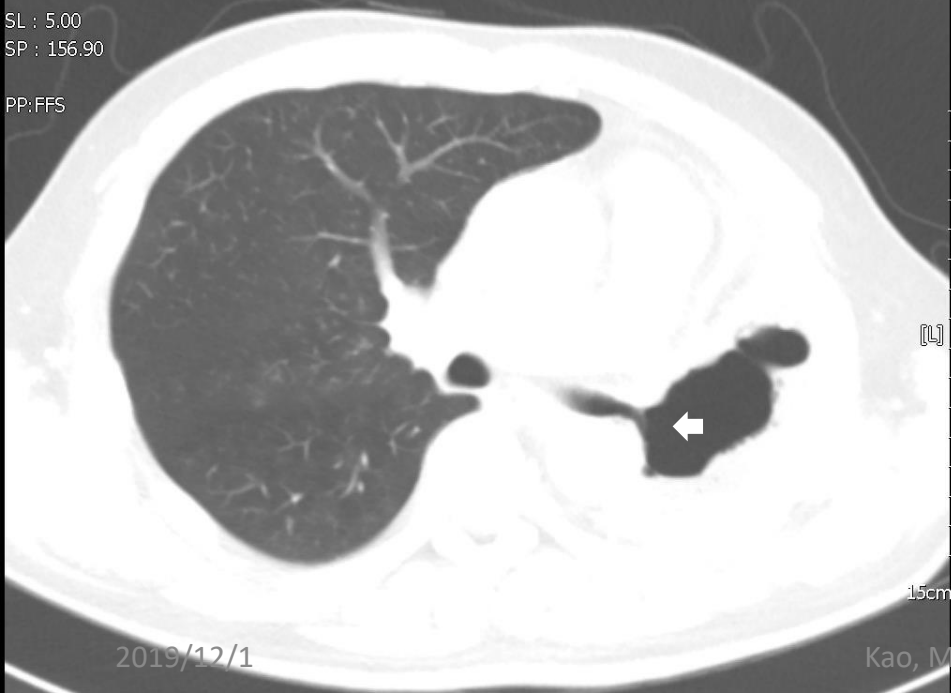
SL : 5.00  
SP : 176.90

PP:FFS



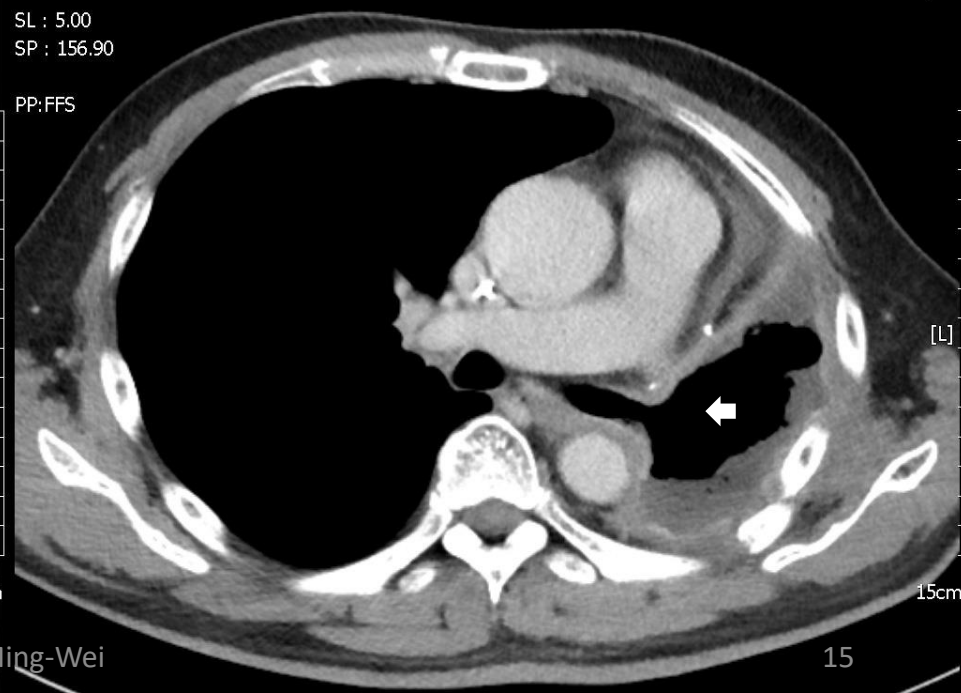
SL : 5.00  
SP : 156.90

PP:FFS



SL : 5.00  
SP : 156.90

PP:FFS



2019/12/1

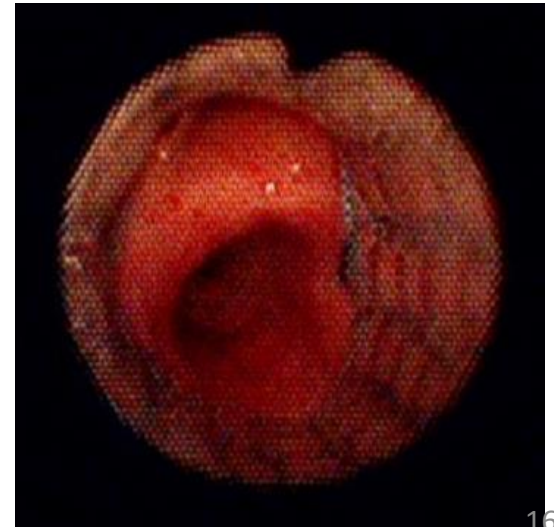
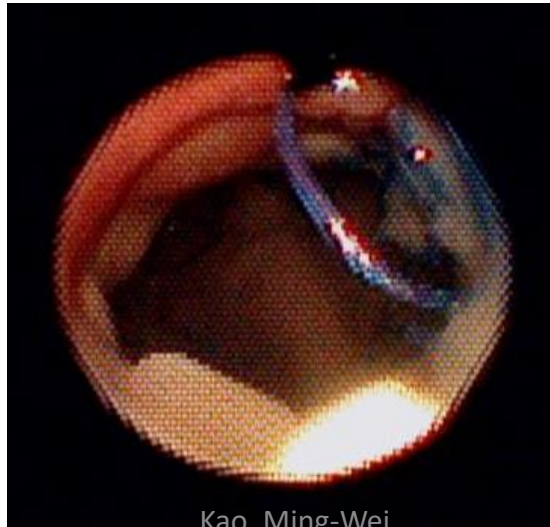
Kao, Ming-Wei

