CHEST® Live Learning

# Malignant Pleural Effusions

## Diagnosis and Management

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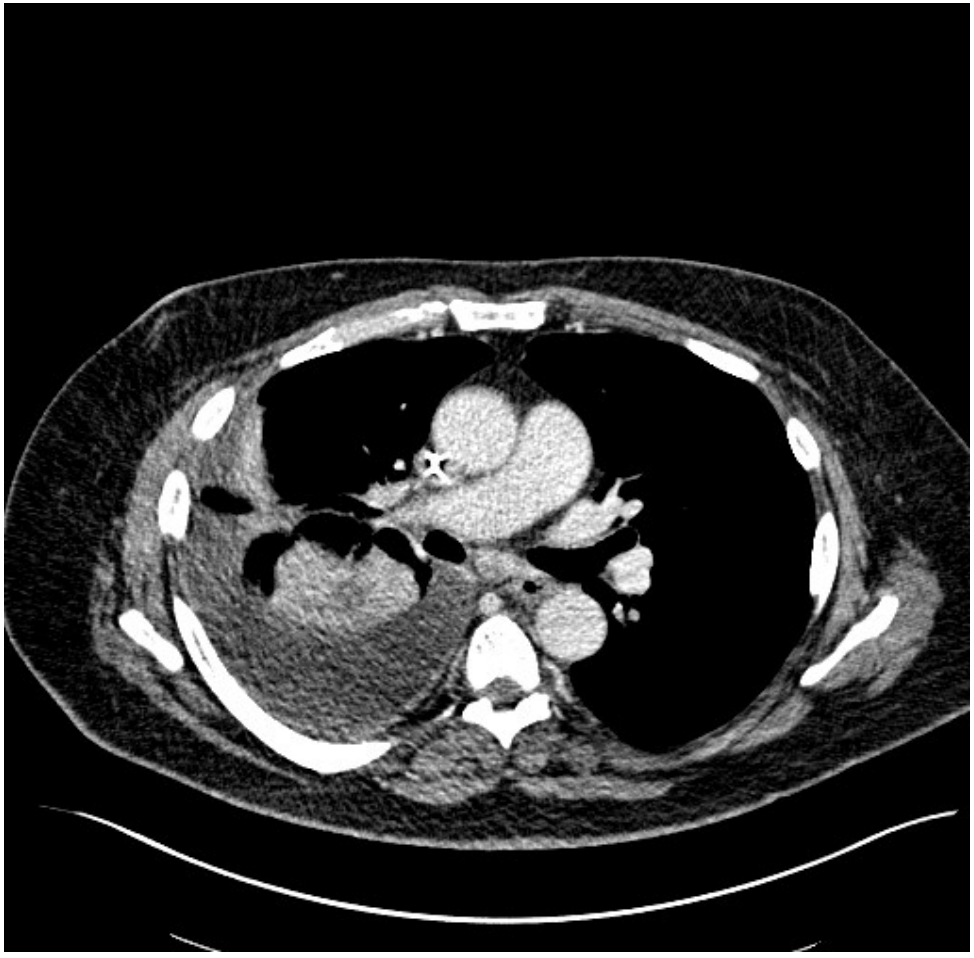
# Disclosures

- Research support from Rocket Medical

# Objectives

- The various prognostic factors for malignant pleural effusions will be discussed.
- A treatment algorithm will be proposed.
- Treatment options such as thoracentesis, tunneled pleural catheters, and thoracoscopy will be reviewed and the latest evidence will be presented.

# Case 1: 77 year old smoker with shortness of breath referred to you in need of a diagnosis.



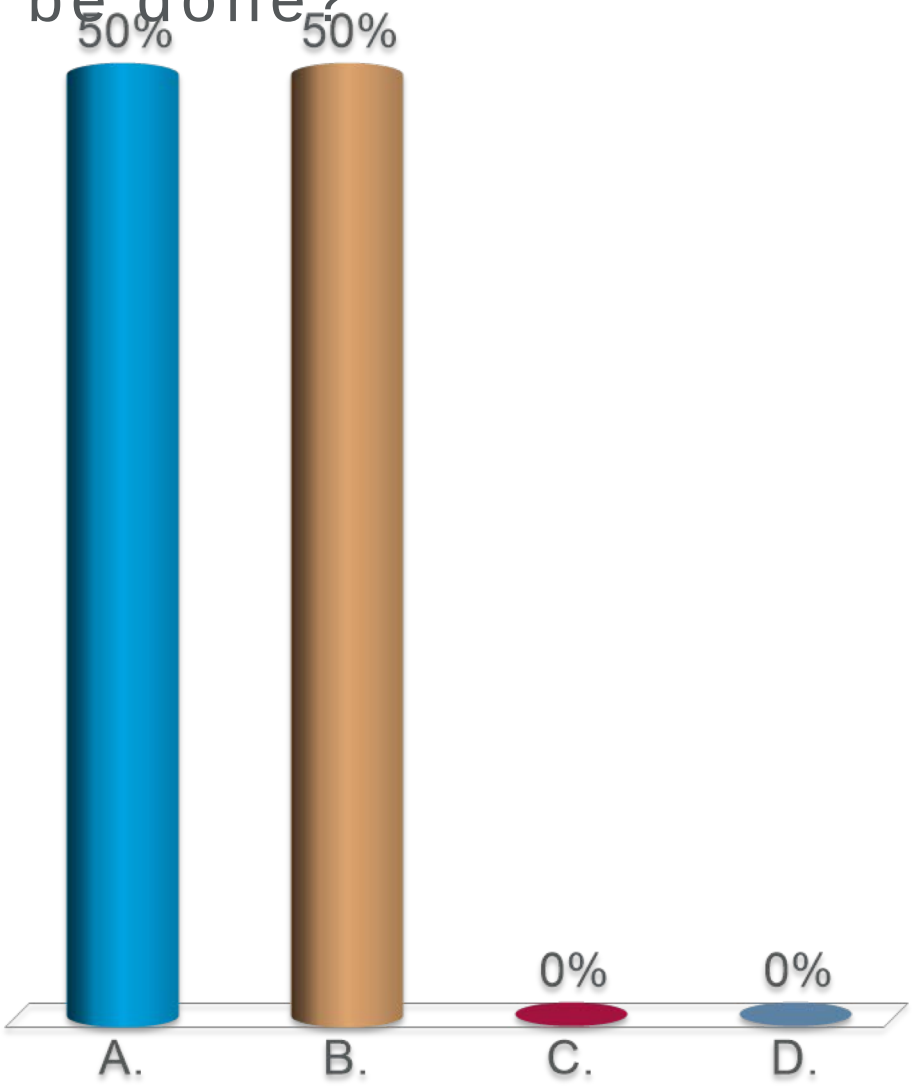
# What procedure should be done?

A. EBUS with TBNA of level 7

B. Guided bronchoscopy to biopsy the RLL mass

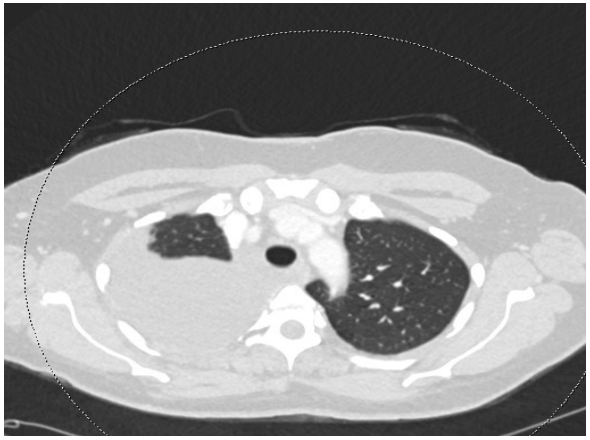
✓ C. Ultrasound guided thoracentesis

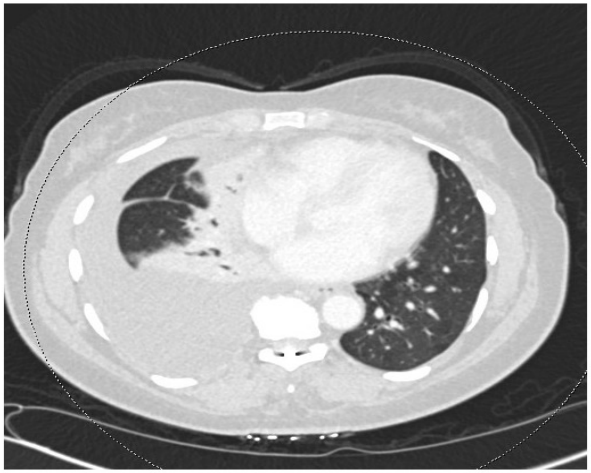
D. Pleuroscopy with biopsies



# Case 2

- 59 yo F with metastatic ovarian cancer receiving doxorubicin and bevacizumab every 28 days for the past 3 months.
- She developed shortness of breath with a large malignant pleural effusion prior to starting chemotherapy.
- She's had recurrent dyspnea and thoracentesis x 4 with >1500 cc bloody appearing malignant fluid removed each time with relief.
- She feels that the dyspnea is starting to return. She currently denies chest pain, fevers, chills, or sweats.





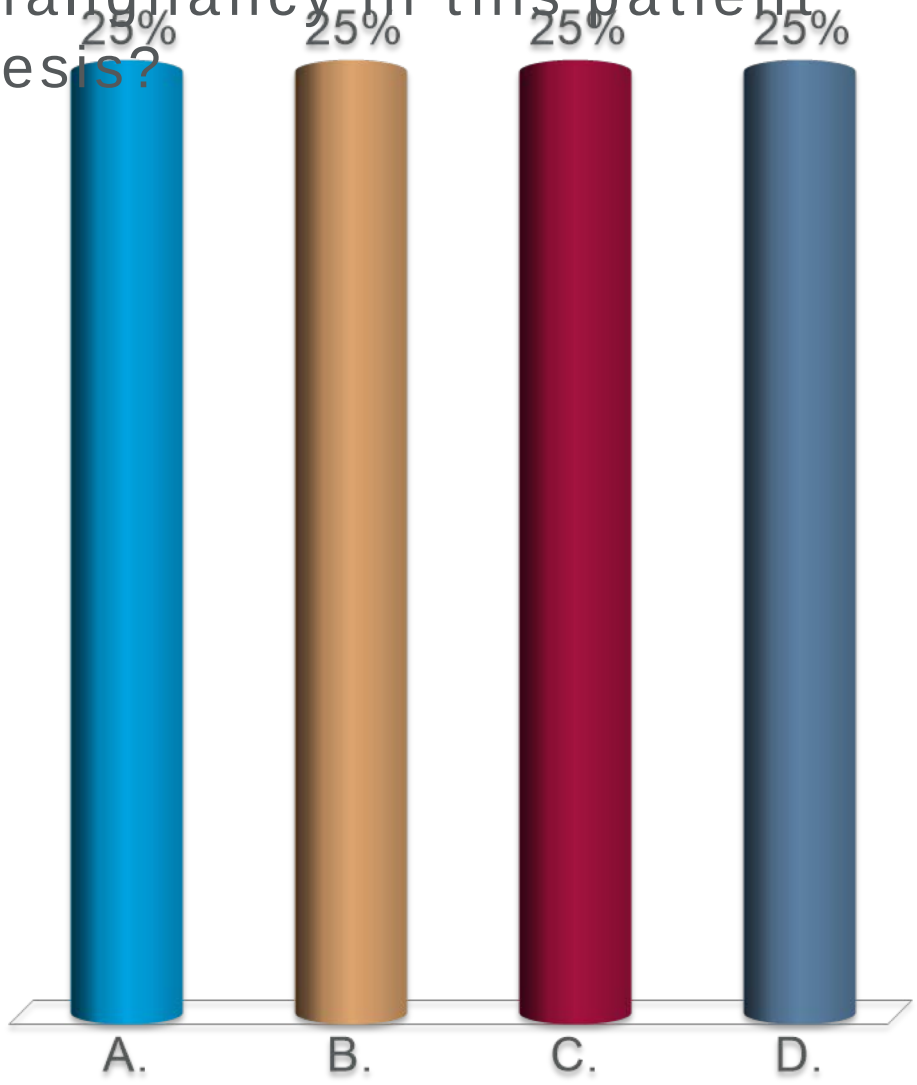
What was the expected yield of pleural fluid cytology for diagnosing malignancy in this patient after the initial thoracentesis?

