# An update on pleural disease

# Conflicts of interest

- Sponsored by Rocket Medical to attend conferences
- Honoraria by AstraZaneca for speaker fees

# Why me?

- Newcastle medical school 2000-2005
- Trained in region as registrar
- 1 year in Australia
- 1 year in pleural fellowship
- 2 years pleural consultant
- About 50 publications, abstracts, posters, presentations worldwide
- Faculty member on thoracoscopy, ERS, Asia Pacific courses and conferences
- Written pleural guidelines
- Trial recruiter

# Pleural disease- vast topic

- Malignant vs non malignant disease
- Unilateral vs bilateral disease
- Pneumothorax
- Diagnostics
- Treatment
- Palliation
- Many guidelines- BTS ones most up-to-date, and many books

# Vignette

- 62 year old male, breathless
- Admitted under cardiology with bilateral pleural effusions, pedal oedema and a raised jvp

- History of hypertension, previous heavy smoking and deep vein thrombosis. He is diuretic naïve.
- Echo LV function 40% , BNP 5000
- Intravenous diuretics, fluid restriction and blood pressure control help in alleviating some breathlessness but his effusions, though smaller, persist.

<u>Respiratory opinion</u>

- Some asbestos exposure (previous shipyard worker) 40 years ago.
- Bedside thoracic ultrasound - left sided effusion, bigger than the right.

pH of 7.32, LDH 300units/L, protein 33g/L with respective plasma values of 550units/L and 89g/L. Cytology is negative.

A chest computer tomogram shows bilateral effusions with mild enhancement of the left pleural surface.

- Continued diuresis? Reassurance? Further imaging? Further diagnostics?

# Diagnostics

- Light’s criteria

Pleural fluid is exudate if one of the following is present:

1.Effusion protein/serum protein ratio greater than 0.5

2.Effusion lactate dehydrogenase (LDH)/serum LDH ratio greater than 0.6

3.Effusion LDH level greater than two-thirds the upper limit of the laboratory's reference range of serum LDH

pH of 7.32, LDH 300units/L, protein 33g/L with respective plasma values of 550units/L and 89g/L.

# Diagnostics

- 80% of patients with bilateral effusions have cardiac failure and 75% of those resolve within 48 hours of starting diuresis
- 20% of those become exudative due to protein re-absorption and resolution of venous hypertension.
- The diagnostic sensitivity of Light's criteria approaches 96% but care must be taken when applying the criteria to effusions in chronic heart failure

Our patient has an exudate and heart failure

Continued diuresis? Reassurance? Further imaging? Further diagnostics?