15

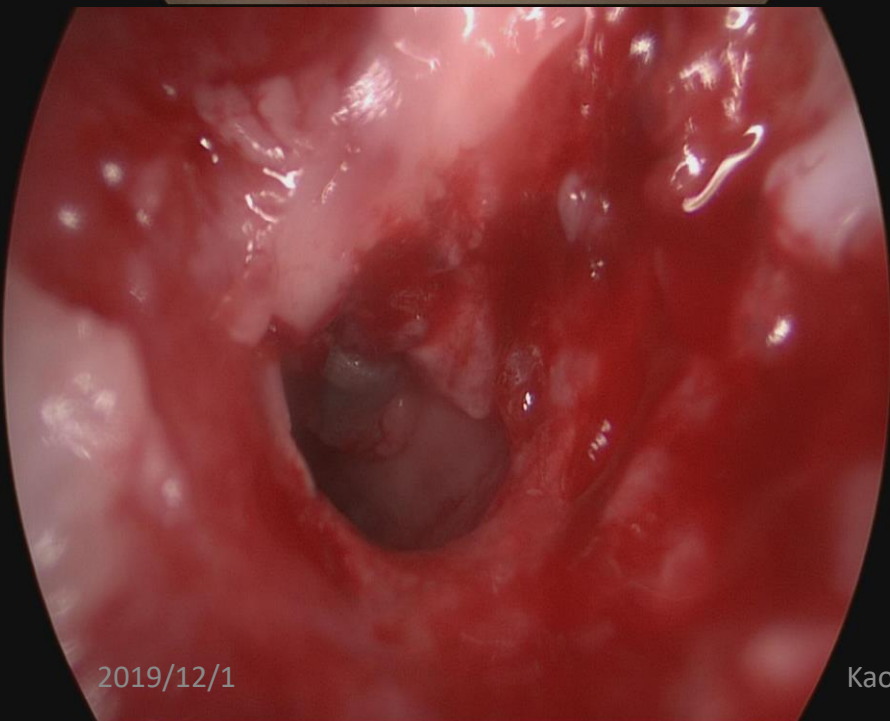
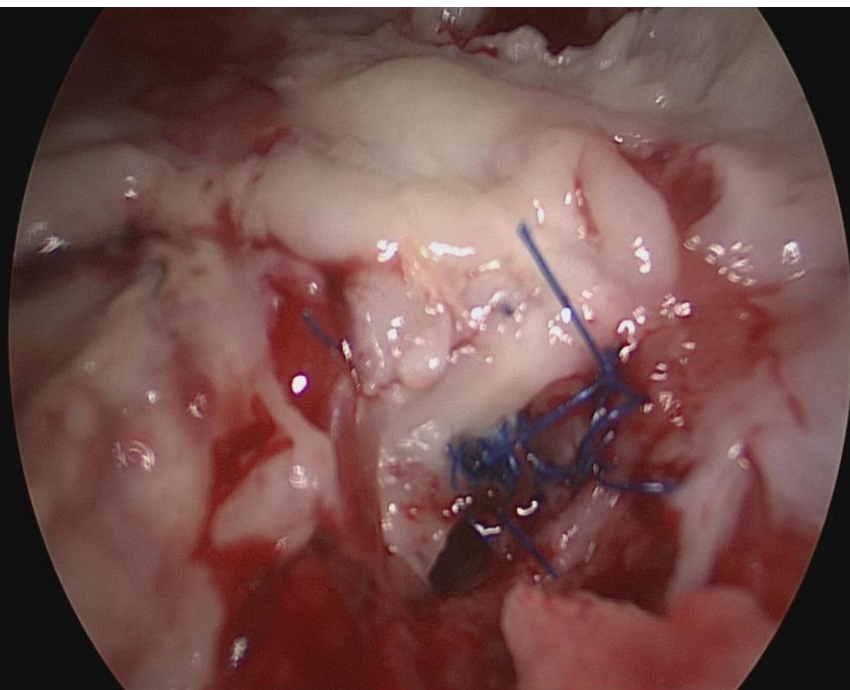
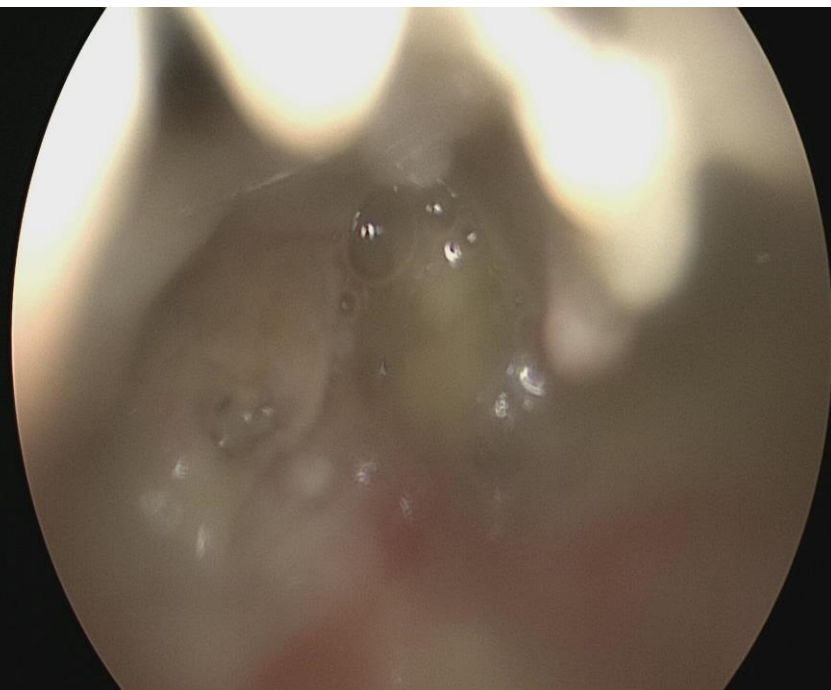
Zoom : 197.46%

# Clinical Course -6

- Left BPF and empyema:
  - ABX treatment
  - Surgical debridement on 2018/11/8: bronchial stent placement first, followed by debridement and open window thoracotomy (OWT)