A. <20%

B. 21-50%

C. 51-65%

✓ D. >65%



# Diagnosis with pleural fluid

- Sixty mL pleural fluid is adequate for diagnosis of MPE (more recommended for mutation analysis).
- MPE is usually an exudate, but 5–10% are transudates.
- Malignant pleural fluid is usually sufficient for mutation analysis.
- Second specimen increases the yield by 27%, but more than 2 does not increase the diagnostic yield.

Hooper, et al. Thorax 2010;65 Suppl 2:ii4-17
Swiderek, et al. Chest 2010;137:68-73
Sahn, et al. Am Rev Respir Dis 1988;138:184-234.
Billah, et al. Cancer Cytopathol. 2011;119(2):111-117

Interventional Pulmonology

Respiration

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# Sensitivity of Initial Thoracentesis for Malignant Pleural Effusion Stratified by Tumor Type in Patients with Strong Evidence of Metastatic Disease

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[a]Department of Pulmonary Medicine, The University of Texas MD Anderson Cancer Center, Houston, TX, USA;
[b]Department of Internal Medicine, University of Texas Health Science Center at Houston, Houston, TX, USA

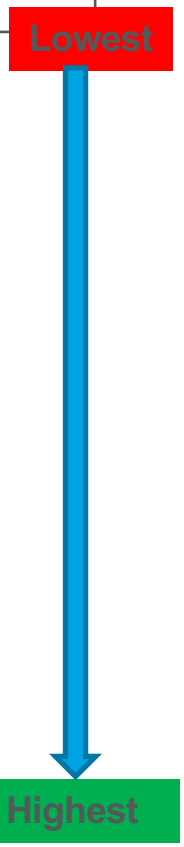
- Traditionally Dx yield of first thora is 60%
- Adeno > 60% and meso <<<60%
- Specific aim: to evaluate the sensitivity of initial thoracentesis with analysis of cytology stratified by tumor type in patients with known cancer or high clinical suspicion of MPE

Bielsa et al, An Med Interna. 2008;25(4):173-7.
Prakash, et al. Mayo Clin Proc. 1985;60(3):158-64.

# Results

## DIAGNOSTIC YIELD OF PLEURAL FLUID CYTOLOGY

| Type of cancer | Cytology positive for malignancy, % | 95% CI |
|---|---|---|
| Mesothelioma | 0/5 (0) | 0.005–0.716 |
| Sarcoma | 6/29 (20) | 0.079–0.397 |
| Head and neck | 5/23 (21) | 0.074–0.437 |
| Renal | 16/43 (37) | 0.229–0.532 |
| Lung, squamous cell | 9/23 (39) | 0.197–0.614 |
| Other solid | 7/16 (43) | 0.197–0.701 |
| Prostate | 6/13 (46) | 0.192–0.748 |
| Melanoma | 10/21 (47) | 0.257–0.702 |
| Multiple solid | 38/74 (51) | 0.394–0.631 |
| Lung, small cell | 7/13 (54) | 0.251–0.807 |
| Unknown primary | 6/11 (54) | 0.233–0.832 |
| Colorectal | 20/37 (55) | 0.369–0.705 |
| Esophageal | 13/23 (56) | 0.344–0.768 |
| Lung, large cell | 14/24 (58) | 0.366–0.778 |
| Cervical, squamous cell | 4/6 (66) | 0.222–0.956 |
| Hepatic | 4/6 (66) | 0.222–0.956 |
| Lung unspecified | 5/7(71) | 0.290–0.963 |
| Gastric | 11/15 (73) | 0.448–0.922 |
| Endometrial | 6/8 (75) | 0.349–0.968 |
| Thyroid | 10/13 (77) | 0.461–0.949 |
| Lung, adenocarcinoma | 71/91 (78) | 0.681–0.860 |
| Urothelial carcinoma | 5/6 (83) | 0.358–0.995 |
| Ovarian | 26/31 (84) | 0.662–0.945 |
| Breast | 140/165 (85) | 0.784–0.899 |
| Pancreatic | 19/22 (86) | 0.650–0.970 |

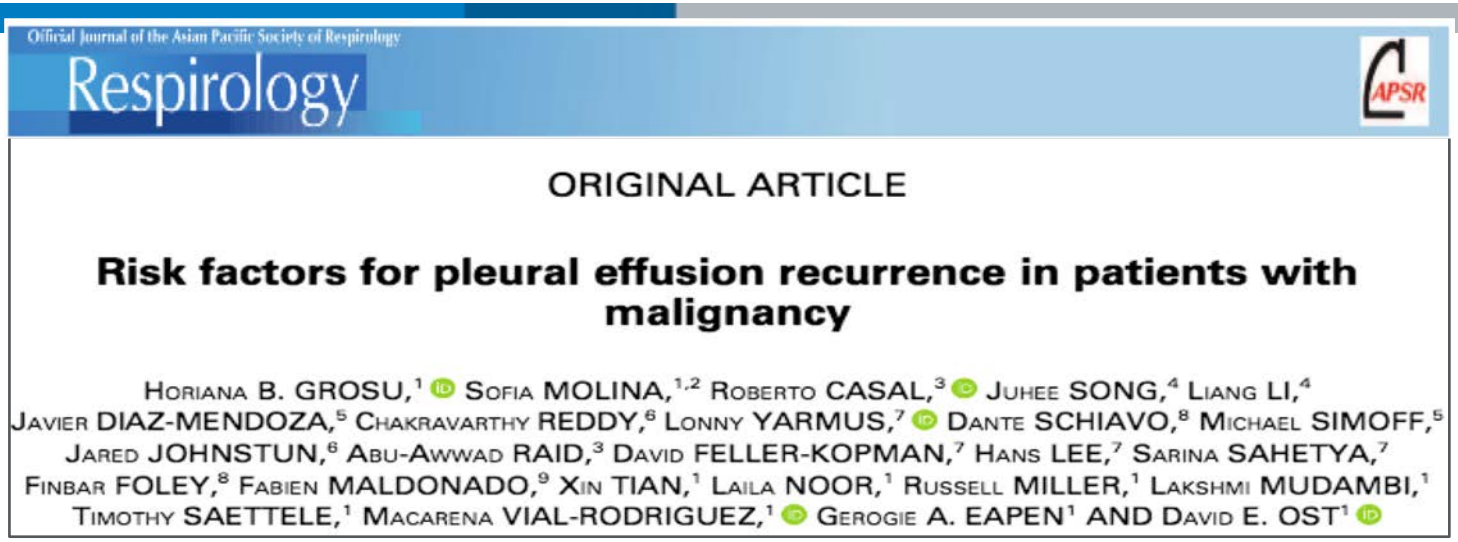



## SENSITIVITY BY TUMOR TYPE

| Test | Sensitivity (95% CI) |
|---|---|
| Mesothelioma | 0.00 (0.00–0.70) |
| Head and neck | 0.38 (0.13–0.68) |
| Sarcoma | 0.38 (0.15–0.65) |
| Kidney | 0.53 (0.34–0.72) |
| Squamous cell, lung | 0.69 (0.39–0.90) |
| Melanoma | 0.66 (0.38–0.88) |
| Colorectal | 0.77 (0.56–0.91) |
| Large cell, lung | 0.78 (0.52–0.93) |
| Small cell carcinoma | 0.78 (0.40–0.97) |
| Urothelial carcinoma | 0.83 (0.36–0.99) |
| Adenocarcinoma, lung | 0.90 (0.81–0.96) |
| Unspecified, lung | 0.92 (0.78–0.98) |
| Breast cancer | 0.93 (0.88–0.97) |
| Ovarian | 0.96 (0.82–0.99) |
| Pancreatic | 1.00 (0.82–1.00) |
| Prostate | 1.00 (0.54–1.00) |
| Gastric | 1.00 (0.72–1.00) |
| Thyroid | 1.00 (0.69–1.00) |
| Endometrial | 1.00 (0.54–1.00) |
| Squamous cervical | 1.00 (0.40–1.00) |
| Esophageal | 1.00 (0.75–1.00) |
| Hepatic | 1.00 (0.40–1.00) |

**Case 2 continues…thoracentesis is performed. 1.8 L removed. Cytology is positive. Which of the following factors increases the risk of MPE recurrence?**

A. The presence of contralateral pleural effusion
B. High pleural fluid triglycerides
C. Radiation within 30 days after the thoracentesis
D. High amount of pleural fluid drained



Official Journal of the Asian Pacific Society of Respirology
Respirology
APSR

ORIGINAL ARTICLE

**Risk factors for pleural effusion recurrence in patients with malignancy**

HORIANA B. GROSU,[1] SOFIA MOLINA,[1,2] ROBERTO CASAL,[3] JUHEE SONG,[4] LIANG LI,[4] JAVIER DIAZ-MENDOZA,[5] CHAKRAVARTHY REDDY,[6] LONNY YARMUS,[7] DANTE SCHIAVO,[8] MICHAEL SIMOFF,[5] JARED JOHNSTUN,[6] ABU-AWWAD RAID,[3] DAVID FELLER-KOPMAN,[7] HANS LEE,[7] SARINA SAHETYA,[7] FINBAR FOLEY,[8] FABIEN MALDONADO,[9] XIN TIAN,[1] LAILA NOOR,[1] RUSSELL MILLER,[1] LAKSHMI MUDAMBI,[1] TIMOTHY SAETTELE,[1] MACARENA VIAL-RODRIGUEZ,[1] GEROGIE A. EAPEN[1] AND DAVID E. OST[1]

- The main purpose of treatment in patients with MPE is symptom palliation

- Useful to know what the **risk factors for recurrence** are and which effusions are likely to rapidly recur after initial thoracentesis