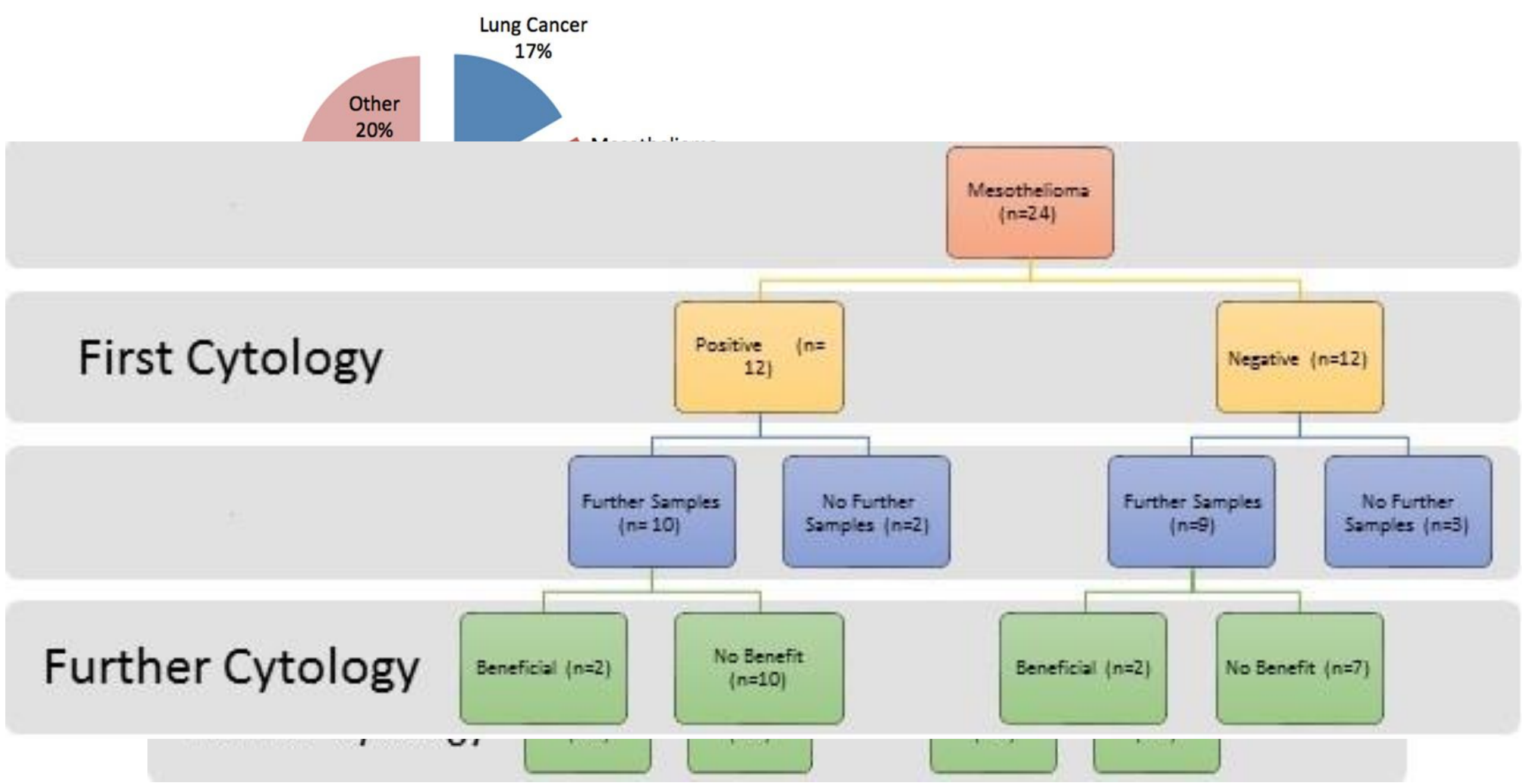
# Diagnostics

- Commonest cause of an exudate is malignancy

<u>BUT although up to 15% of