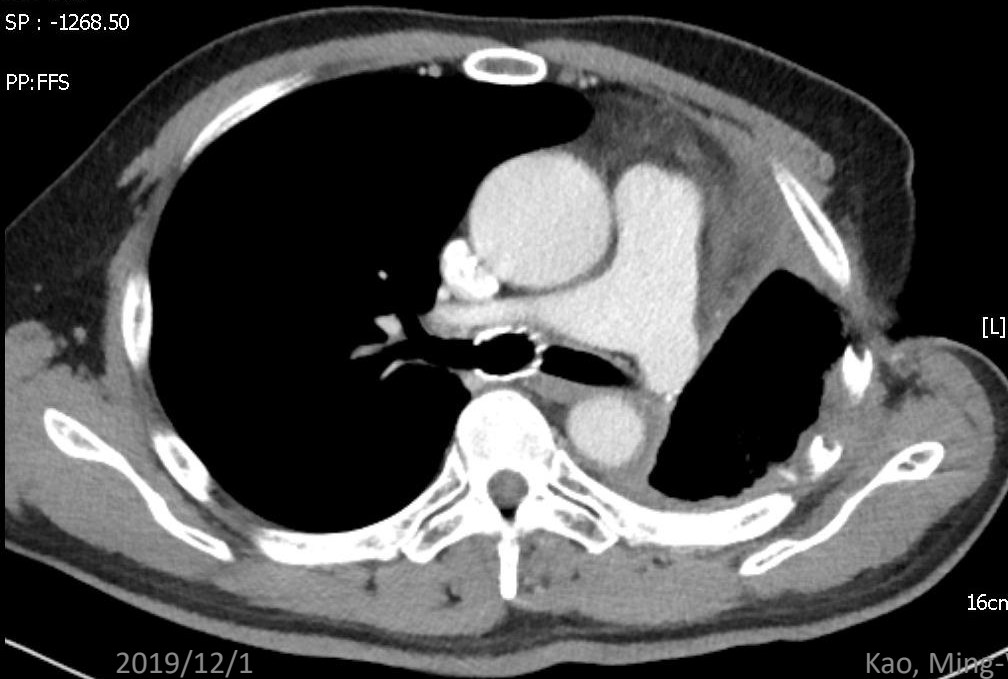
SP : -1278.50

PP:FFS



SL : 5.00  
SP : -1268.50

PP:FFS



2019/12/1

Kao, Ming-Wei

18

# Clinical Course -7

- 2018/11/8 ~ 12/10: OWT dressing, cultures: K. pneumoniae + MDR A. baumannii
- 2018/12/11: pectoralis major flap reconstruction
  - left 2nd and 3rd rib was cut
  - PM rotated to defect, goes through under the pectoralis minor
- 2018/12/15: discharge

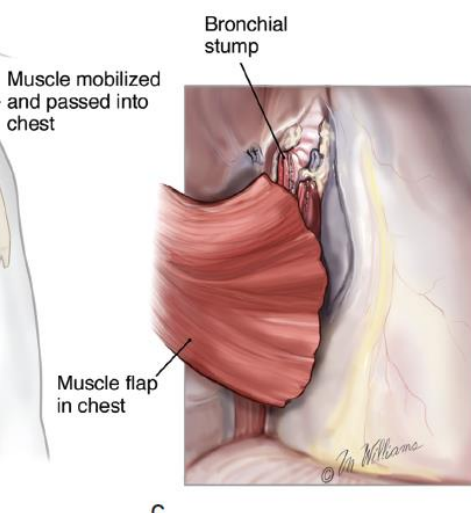




Courtesy of Dr. 施翔順 (義大整外)

2018/12/11





Courtesy of Dr. 施翔順 (義大整外)

2018/12/11





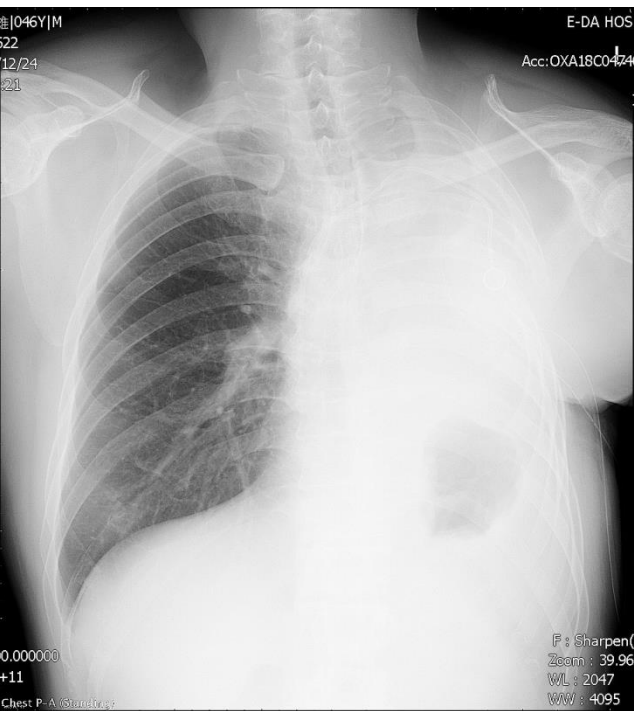
Courtesy of Dr. 施翔順 (義大整外)

2018/12/11

2019/12/1

Kao, Ming-Wei

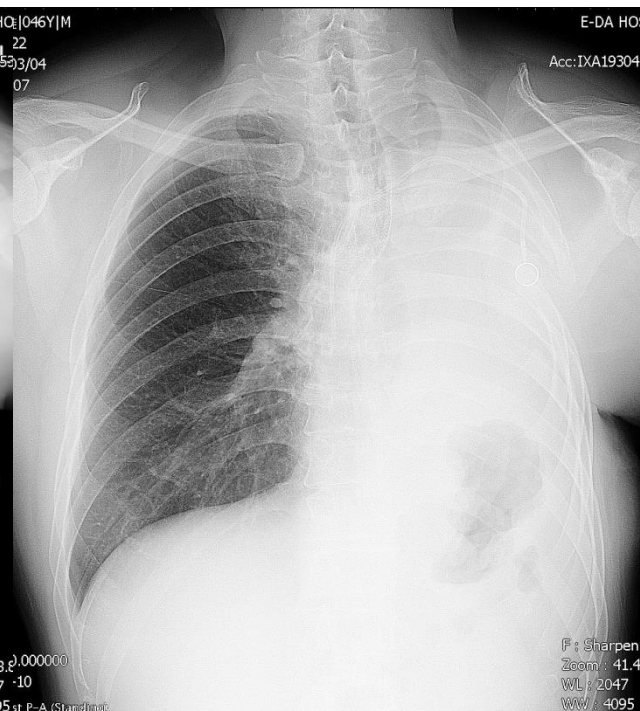
22



2018/12/24  
(post-op 2wk)



2019/1/17  
(post-op 1M)