# Methods

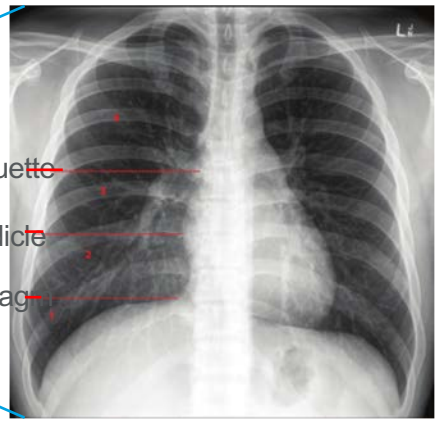
**INCLUSION CRITERIA**

18 years or older with either ***proven metastatic cancer or strong clinical evidence of metastatic disease*** (based on imaging) undergoing their first thoracentesis for pleural effusion

**EXCLUSION CRITERIA**

- lost to follow-up immediately after the procedure
- did not have imaging within 14 days from first thoracentesis
- no history of cancer, suspicion of cancer or active cancer
- who had loculated pleural effusions on CXR
- with multiple types of cancer
- previous fluid drainage at another institution or history of chest tube placement

EFFUSION SIZED BASED ON ZONES



# Results

- High cumulative incidence of recurrence (30% by day 15)

- Increased hazard of recurrence:
  - Size (to top of cardiac silhouette)
  - Larger amount of fluid drained
  - High pleural fluid LDH
  - Positive cytology

## Case 2 continues…Which of the following tumor histological types predicts the worst survival in MPE?

A. Ovarian cancer

B. Lymphoma

C. Breast cancer

D. Lung cancer

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ORIGINAL ARTICLE

# Predicting survival in malignant pleural effusion: development and validation of the LENT prognostic score

Amelia O Clive,[1,2] Brennan C Kahan,[3] Clare E Hooper,[1,2] Rahul Bhatnagar,[1,2] Anna J Morley,[2] Natalie Zahan-Evans,[2] Oliver J Bintcliffe,[2] Rogier C Boshuizen,[4] Edward T H Fysh,[5,6] Claire L Tobin,[5] Andrew R L Medford,[2] John E Harvey,[2] Michel M van den Heuvel,[4] Y C Gary Lee,[5,6] Nick A Maskell[1,2]

3 prospectively collected databases from the UK, Australia and The Netherlands were used to identify patients with MPE, who had been followed up for a minimum of 12 months or until death

Data were obtained on 789 patients

Survival varied significantly based on cancer type

**Table 2** Median survival according to cell type for the UK, Australian and Dutch cohorts combined

| Cell type | Median survival in days (95% CI) | n |
|---|---|---|
| Mesothelioma | 339 (267 to 422) | 170 |
| Haematological malignancy | 218 (160 to 484) | 35 |
| Gynaecological malignancy | 203 (97 to 279) | 59 |
| Breast cancer | 192 (133 to 271) | 140 |
| Renal cell carcinoma | 114 (33 to 334) | 22 |
| Adenocarcinoma of unknown primary | 87 (13 to 286) | 11 |
| Lung cancer | 74 (60 to 92) | 215 |
| Other | 71 (46 to 102) | 33 |
| Gastrointestinal cancer | 61 (44 to 73) | 61 |
| Sarcoma | 44 (19 to 76) | 12 |
| Melanoma | 43 (23 to 72) | 23 |
| Urological cancer (bladder, prostate, testis, penile) | 33 (22 to 168) | 8 |
| Overall | 136 (119 to 167) | 789 |

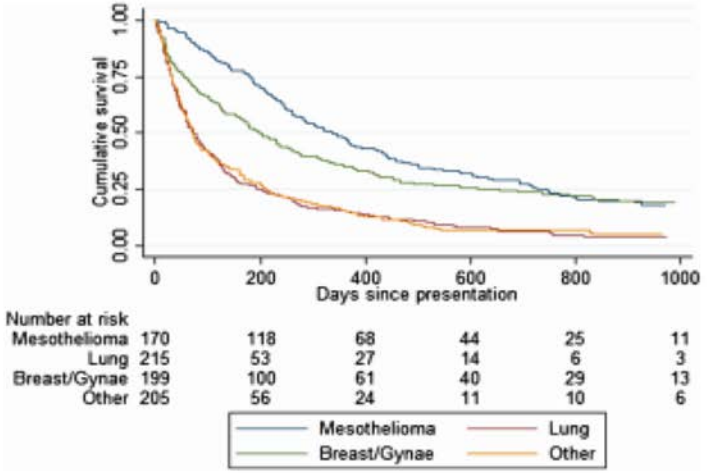



**Figure 1** Kaplan–Meier survival curves according to cell type for the UK, Australian and Dutch cohorts combined.

Multivariable analysis identified effusion size, ECOG, pleural fluid LDH, serum neutrophil-to-lymphocyte ratio (NLR), serum NT-proBNP and malignant cell type as independently associated with survival

Authors selected four variables to include in a predictive model, 'the **LENT score**'.

| | Variable | Score |
|---|---|---|
| L | LDH level in pleural fluid (IU/L) | |
| | <1500 | 0 |
| | >1500 | 1 |
| E | ECOG PS | |
| | 0 | 0 |
| | 1 | 1 |
| | 2 | 2 |
| | 3–4 | 3 |
| N | NLR | |
| | <9 | 0 |
| | >9 | 1 |
| T | Tumour type | |
| | Lowest risk tumour types | 0 |
| | ▶ Mesothelioma | |
| | ▶ Haematological malignancy | |
| | Moderate risk tumour types | 1 |
| | ▶ Breast cancer | |
| | ▶ Gynaecological cancer | |
| | ▶ Renal cell carcinoma | |
| | Highest risk tumour types | 2 |
| | ▶ Lung cancer | |
| | ▶ Other tumour types | |

| Risk categories | Total score |
|---|---|
| Low risk | 0–1 |
| Moderate risk | 2–4 |
| High risk | 5–7 |

# Therapeutic Thoracentesis

- Often the initial step in managing MPE
- Allows you to **confirm that dyspnea is secondary to MPE**

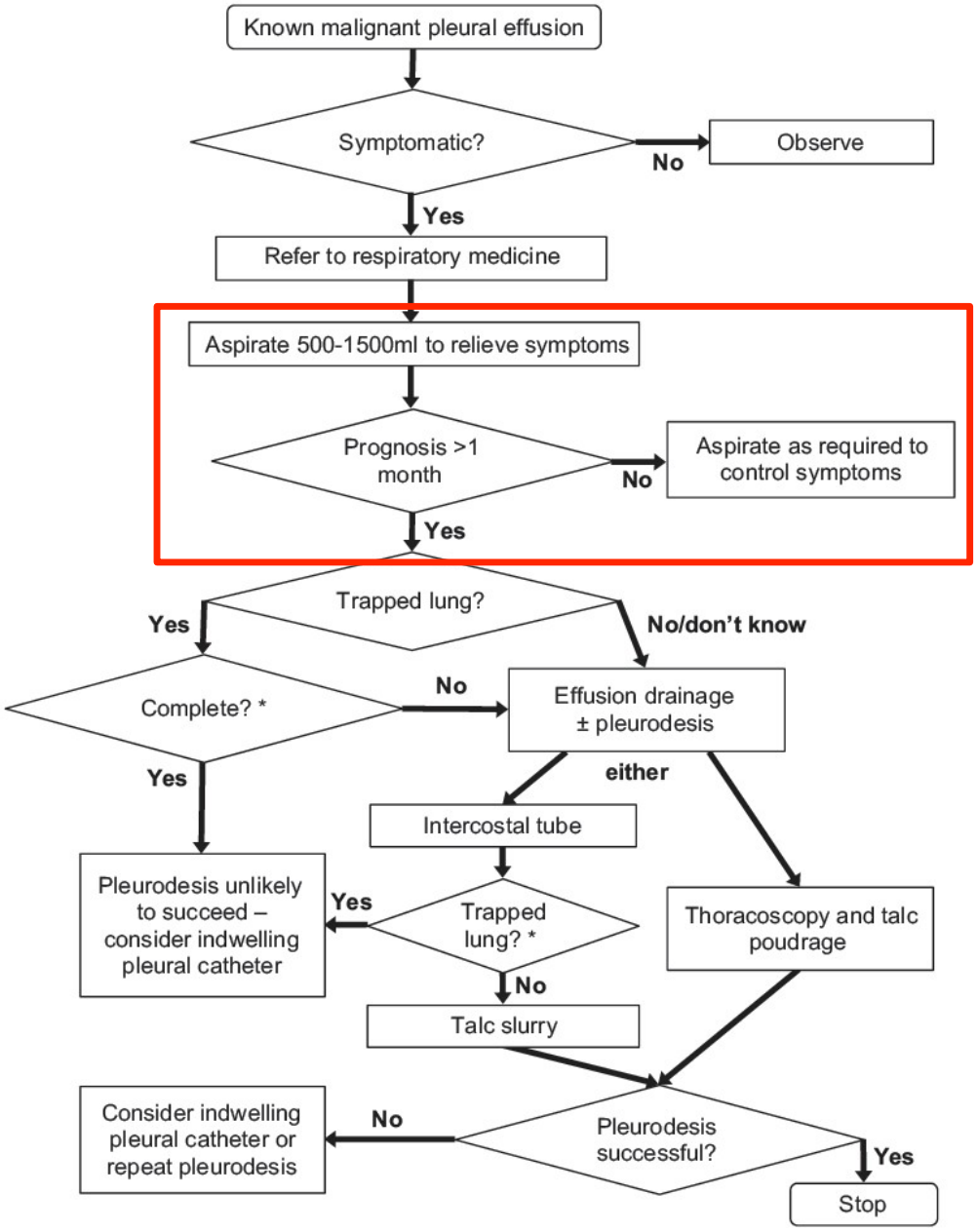
TABLE 4. **Causes of Dyspnea in Patients With Malignant Pleural Effusions**

| |
|---|
| Pleural |
| Malignant effusions |
| Effusions caused by |
| Drugs |
| Pneumonia |
| Heart failure |
| Pulmonary embolism |
| Pulmonary parenchyma |
| Lymphangitic cancer |
| Chemotherapy-induced pneumonitis or fibrosis |
| Radiation fibrosis or pneumonitis |
| Extensive tumor mass with lung restriction |
| Airways |
| Airway obstruction by tumor |
| Bilateral vocal cord paralysis from recurrent laryngeal nerve praxis |
| Cardiac and pericardial |
| Chronic heart failure |
| Pericardial effusion |
| Constrictive pericarditis |
| Restrictive cardiomyopathy due to tumor infiltration |
| Vascular |
| Pulmonary thromboemboli |
| Tumor emboli |
| Other |
| Deconditioning |
| Poor nutrition |
| Cancer-related cachexia |
| Myopathy |
| Chest wall invasion by tumor |
| Progression of underlying lung disease (eg, emphysema) |

*Mayo Clin Proc 2008*; 83: 235-50

# Management of a malignant pleural effusion: British Thoracic Society pleural disease guideline 2010

Mark E Roberts,[1] Edmund Neville,[2] Richard G Berrisford,[3] George Antunes,[4] Nabeel J Ali[1], on behalf of the BTS Pleural Disease Guideline Group