transudates can be malignant</u>

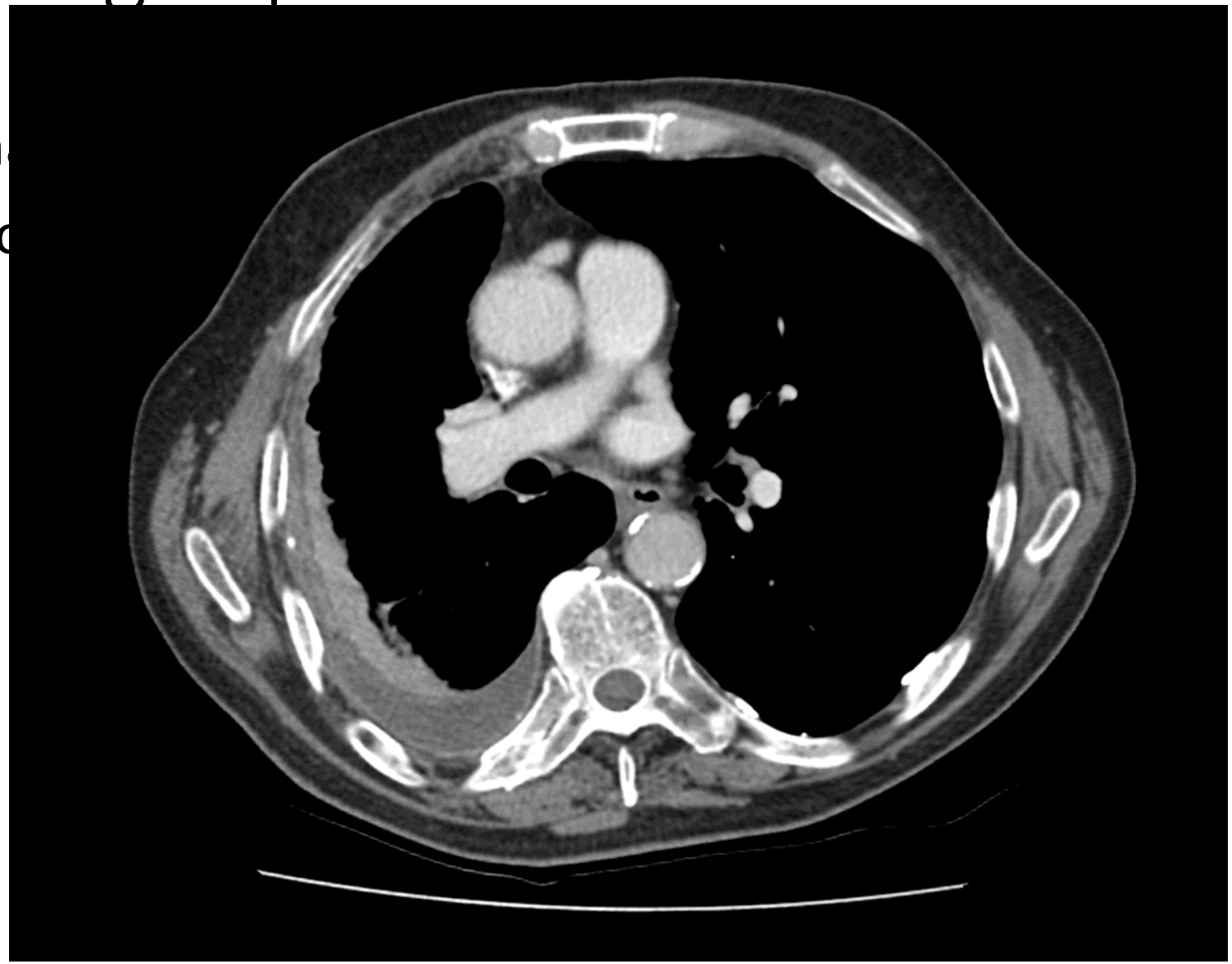
Cytology is positive in up to 60% of malignant effusions