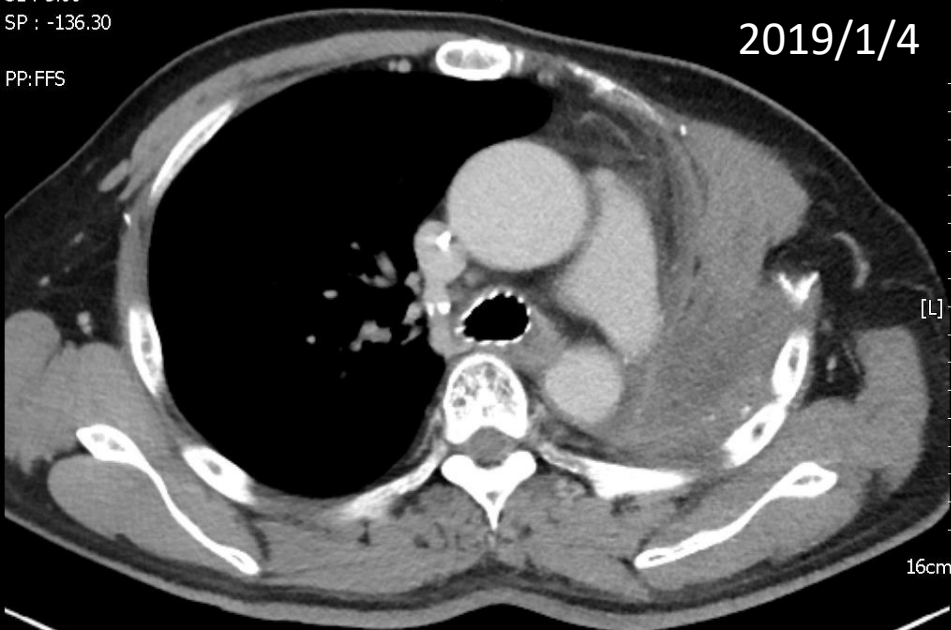


2019/3/4  
(post-op 3M)

SP : -136.30

PP:FFS

2019/1/4



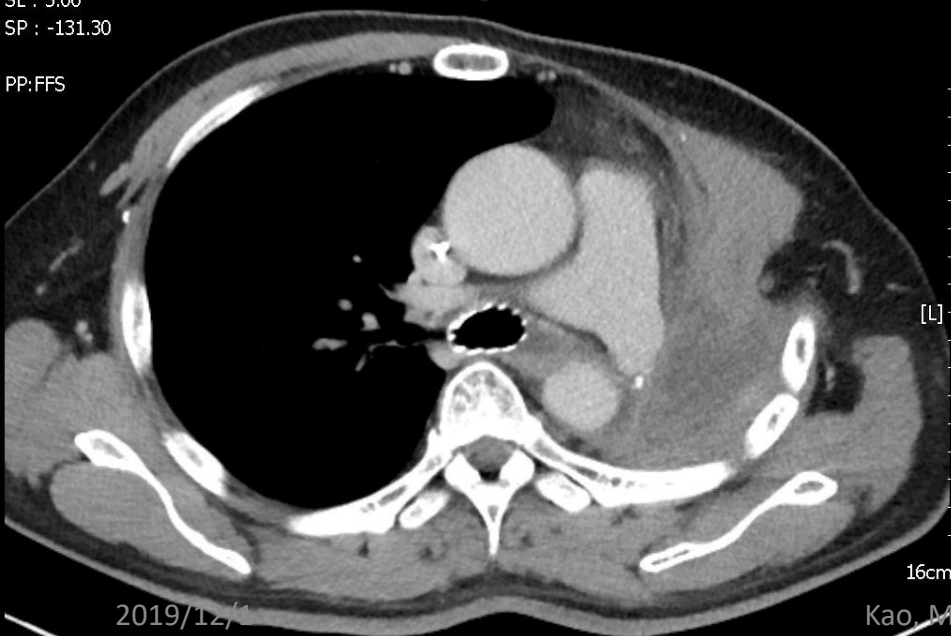
SP : -126.30

PP:FFS



TI 500 ms  
kV:120.000000  
SL : 5.00  
SP : -131.30

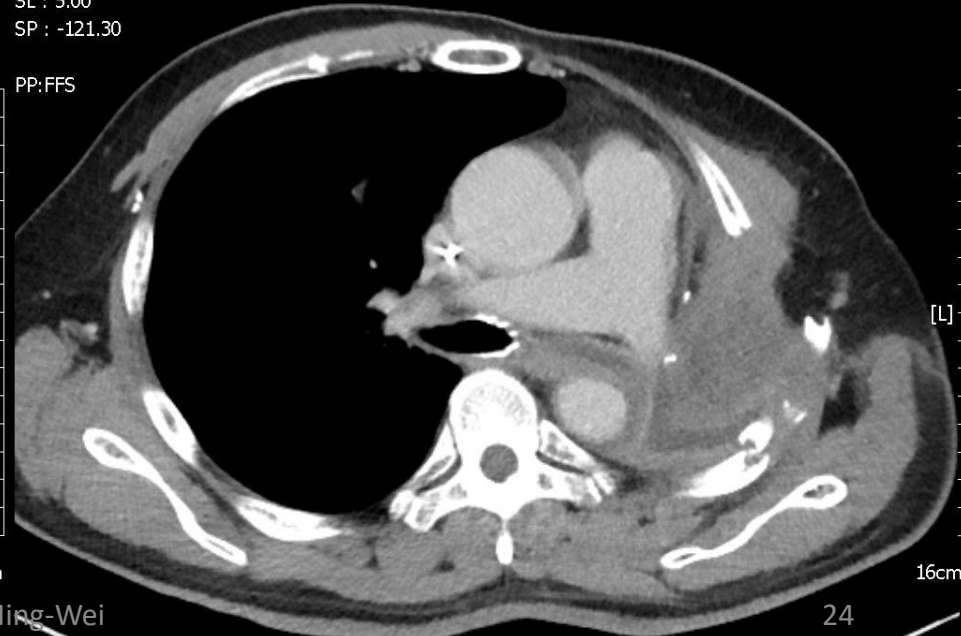
PP:FFS



Zoom : 197.46%  
WL : 42

TI 500 ms  
kV:120.000000  
SL : 5.00  
SP : -121.30

PP:FFS



Zoom : 197.46%  
WL : 42

2019/12/1

Kao, Ming-Wei

24



# Clinical Course -8

- 2019/3/5: stent removal
- 2019/5 Vinorelbine (60-80mg/m<sup>2</sup>) 100 mg po  
→ intolerance and patient refused further chemotherapy
- Latest CT follow on 2019/10/23: no recurrence
  - post-pneumonectomy: 14 M
  - post flap reconstruction: 10 M