*Thorax* 2010;65 (suppl 2):ii32-40

# Therapeutic Thoracentesis

- Fluid and symptoms recur in over 90% within 30 days

- Repeated thoracentesis reasonable for:
  - Slowly reaccumulating effusions
  - Highly responsive malignancies
  - Severely debilitated patients
  - Fluid re-accumulation after pleurodesis
  - Patients with short life expectancy

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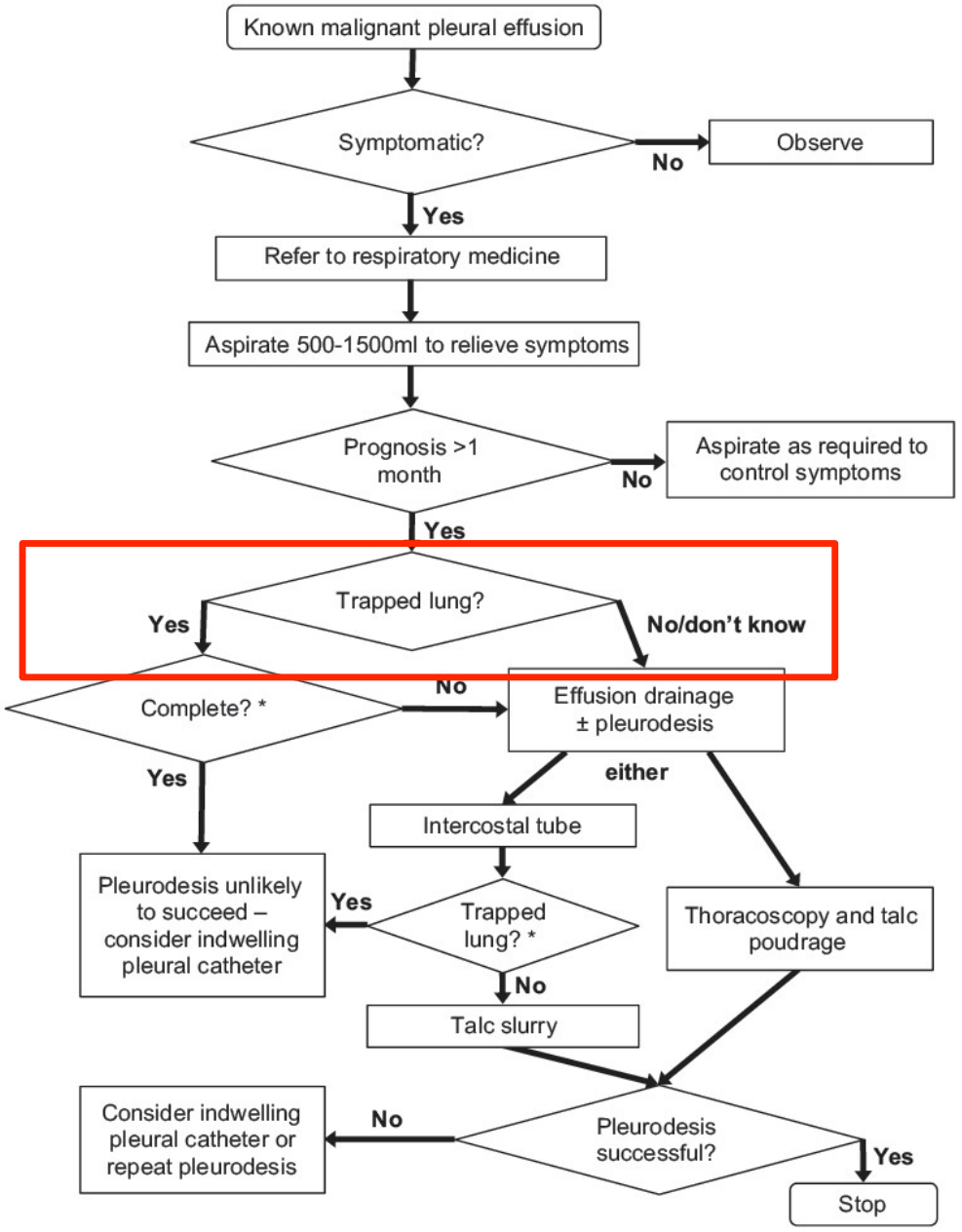
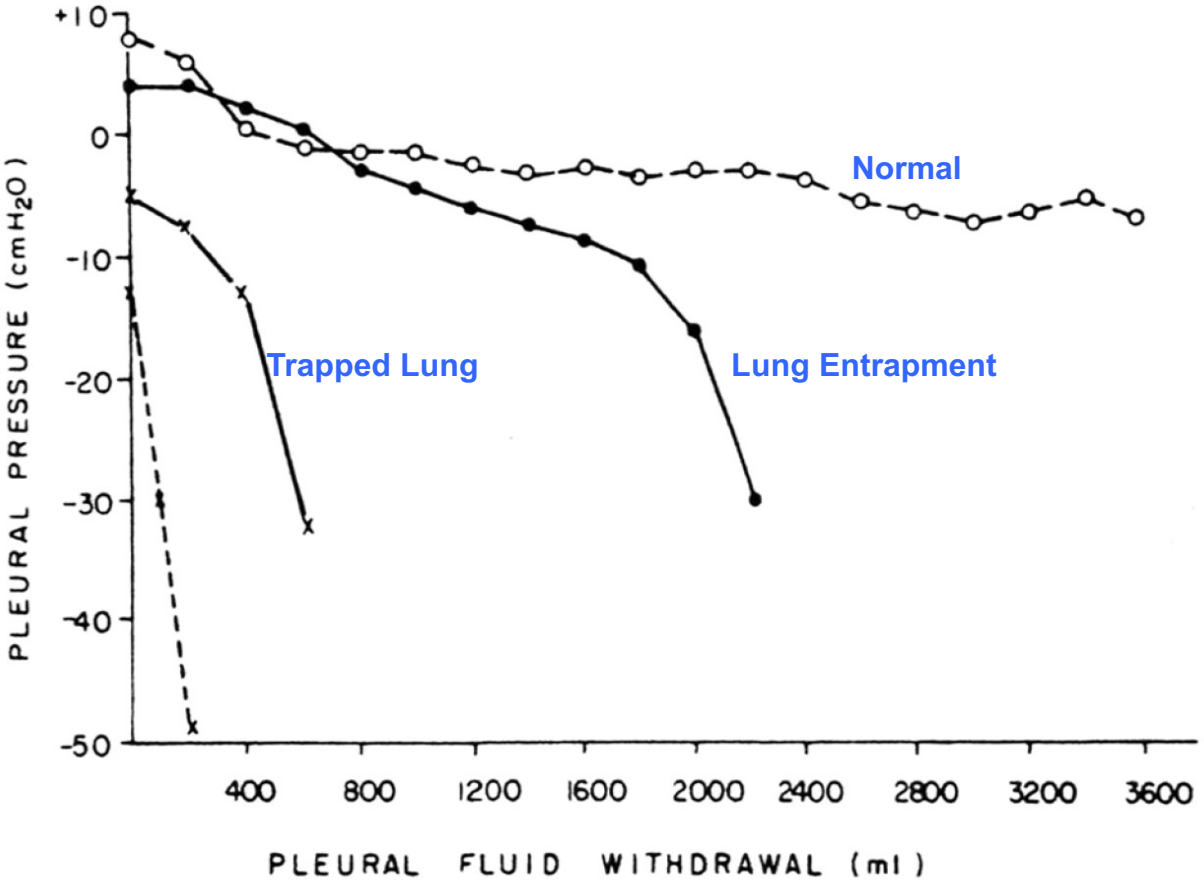



*Thorax* 2010;65 (suppl 2):ii32-40

## Therapeutic Thoracentesis

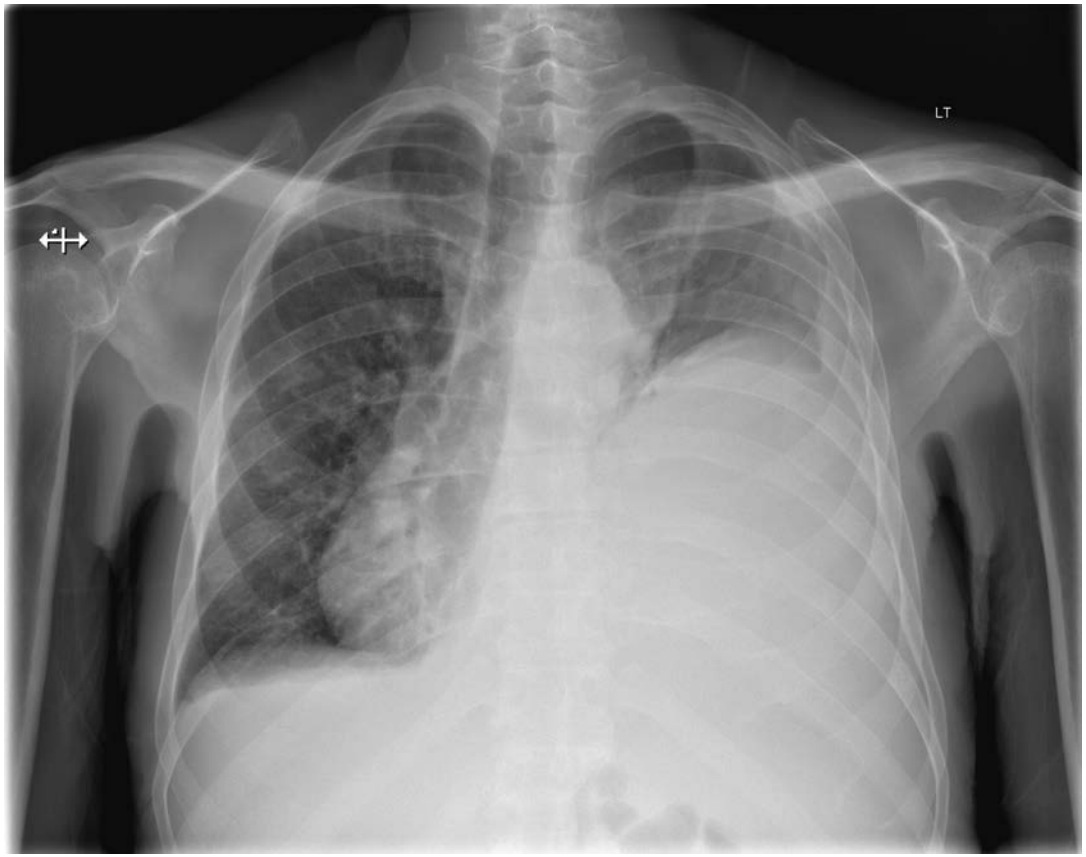
- Allows an assessment of lung entrapment
- Ideally performed with pleural pressure measurements




Light RW et al. *Am Rev Respir Dis* 1980; 121: 799-804

# Pleurodesis

Case 3: 60 year old smoker with a recurrent malignant left pleural effusion (1.5L drained last week) and worsened shortness of breath. Has adenocarcinoma of the lung (PDL-1 90%) and ECOG performance 1.