A second sample only increases diagnostic yield by about 15%

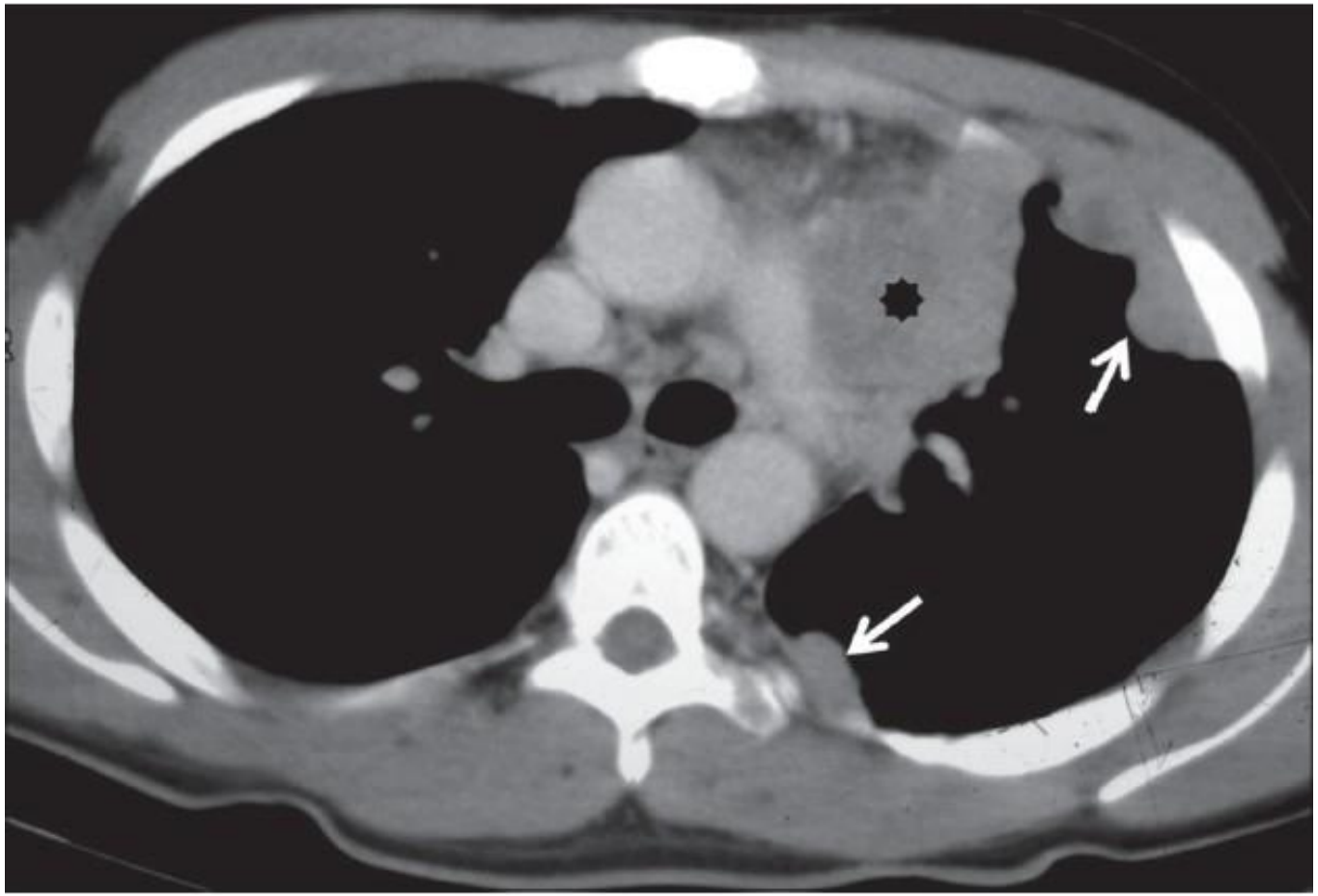

Lung Cancer
17%
Other
20%
Mesothelioma (n=24)
First Cytology
Positive (n= 12)
Negative (n=12)
Further Samples (n= 10)
No Further Samples (n=2)
Further Samples (n=9)
No Further Samples (n=3)
Further Cytology
Beneficial (n=2)
No Benefit (n=10)
Beneficial (n=2)
No Benefit (n=7)