46Y|M

06

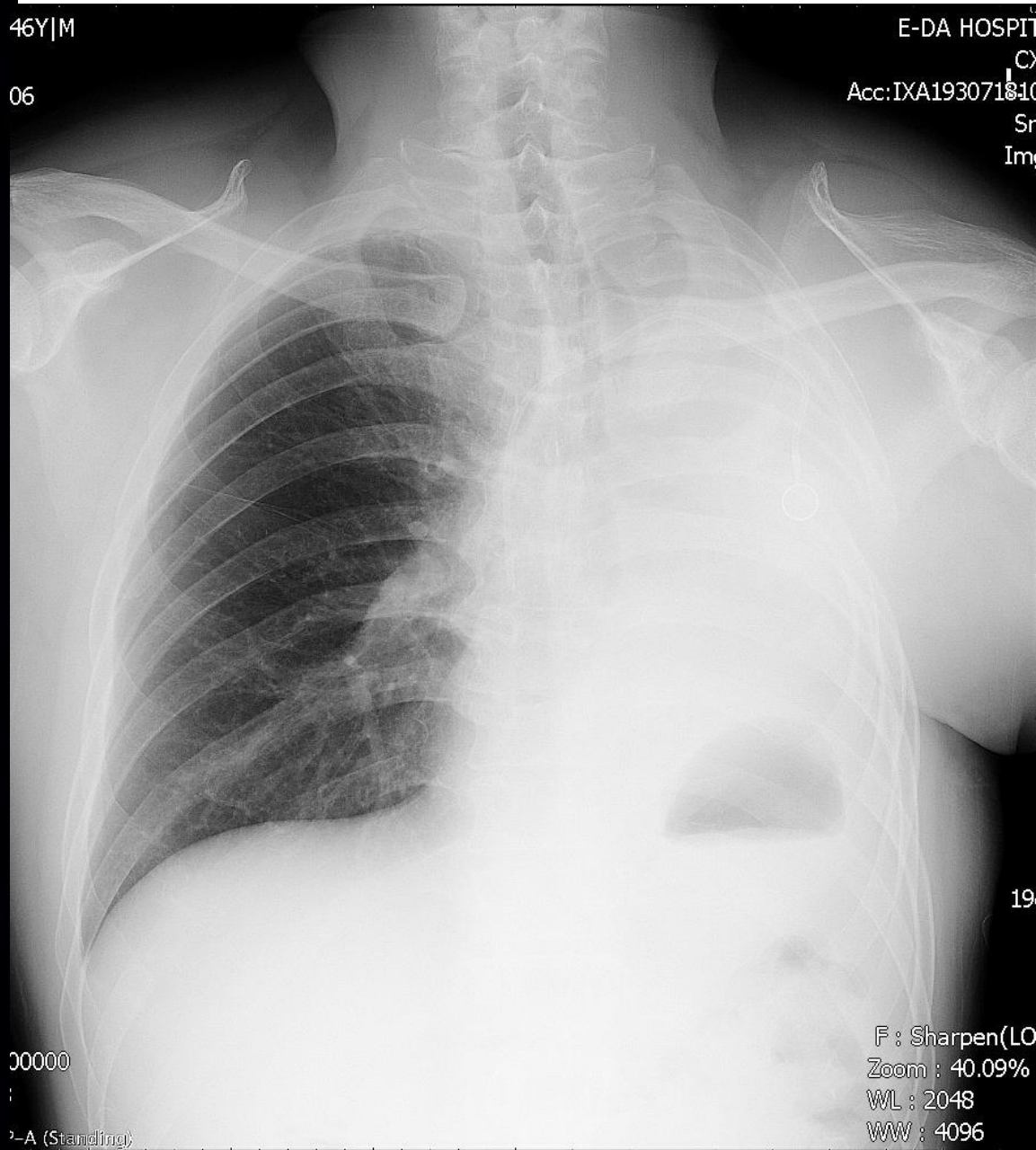
E-DA HOSPIT

CX

Acc:IXA193071810

Sr

Im

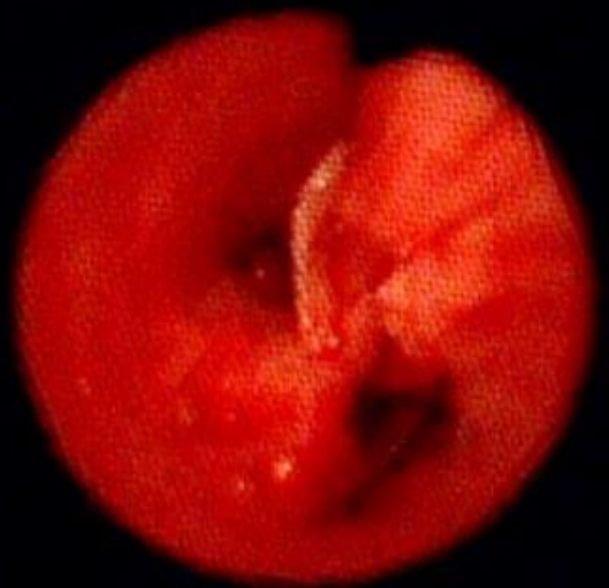
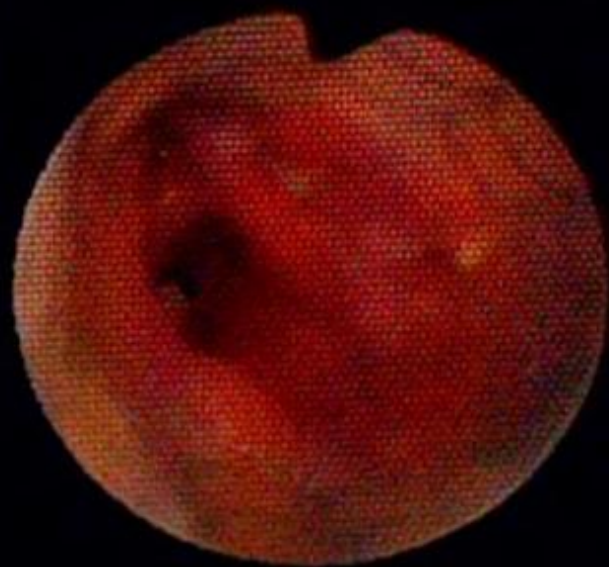