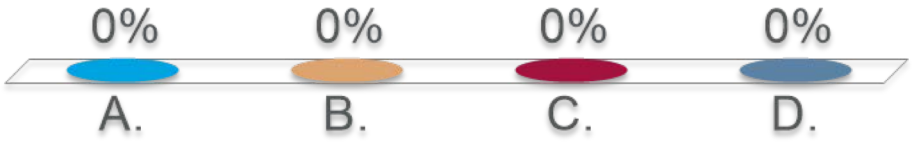
# What should be done next?

A. Return for weekly thoracentesis

✓ B. B. Tube thoracostomy with talc pleurodesis

✓ C. C. Medical pleuroscopy with talc poudrage

✓ D. D. Tunneled pleural catheter with daily drainage



The answer:


Something definitive should be done, and an ongoing RCT will try to answer what.

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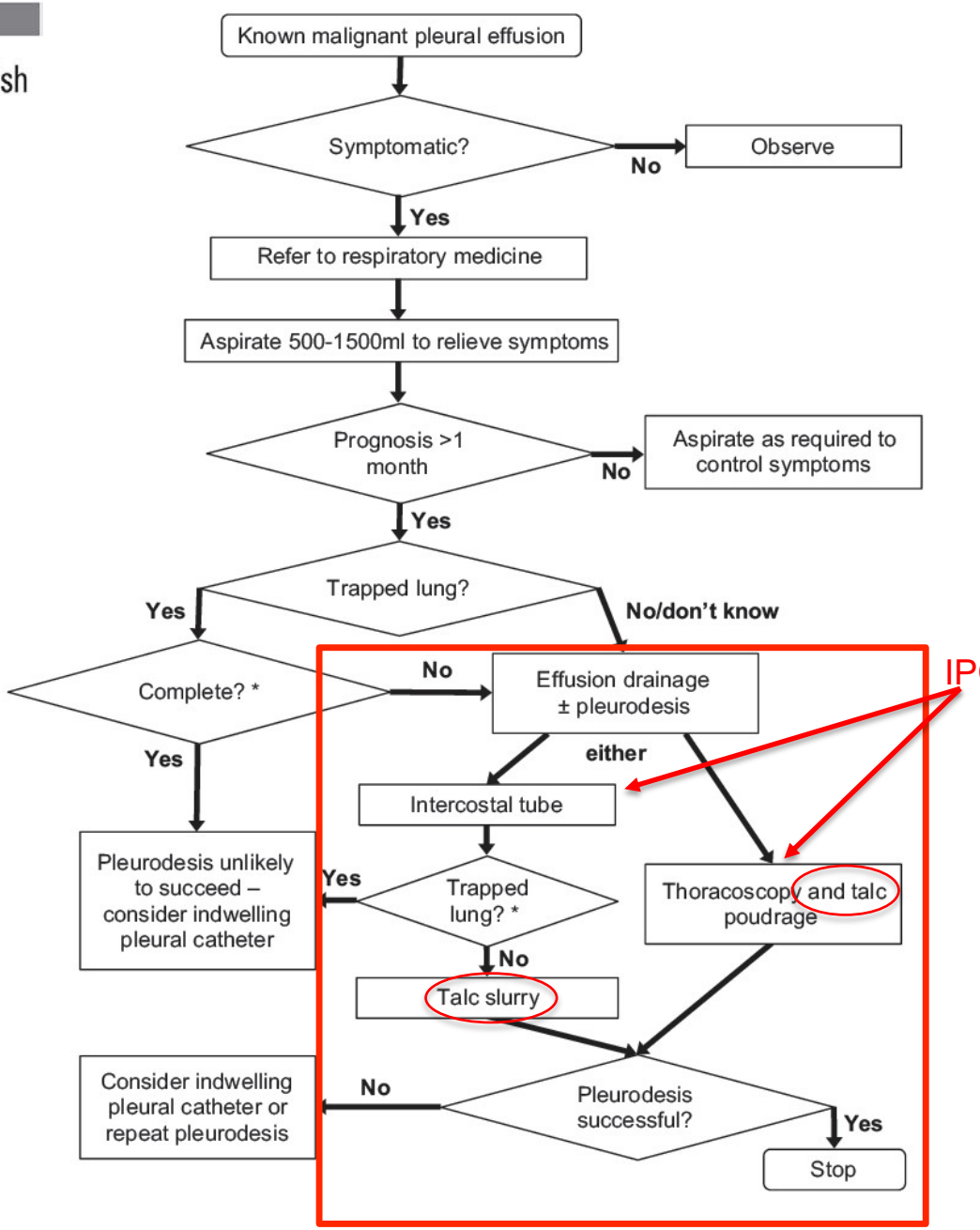


*Thorax* 2010;65 (suppl 2):ii32-40

# Cochran review identifies talc as most effective sclerosing agent.

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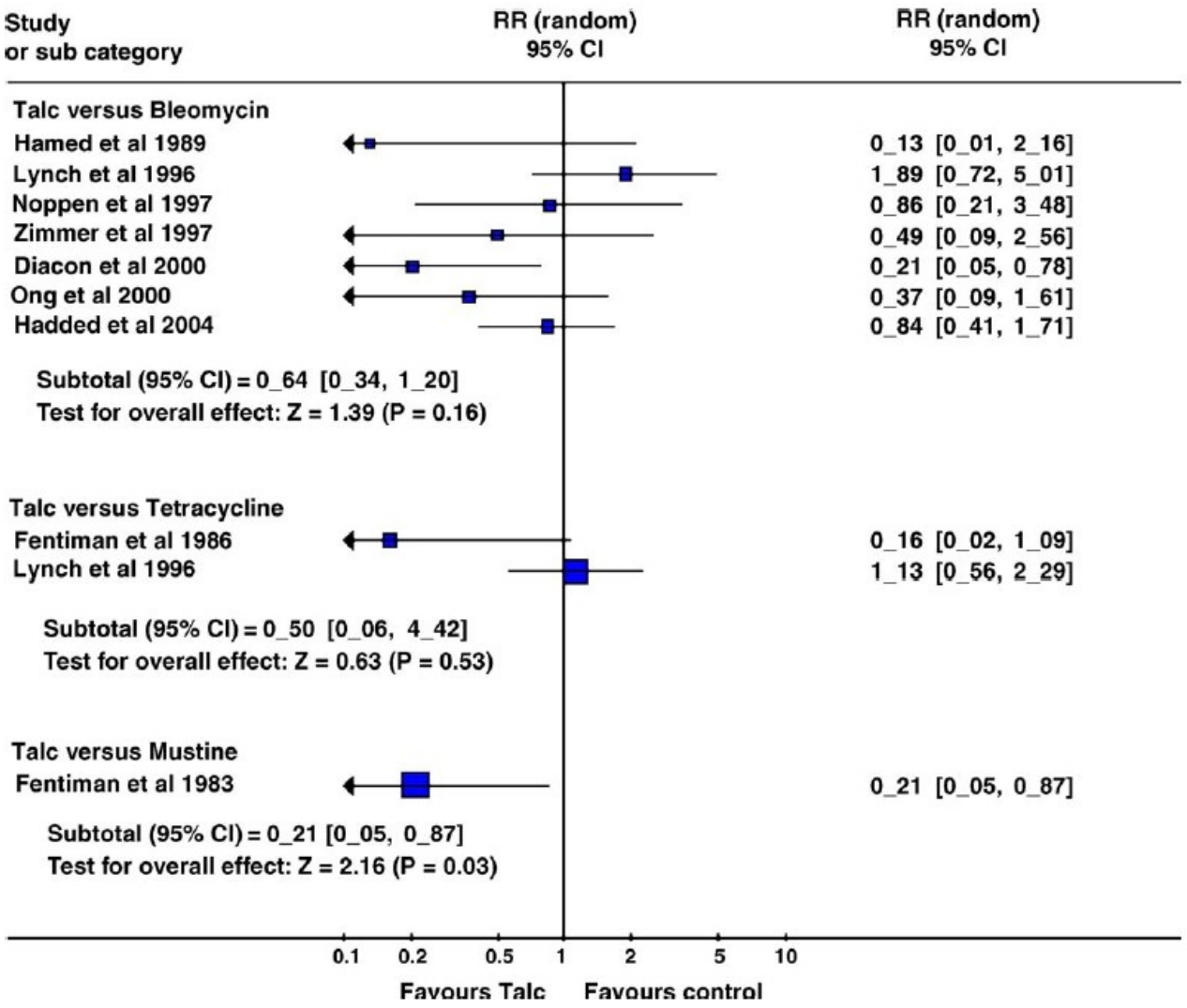
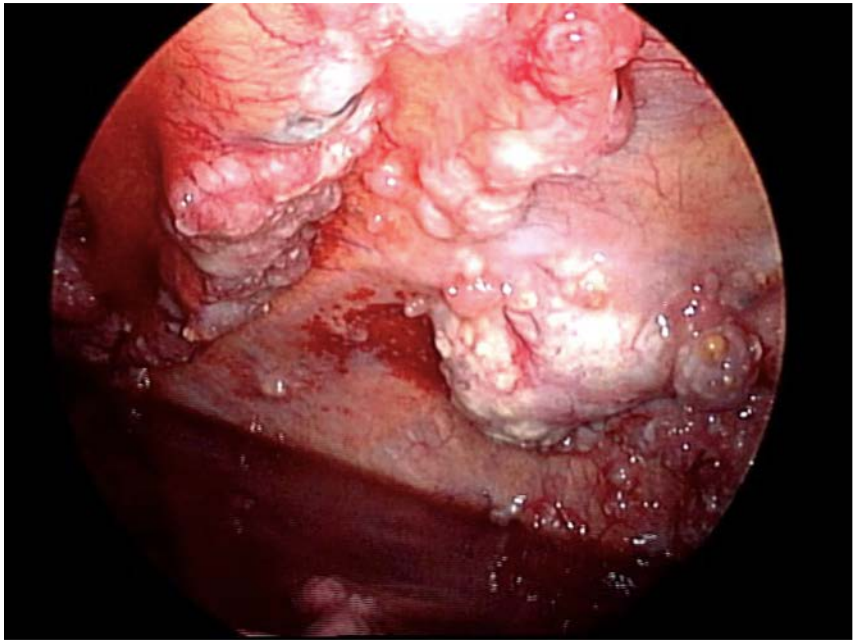
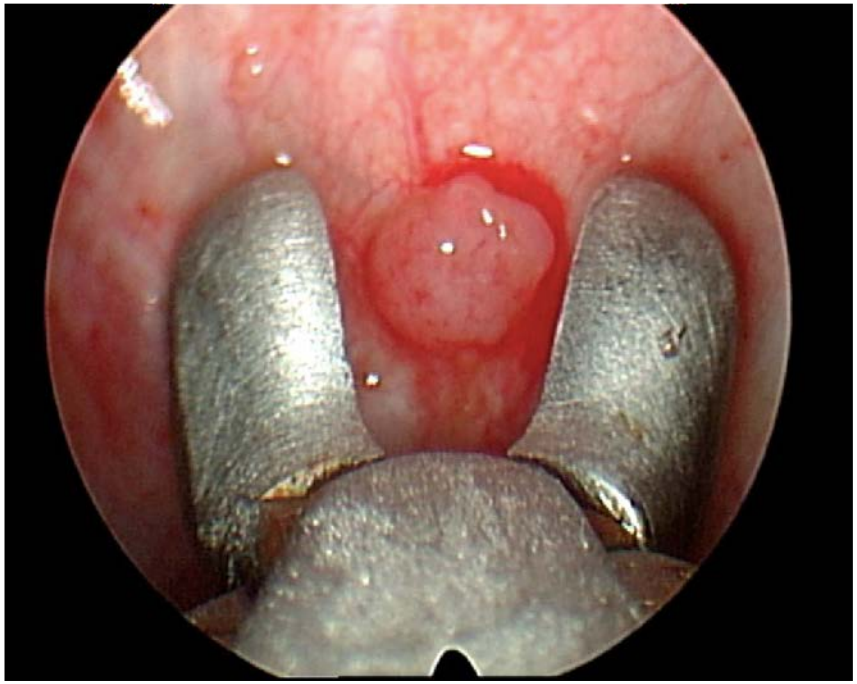