# CT scanning in pleural disease

- Delayed ph
- Sensitivity c



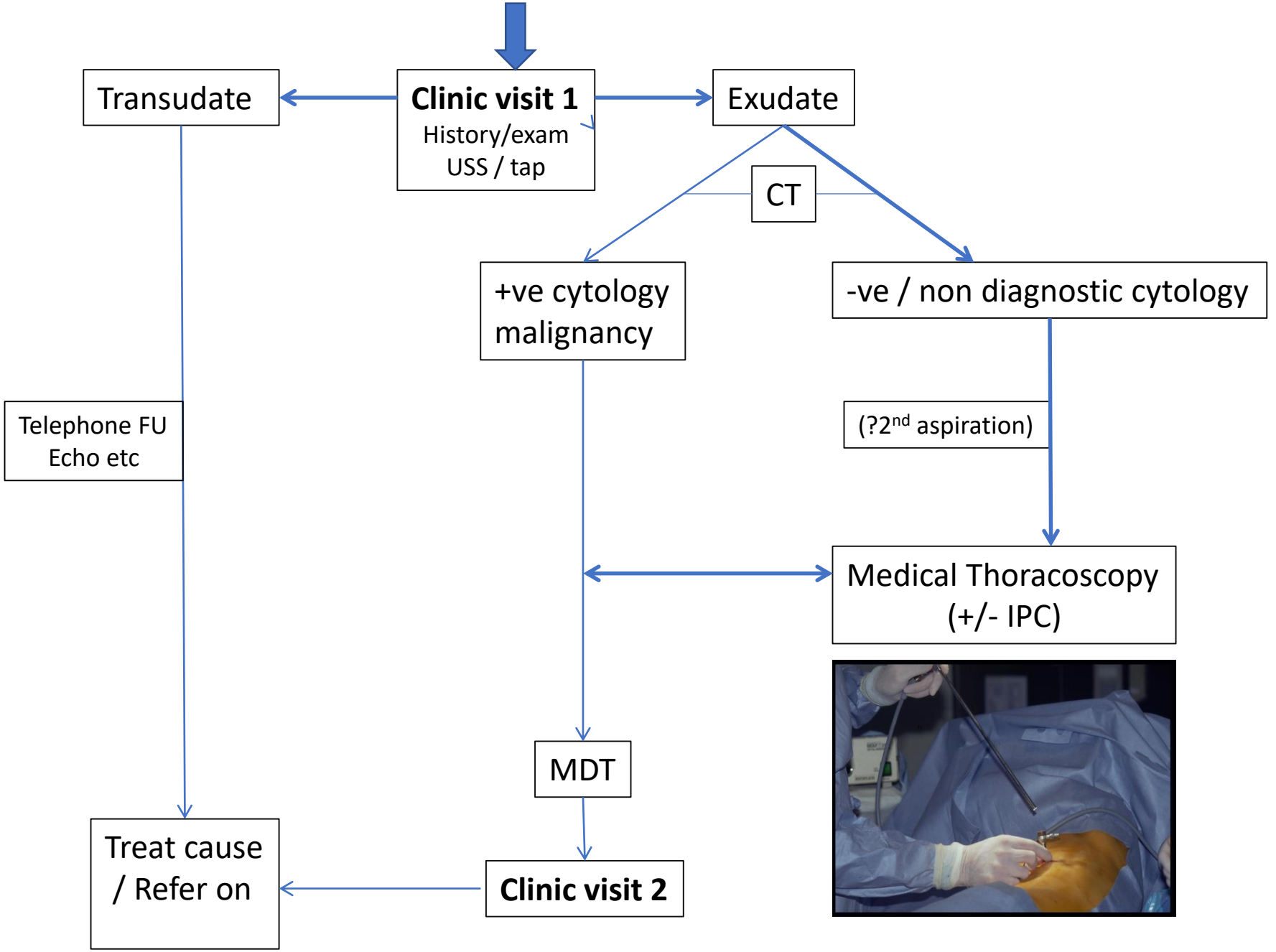
Pleural nodularity - CT guided biopsies – high sensitivities and specificities