00000

19

Kao, Ming-Wei

26



2019/12/1

SL : 5.00|sp5.00  
SP : -201.75

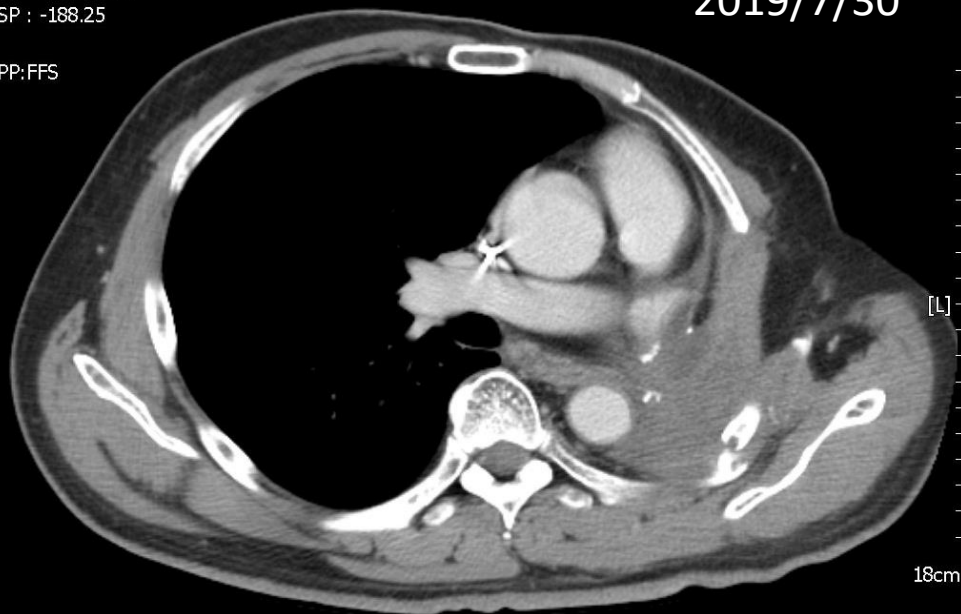
2019/4/24

SL : 5.00|sp5.00  
SP : -188.25

2019/7/30

PP:FFS

PP:FFS



SL : 5.00|sp5.00  
SP : -170.50

2019/10/23

PP:FFS



2019/12/1

Kao Ming-Wei

27





2019/11/7

Courtesy of Kao MW

Kao, Ming-Wei



2017/3 Left hilar lung cancer, SqCC

2017/12 Definitive chemoradiation completed

2018/1 Thoracotomy in PTCH → discontinued and observation

2018/5 hemoptysis

2018/6 recurrence noted by CT

2018/7 referred to EDAH

2018/8/28 Left pneumonectomy (8/28-8/31 SICU, 9/3 discharge)

ypT4N0Mx, Tumor size: 4.8cm, PL2 invasion, direct Invasion of 2<sup>nd</sup> carina

2018/9/27-10/18 post-operative chemotherapy Taxotere / Gemzar

2018/11/1 Fever, BPF noted

2018/11/8 stent placement and debridement

OWT wet dressing

2019/12/11 PM flap reconstruction

2019/3/5 stent removal

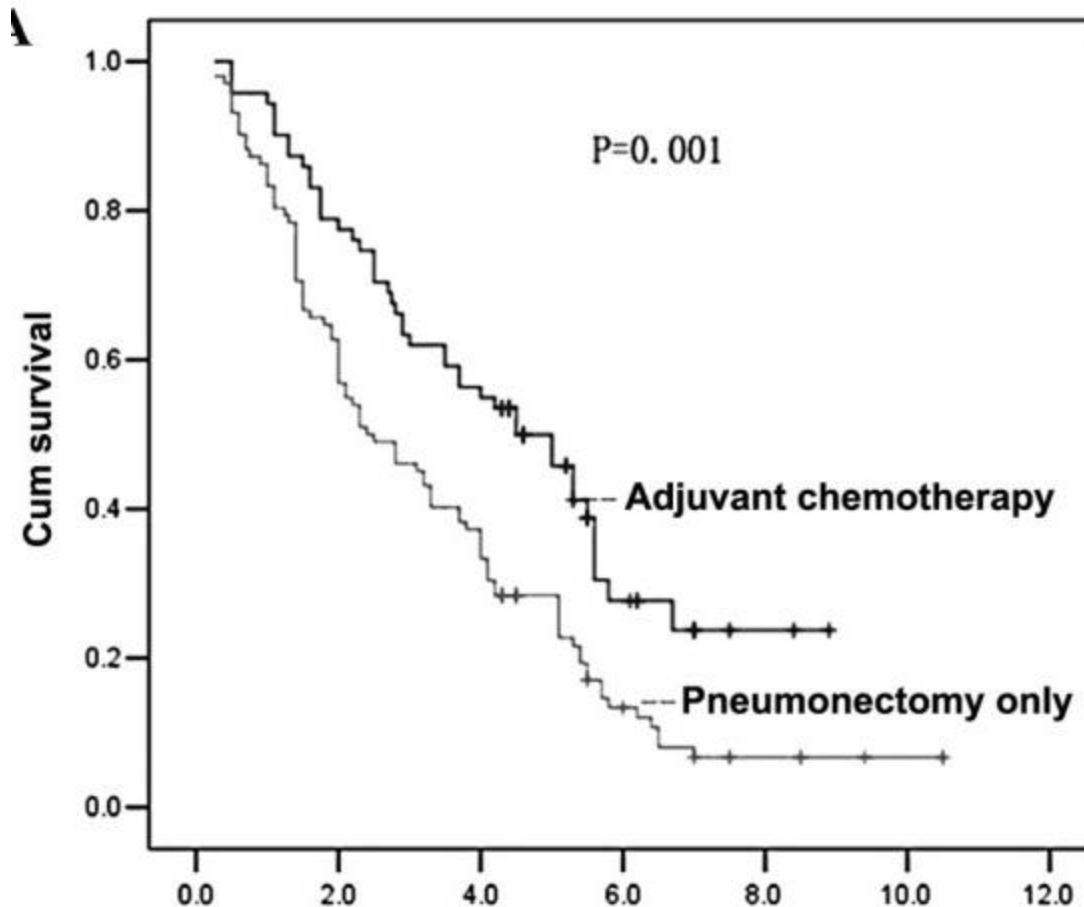
2019/10/23 CT: no recurrence

# **QUESTIONS AND LITERATURE REVIEW**

# Questions

- Q1. What is the optimal interval for post-operative chemotherapy after pneumonectomy ? (usually 4-6 weeks after lobectomy)
- Q2. What is the better technique for main bronchial stump closure in pneumonectomy?

# Adjuvant chemotherapy after pneumonectomy



6 weeks

Adjuvant chemotherapy n=87

Pneumonectomy only n=130



Table 2. Complications after pneumonectomy ( $n=168$ )

Variables	No.	Percent (%)
Minor complications	127	75.6
Atrial dysrhythmia	79	
Bronchoscopy for secretions	17	
Vocal cord paralysis	31	
Major complications	86	48.2
Reintubation	5	
Reoperation for bleeding	3	
Bronchopleural fistula	7	(4.2%)
Empyema	1	
Pneumonia	58	
Pulmonary oedema/ARDS	4	
Pulmonary emboli	1	
Myocardial infarction	2	

ARDS, adult respiratory distress syndrome.