Tan C, et al. *Eur J Cardiothorac Surg* 2006; 29: 829-38

## Thoracoscopy (medical and VATS) role



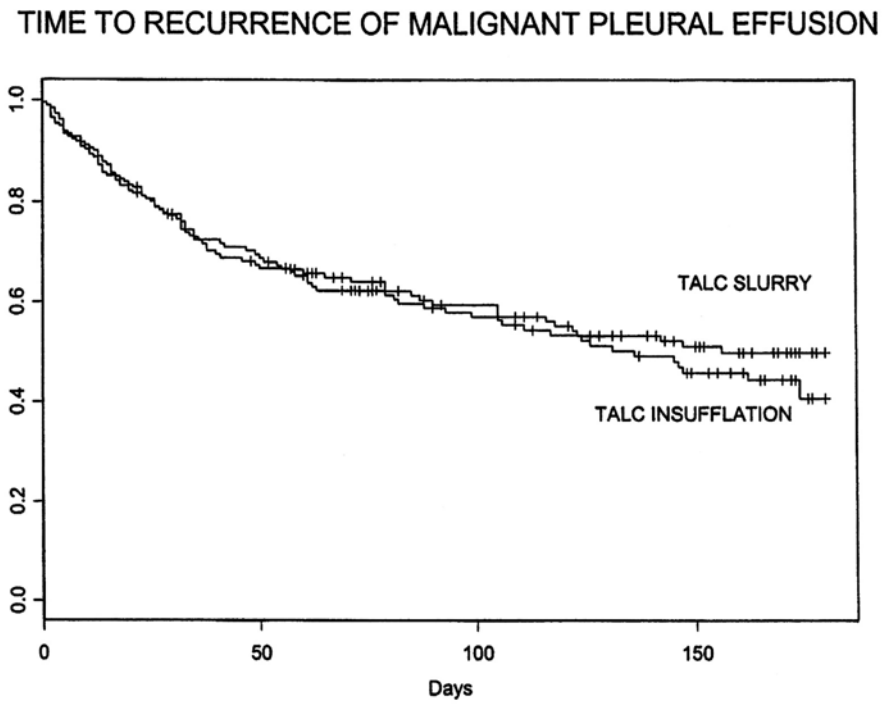
## To diagnose and treat



# Cochran Review: Conclusions Shaw and Agarwal, *Cochran Library,* Issue 3, 2004

- Greater likelihood of success with thoracoscopic pleurodesis
- Talc the sclerosant of choice
- No reports of ARDS
- Thoracoscopic instillation of sclerosant increased likelihood of success even when MPE had been drained thoracoscopically

# Phase III Intergroup Study of Talc Poudrage vs Talc Slurry Sclerosis for Malignant Pleural Effusion*



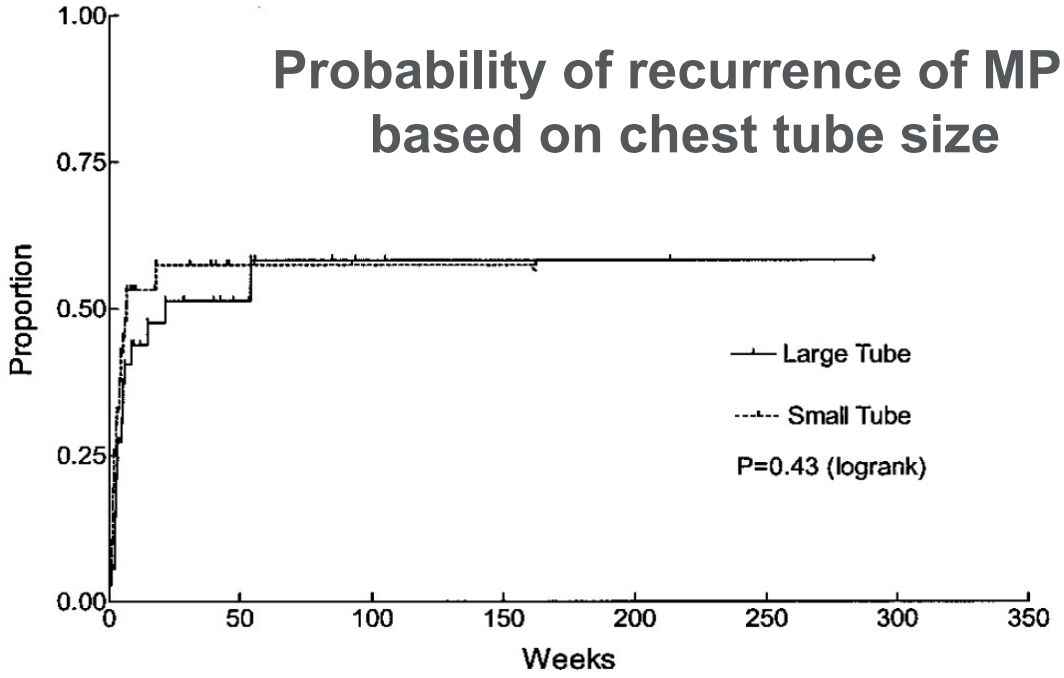

Talc delivered via chest tube was as effective as talc poudrage in this study. But, a Multicenter RCT now in progress to answer.

Dresler CM et al. *Chest* 2005; 127: 909-15

# Use of Small-Bore vs Large-Bore Chest Tubes for Treatment of Malignant Pleural Effusions*

*Wendy Parulekar MD, Gina Di Primio MD, Fred Matzinger MD, Carole Dennie MD, and Gregory Bociek MD*

## Probability of recurrence of MPE based on chest tube size




*Chest* 2001; 120: 19-25

# Indwelling Pleural Catheter

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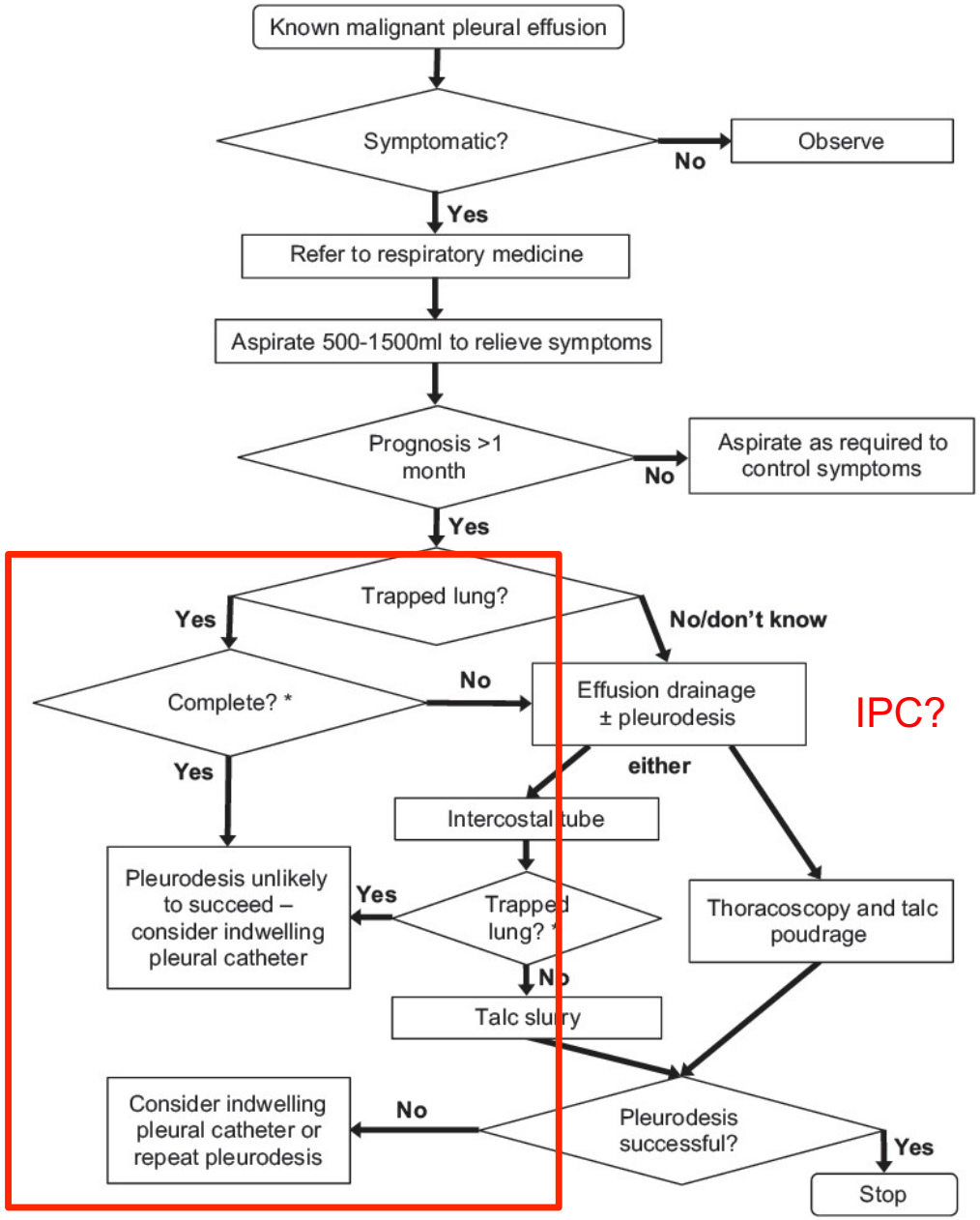


*Thorax* 2010;65 (suppl 2):ii32-40

# Effect of an Indwelling Pleural Catheter vs Chest Tube and Talc Pleurodesis for Relieving Dyspnea in Patients With Malignant Pleural Effusion

## The TIME2 Randomized Controlled Trial

- No difference in dyspnea and chest pain scores between IPC and pleurodesis groups in first 42 days, although significant decrease in dyspnea in IPC group at 6 months
- No overall difference in quality of life
- No difference in total mortality although ad hoc analysis suggested better survival in IPC group
- Significantly shorter initial hospitalization in IPC group (0 vs 4 days)
- Significantly less rehospitalization for drainage or drainage-related issues in the IPC group (1 vs 4.5 days) at 12 months
- Significantly more complications in IPC group, although no difference in severe complications