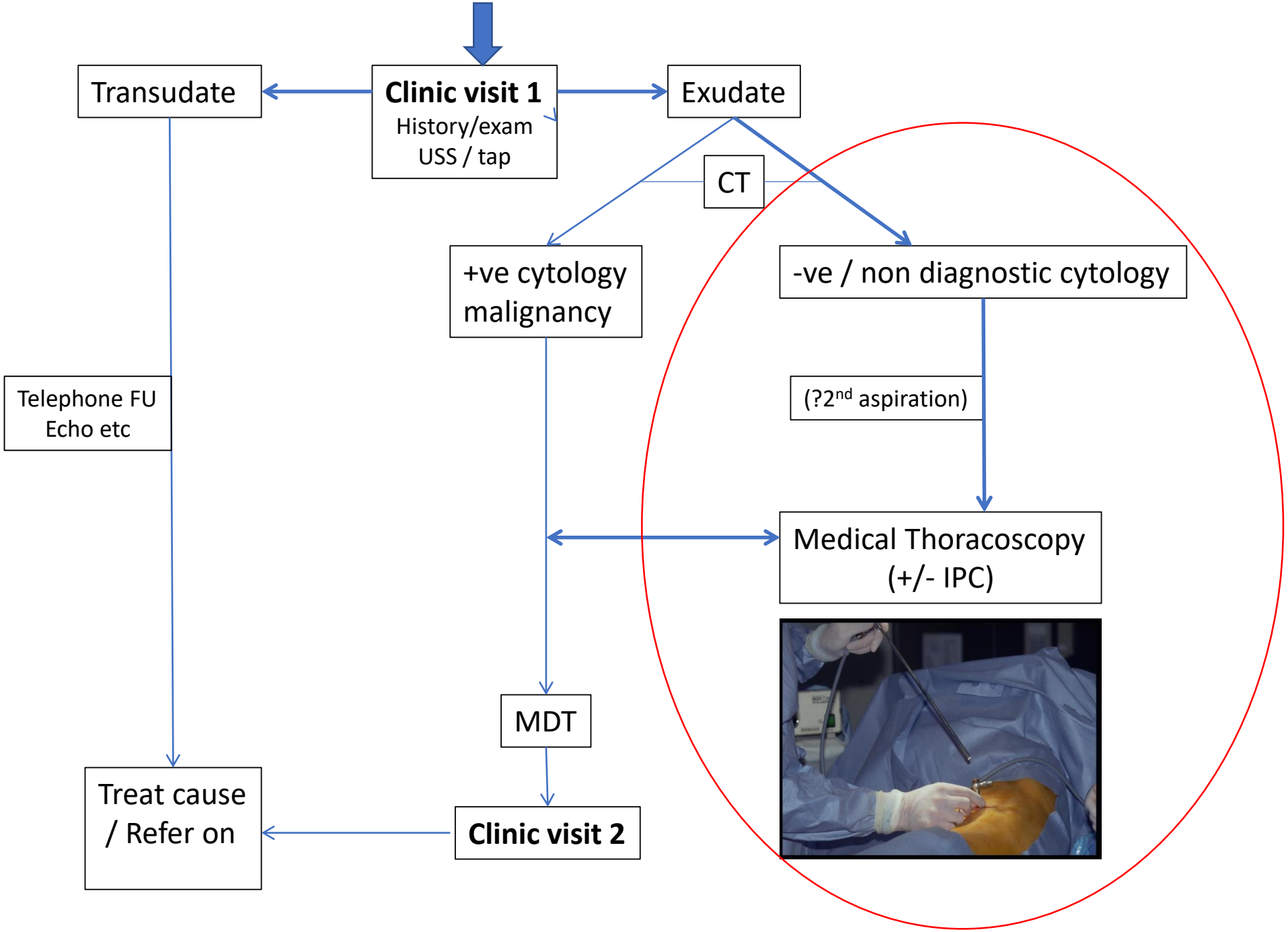


Abram’s needle biopsies are only useful in areas of high tuberculosis incidence and only have a diagnostic rate of 57% for malignancy

# The Pleural Clinic

- Timely appointment; 2 week rule
- 45 mins NP / 30 mins FU procedures
- ‘One-stop’ clinic (CT before)
  - History / examination
  - Thoracic USS
  - Diagnostic (+/- therapeutic) aspiration
  - Baseline bloods
  - Thoracoscopy / IPC
  - Discuss potential trial entry