**Table 2**  
**Complications in the Late Postoperative Period**

Complication	No. of Patients*
Delayed surgical complications	27 (9.9)
Late-onset bronchopleural fistula	25 (9.2)
Postpneumonectomy syndrome	1 (0.3)
Esophagopleural fistula	1 (0.3)
Infections	23 (8.4)
Pneumonia	20 (7.3)
Late-onset postpneumonectomy empyema	3 (1.1)
Complications related to treatment	9 (3.3)
Radiation pneumonitis	4 (1.5)
Radiation-induced pleural and pericardial effusion	1 (0.3)
Radiation-induced BOOP	3 (1.1)
Chemotherapy-induced lung disease	1 (0.3)
Recurrence of primary disease	26 (9.5)
Tumor	23 (8.4)
Tuberculosis	3 (1.1)
Other	2 (0.7)
Total	87 (31.7)

\*Numbers in parentheses are percentages.

BOOP = bronchiolitis obliterans with organizing pneumonia.

Kao, Ming-Wei

Table 3. Risk factors of major complications and operative mortality on univariate analysis

Variables	No.	Major complications	Percent (%)	<i>P</i> -value
Overall	168	86		
Age $\geq 70$ years	35	19	54.3	0.01
Gender (male)	156	30	19.2	NS
BMI $\geq 25$	13	5	38.4	NS
History of smoking	160	22	13.7	NS
COPD	24	6	25.0	0.04
ASA	21	13	61.9	0.015
CAD	35	8	22.8	0.008
Carcinologic staging IIIA/IIIB	106	52	49.0	NS
Neoadjuvant therapy	26	4	15.3	NS
Right pneumonectomy	59	12	20.3	NS
Bronchial stump coverage	92	35	38.0	NS
Epidural analgesia	168	86	51.1	NS

BMI, body mass index; NS, not significant; COPD, chronic obstructive pulmonary disease; ASA, American Society of Anesthesiology scoring; CAD, coronary artery disease.

ply.<sup>2</sup> We remain convinced that the *Pl<sup>A2</sup>* phenotype is a risk factor for coronary artery disease and that functional consequences of this alteration will gradually be elucidated.

PASCAL J. GOLDSCHMIDT-CLERMONT, M.D.

PAUL F. BRAY, M.D.

Johns Hopkins University  
Baltimore, MD 21205

1. Kunicki TJ. Biochemistry of platelet-associated isoantigens and alloantigens. In: Kunicki TJ, George JN, eds. Platelet immunobiology: molecular and clinical aspects. Philadelphia: Lippincott, 1989:99-120.
2. Singer DRJ, Missouris CG, Jeffery S. Angiotensin-converting enzyme gene polymorphism: what to do about all the confusion? *Circulation* 1996; 94:236-9.

## “Keeling” Syndrome — A Late Complication of Pneumonectomy

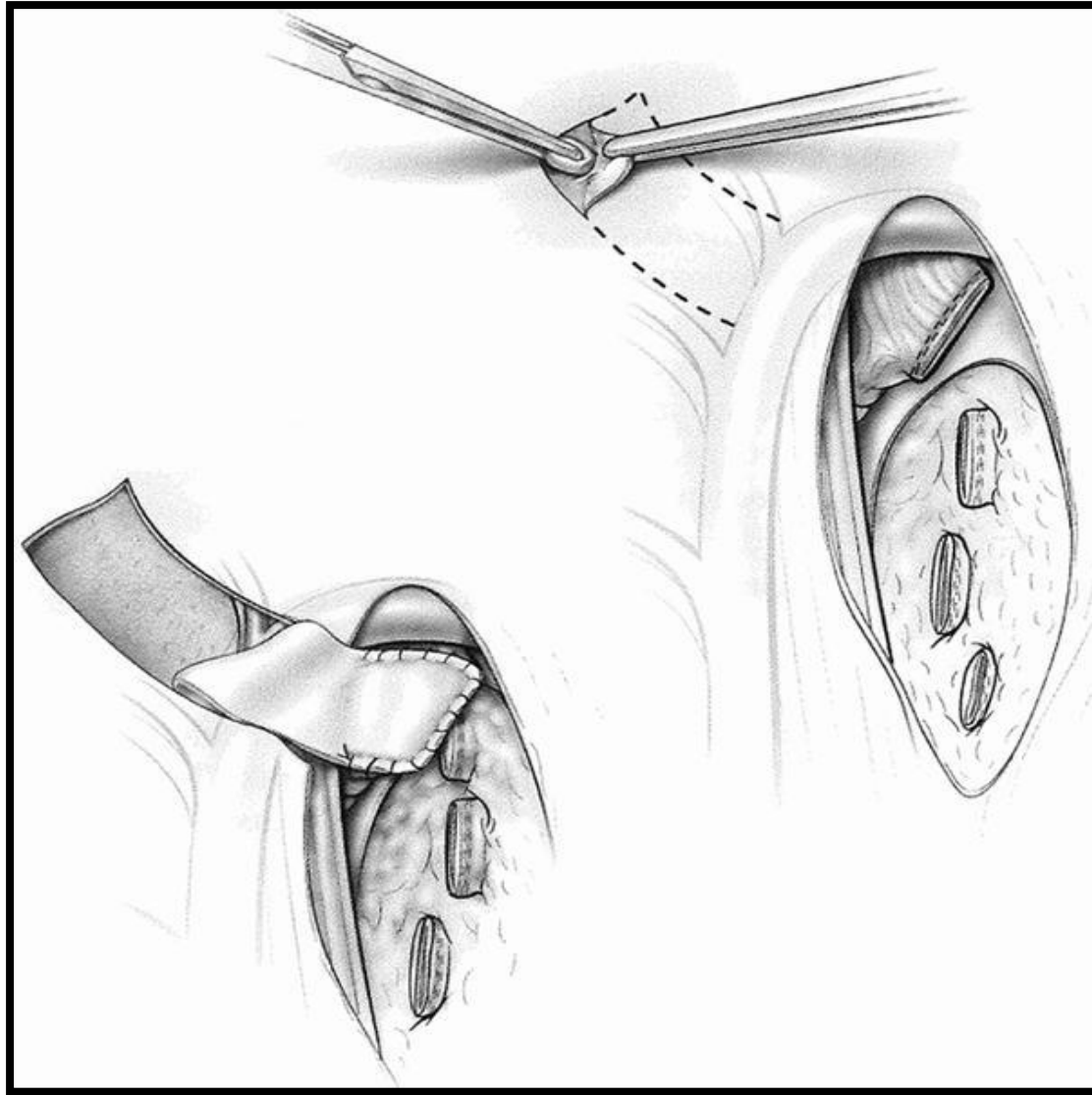
*To the Editor:* Late complications after pneumonectomy include excessive mediastinal displacement to the ipsilateral side with bronchovascular compromise, bronchopleural fistula with empyema, and decreased pulmonary reserve in the event of a respiratory infection.<sup>1,2</sup> We recently learned of an unusual late complication of pneumonectomy that was reported to us by the patient, who then treated himself successfully.