**Davies HE, et al.*JAMA* 2012;13:59-65**

# Treatment of Malignant Pleural Effusion: PleuRx® Catheter or Talc Pleurodesis? A Cost-Effectiveness Analysis

Aaron M. Olden, M.D.[1] and Robert Holloway, M.D., M.P.H.[2]

- Attempt to estimate and compare costs related to IPC vs. talc pleurodesis via chest tube

- Accounted for estimated initial intervention cost, success and complications of each as well as costs for supplies, nursing, and physician visits for IPC

- Included an estimated 3x greater likelihood of death from talc, and 50% higher likelihood of infection with IPC

- Determined:
  - Cost neutral if patient survived up to 6 months, at which point IPC became more costly
  - Clear cost benefit for IPC if patient survived <6 weeks

*J Palliat Med* 2010;13:59-65

JAMA | Original Investigation

# Effect of an Indwelling Pleural Catheter vs Talc Pleurodesis on Hospitalization Days in Patients With Malignant Pleural Effusion

## The AMPLE Randomized Clinical Trial

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| | Indwelling Pleural Catheter (n = 73) | Talc Pleurodesis (n = 71) | Estimated Difference in Location or Proportions (95% CI) | P Value |
|---|---|---|---|---|
| **Primary Outcome** | | | | |
| Total all-cause hospital stay, median (IQR), d | 10 (3-17) | 12 (7-21) | 2.92 (0.43-5.84) | .03 |
| **Secondary Outcomes** | | | | |
| Effusion-related hospital stay, median (IQR), d | 1 (1-3) | 4 (3-6) | 2.06 (1.53-2.58) | <.001 |
| Further ipsilateral invasive pleural procedures required, No. (%) | 3 (4) | 16 (22) | 0.18 (0.08-0.29) | .001 |

**CONCLUSIONS AND RELEVANCE** Among patients with malignant pleural effusion, treatment with an indwelling pleural catheter vs talc pleurodesis resulted in fewer hospitalization days from treatment to death, but the magnitude of the difference is of uncertain clinical importance. These findings may help inform patient choice of management for pleural effusion.

# Case 3 continues...the patient agrees to TPC placement. What home drainage regimen should you recommend?

- A. Once per week
- B. Every other day
- C. Daily drainage
- D. As needed for symptoms

# Randomized Trial of Pleural Fluid Drainage Frequency in Patients with Malignant Pleural Effusions

## The ASAP Trial

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**Abstract**

**Rationale:** Patients with malignant pleural effusions have significant dyspnea and shortened life expectancy. Indwelling pleural catheters allow patients to drain pleural fluid at home and can lead to autopleurodesis. The optimal drainage frequency to achieve autopleurodesis and freedom from catheter has not been determined.

**Objectives:** To determine whether an aggressive daily drainage strategy is superior to the current standard every other day drainage of pleural fluid in achieving autopleurodesis.

**Methods:** Patients were randomized to either an aggressive drainage (daily drainage; n = 73) or standard drainage (every other day drainage; n = 76) of pleural fluid via a tunneled pleural catheter.

**Measurements and Main Results:** The primary outcome was the incidence of autopleurodesis following the placement of the indwelling pleural catheters. The rate of autopleurodesis, defined as complete or partial response based on symptomatic and radiographic changes, was greater in the aggressive drainage arm than the standard drainage arm (47% vs. 24%, respectively; $P = 0.003$). Median time to autopleurodesis was shorter in the aggressive arm (54 d; 95% confidence interval, 34–83) as compared with the standard arm (90 d; 95% confidence interval, 70 to nonestimable). Rate of adverse events, quality of life, and patient satisfaction were not significantly different between the two arms.

**Conclusions:** Among patients with malignant pleural effusion, daily drainage of pleural fluid via an indwelling pleural catheter led to a higher rate of autopleurodesis and faster time to liberty from catheter.

Clinical trial registered with www.clinicaltrials.gov (NCT 00978939).

**Keywords:** malignant pleural effusions; indwelling pleural catheter; pleurodesis

# Aggressive versus symptom-guided drainage of malignant pleural effusion via indwelling pleural catheters (AMPLE-2): an open-label randomised trial

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- Open-labelled randomized study (11 centers)
- Patients with symptomatic MPE randomized in a 1:1 to daily vs symptomatic drainage after placement of IPC

Muruganandan S, Lancet Respir Med 2018, 6(9): 671-680

# AMPLE-2

- Randomization occurred at 72 hours following IPC placement
- Pleurodesis defined:
  1) <50 mL at 3 consecutive days in daily (**drainage group**)
  2) 2 attempts at 2 weeks apart in (**symptom-management group**)
  3) absence of significant pleural fluid on CXR
- Patients were followed for a minimal of 6 months and recorded breathlessness & pain score daily and weekly after 6 months
- Total pleural fluid volume was recorded for each drainage

# AMPLE-2

- **Primary Outcome**

  Mean daily VAS breathlessness score at day 60 from randomization

- **Secondary Outcomes**

  Rates of spontaneous pleurodesis

  EQ-5D-5L

  VAS breathlessness score (100 mm scale) at time of randomization

  Episodes and duration of hospital stay

  Survival

# AMPLE-2

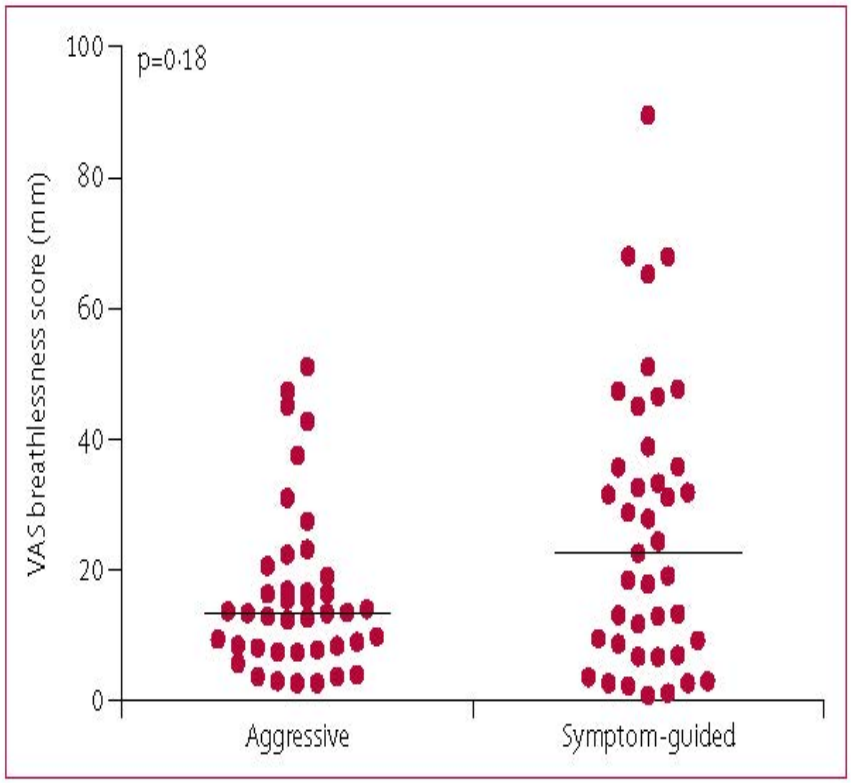



*Figure 2:* Average VAS breathlessness scores of each patient over the first 60 days, by treatment group

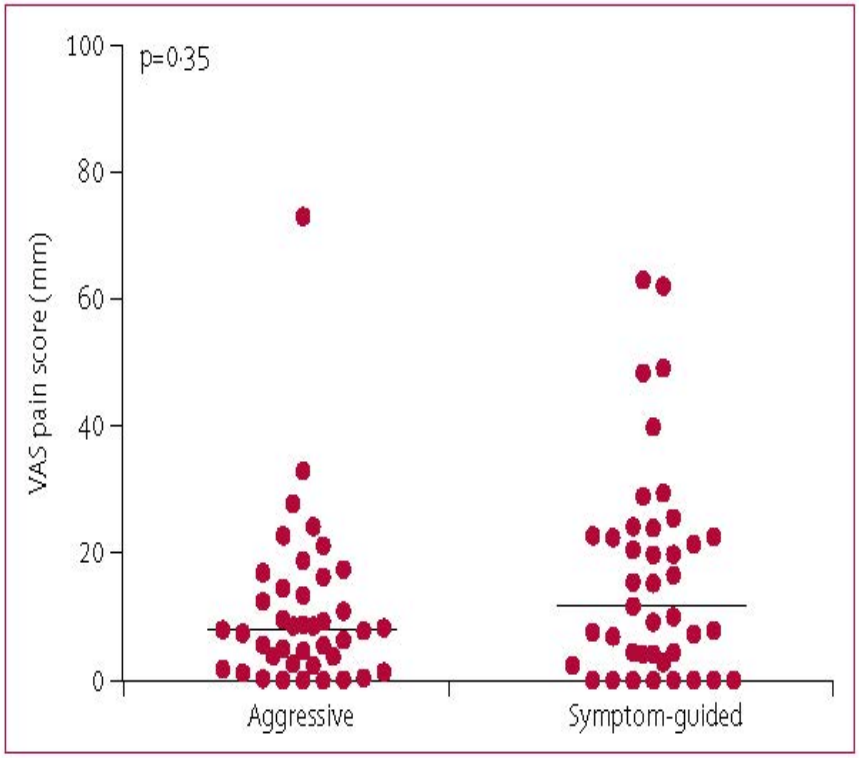
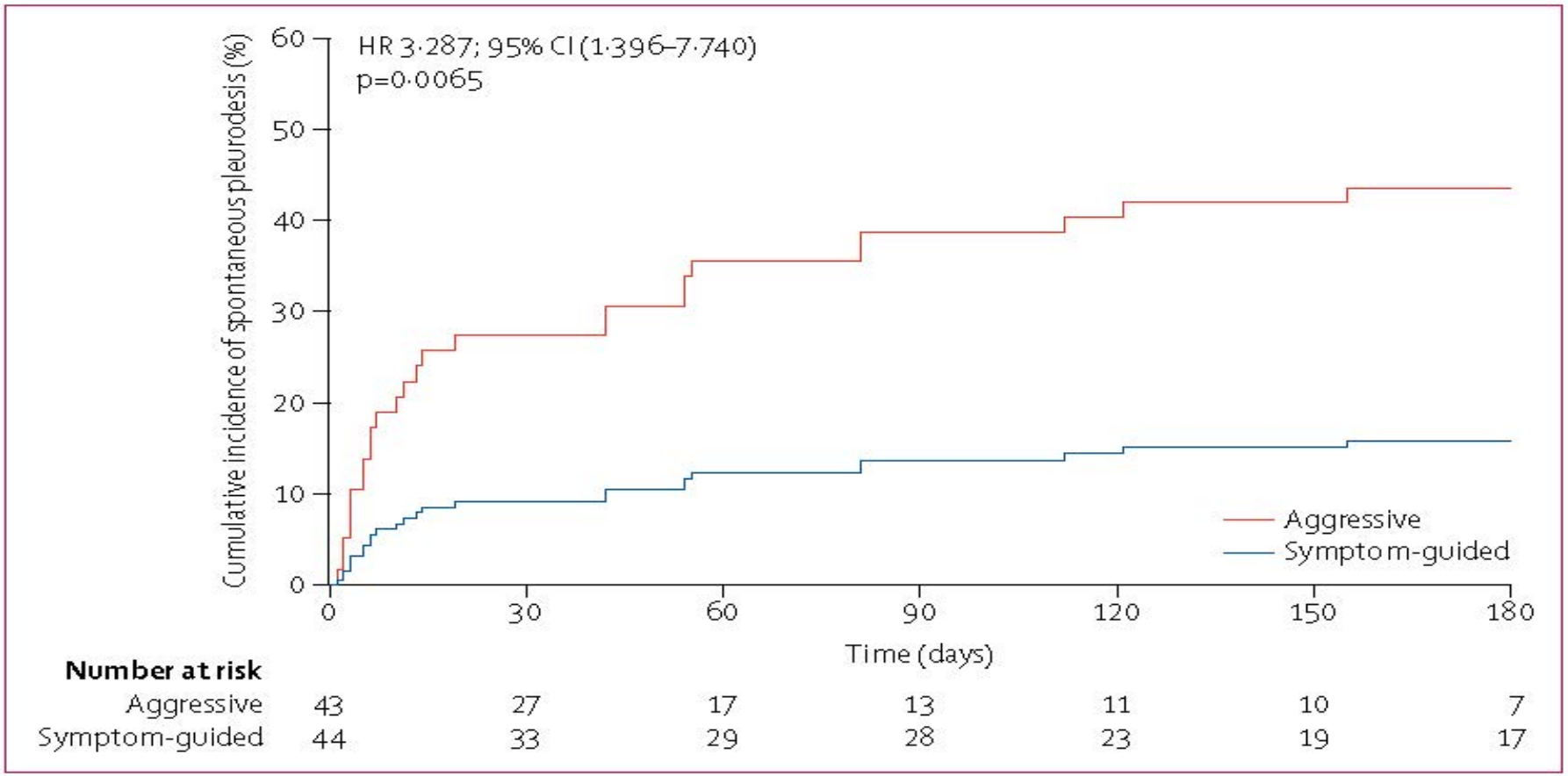