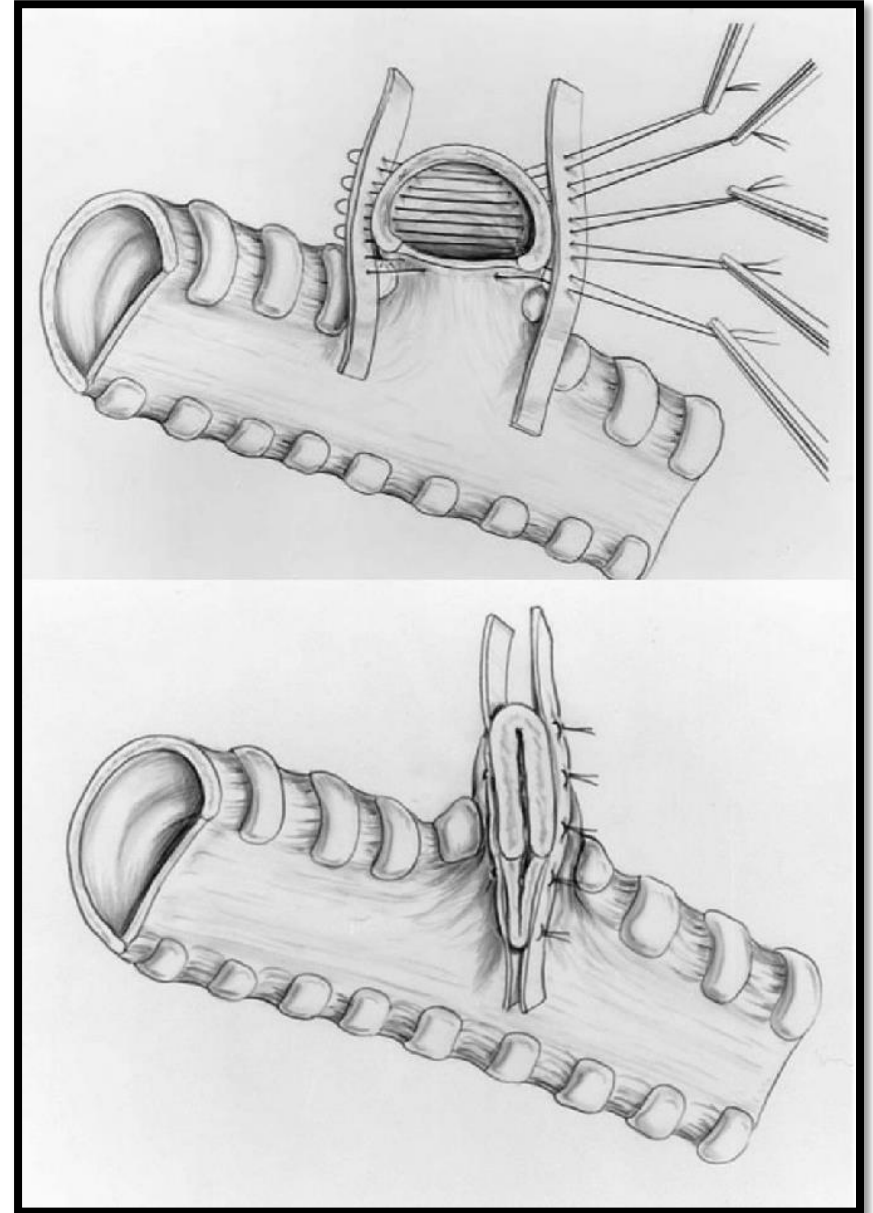
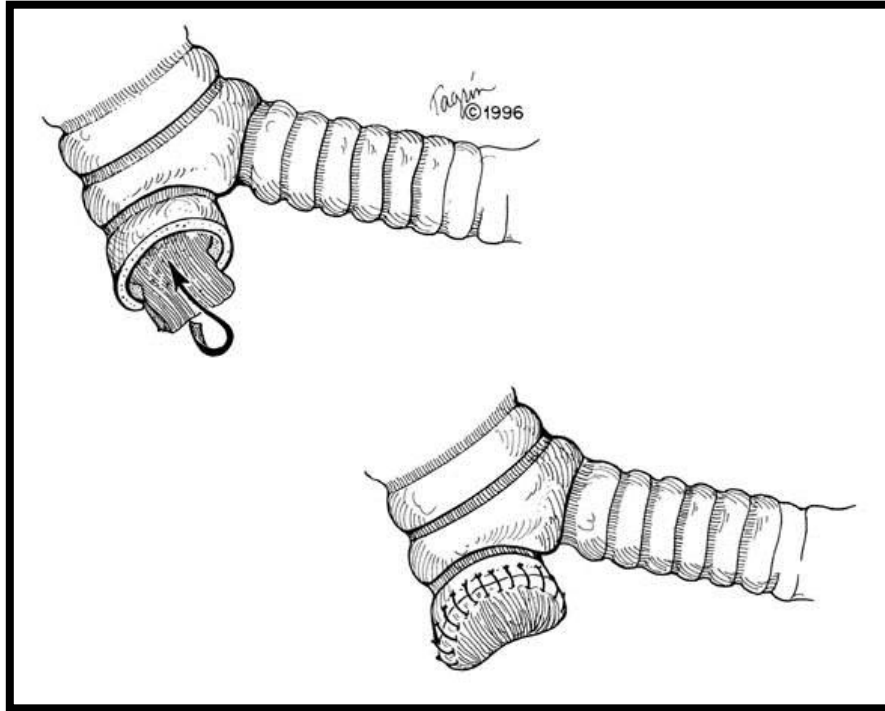
**Figure 1.** Chest Radiograph of the Patient 15 Months after Right Pneumonectomy, Showing the Expected Opacified Right Hemithorax, with Rightward Shift of the Mediastinum, and a Normal Left Lung.

the object has positive buoyancy and will float upward. The human body has natural positive buoyancy that is caused primarily by the air-containing lungs and second

This is what I did...



Next time I will try...



**THANKS FOR YOUR ATTENTION!!**