*Figure 4:* Average VAS pain scores of each patient over the first 60 days
Horizontal lines indicate median values. VAS=visual analogue scale.

# Ample Study: Cumulative Incidence of Pleurodesis at 6 Months



# AMPLE-2 Conclusions

- VAS breathlessness score (*Primary Outcome*) did not differ significantly between the aggressive vs symptom-guided management
- No significant between group differences in survival, hospital days, and VAS pain score
- Higher rate of spontaneous pleurodesis and EQ-5D-5L were observed in the aggressive arm
- AEs were uncommon in either group

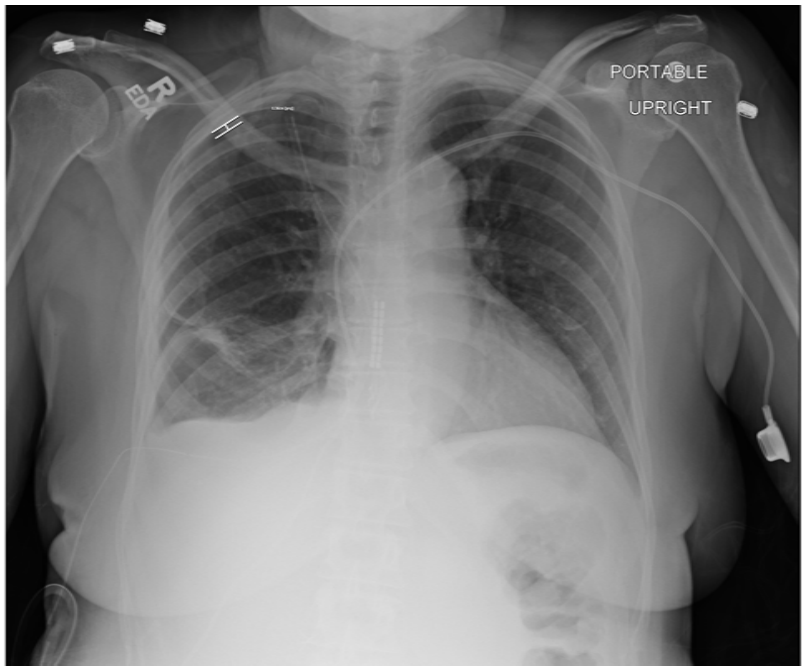
Case 3 cont....After placement of a TPC, here is the CXR. After 10 days, the TPC continues to drain approximately 300 cc per day. What should be considered at this point?

A. Medical thoracoscopy with talc poudrage

B. B. Continue daily drainage

C. C. Talc pleurodesis through the TPC

D. D. Surgery with partial pleurectomy and mechanical pleurodesis

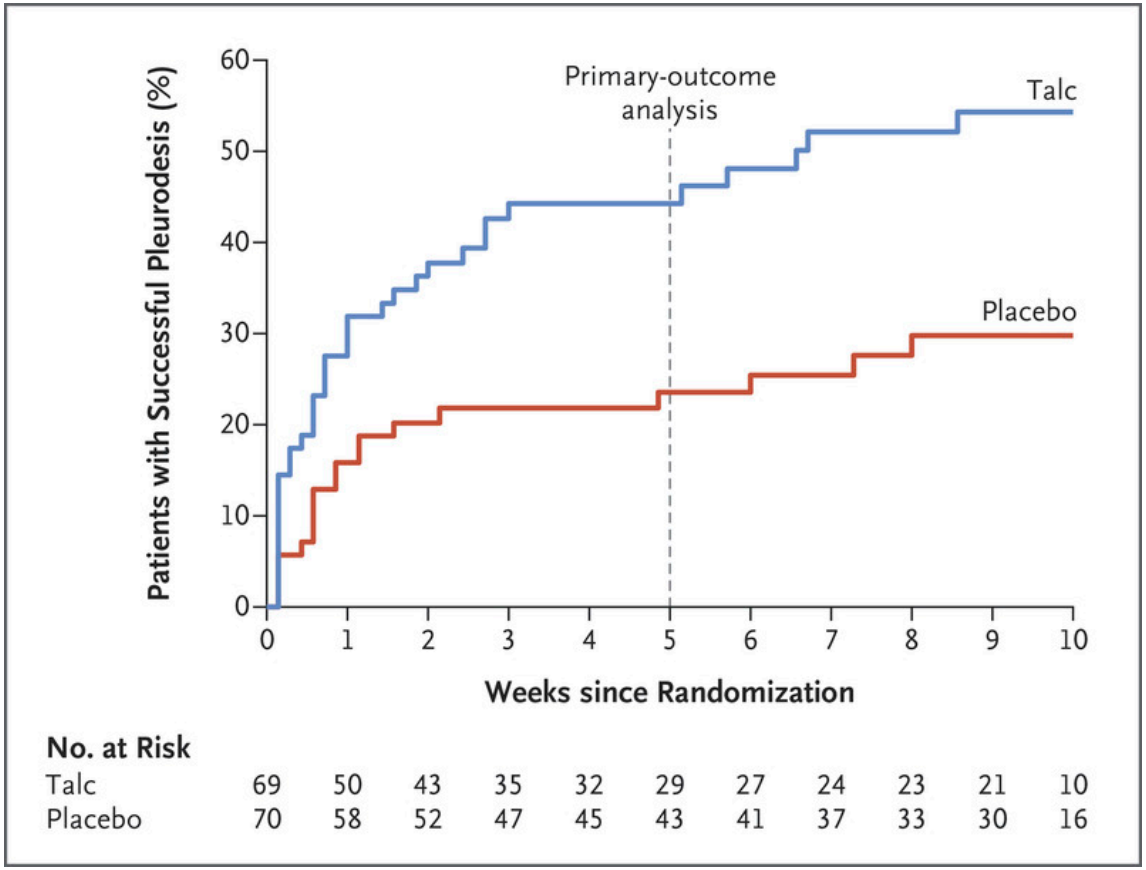



# Outpatient Talc Administration by Indwelling Pleural Catheter for Malignant Effusion

- Talc administered through an indwelling pleural catheter for inducing pleurodesis than the use of an indwelling pleural catheter alone.
- 18 centers in the United Kingdom.
- Drainage regularly on an outpatient basis. If there was no evidence of substantial lung entrapment at 10 days, patients were randomly assigned to receive either 4g of talc slurry or placebo through the indwelling pleural catheter. Talc or placebo was administered on a single-blind basis. Follow-up lasted for 70 days. The primary outcome was successful pleurodesis at day 35 after randomization.
- **30 of 69 patients (43%) in the talc group had successful pleurodesis, as compared with 16 of 70 (23%) in the placebo group (hazard ratio, 2.20; 95% confidence interval, 1.23 to 3.92; P=0.008).** No significant between-group differences in effusion size and complexity, number of inpatient days, mortality, or number of adverse events were identified. No significant excess of blockages of the indwelling pleural catheter was noted in the talc group.

Bhatnagar, et al. N Engl J Med 2018, 378(14):1313-1322

# Outcomes cont.



# 2018 ATS MPE Guidelines Summary

- Use ultrasound to guide pleural interventions
- In asymptomatic patients with known or suspected MPEs, pleural interventions should not be performed
- In symptomatic patients, large volume thoracentesis should be done 1st to determine if symptoms are related to effusion and if lung is expandable
- In patients with symptomatic malignant pleural effusions and known (or likely) expandable lung and no prior definitive therapy, either an indwelling pleural catheter or chemical pleurodesis is suggested as first line definitive pleural intervention for management of dyspnea.
- In patients with a symptomatic MPE and expandable lung undergoing talc pleurodesis, either talc poudrage or talc slurry should be used.

Feller-Kopman et al. Am J of Resp and Crit Care Med 2018; 198(7): 839-849

## 2018 ATS MPE Guidelines Summary cont.

- In patients with symptomatic MPEs with nonexpandable lung, failed pleurodesis, or loculated effusion, IPCs are suggested over chemical pleurodesis.
- In patients with IPC-associated infections, treating through the infection without catheter removal is usually adequate. But, catheter removal is suggested if the infection fails to improve.

Feller-Kopman et al. Am J of Resp and Crit Care Med 2018; 198(7): 839-849

## Summary regarding indwelling pleural catheters:

- Afford excellent symptom control
- Appear cost effective in comparison to pleurodesis up to 6 months of therapy
- Generally can be placed in outpatient setting
- Result in spontaneous pleurodesis in approximately 50% of all patients at 30-50 days, 70% at 90 days in those fit for pleurodesis
- Appear to decrease subsequent hospitalization days relative to pleurodesis
- Daily drainage should be performed when feasible and tolerable by patients
- If no substantial lung entrapment, talc pleurodesis may be used.

# Aknowledgement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