Transudate
Clinic visit 1
History/exam
USS / tap
Exudate
CT
+ve cytology
malignancy
-ve / non diagnostic cytology
Telephone FU
Echo etc
(?2nd aspiration)
Medical Thoracoscopy
(+/- IPC)
MDT
Treat cause
/ Refer on
Clinic visit 2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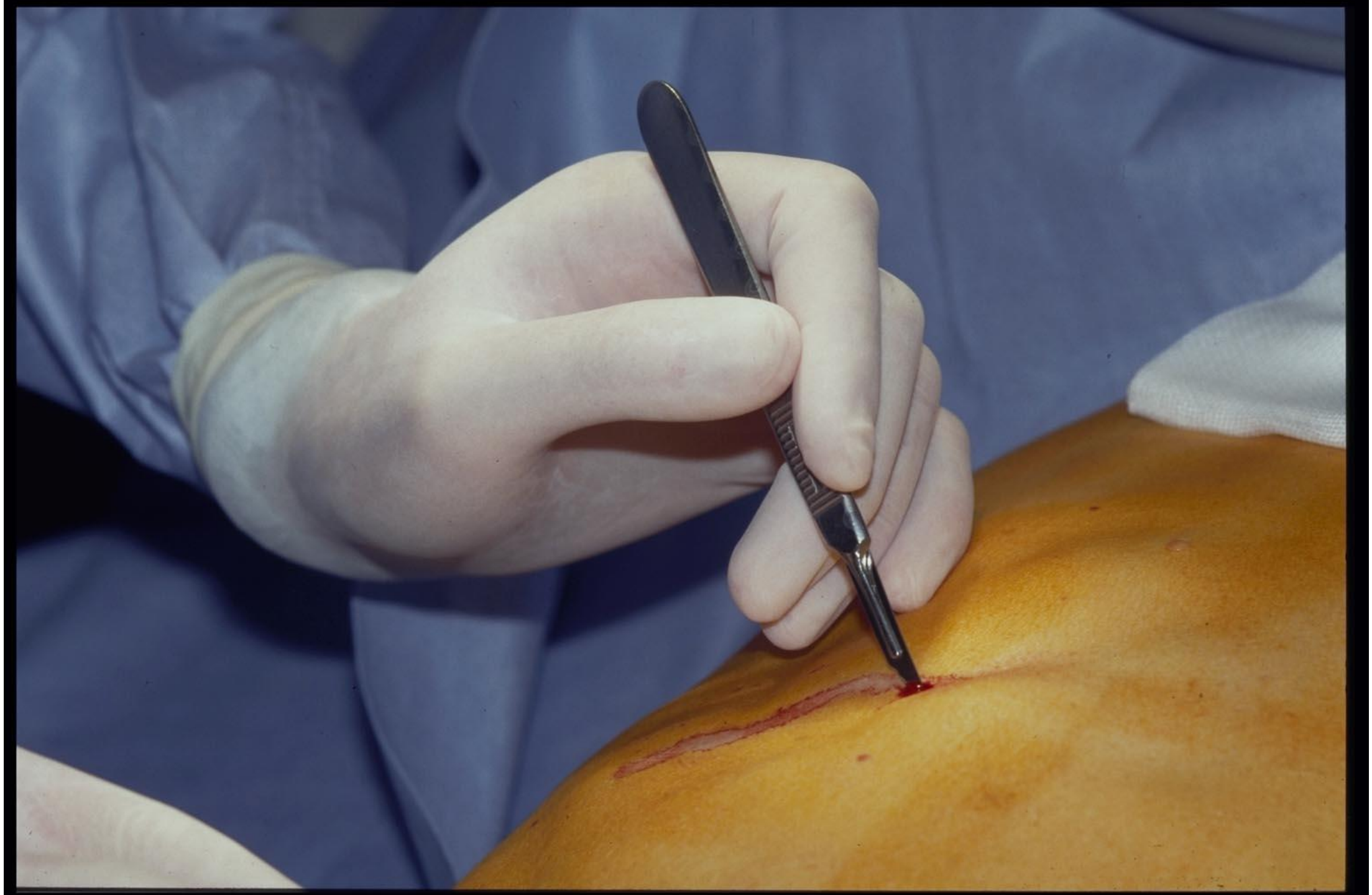
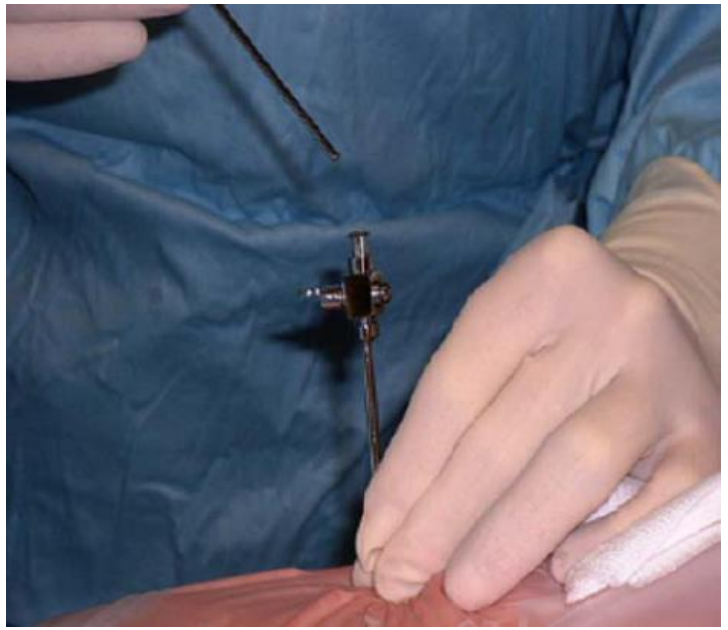
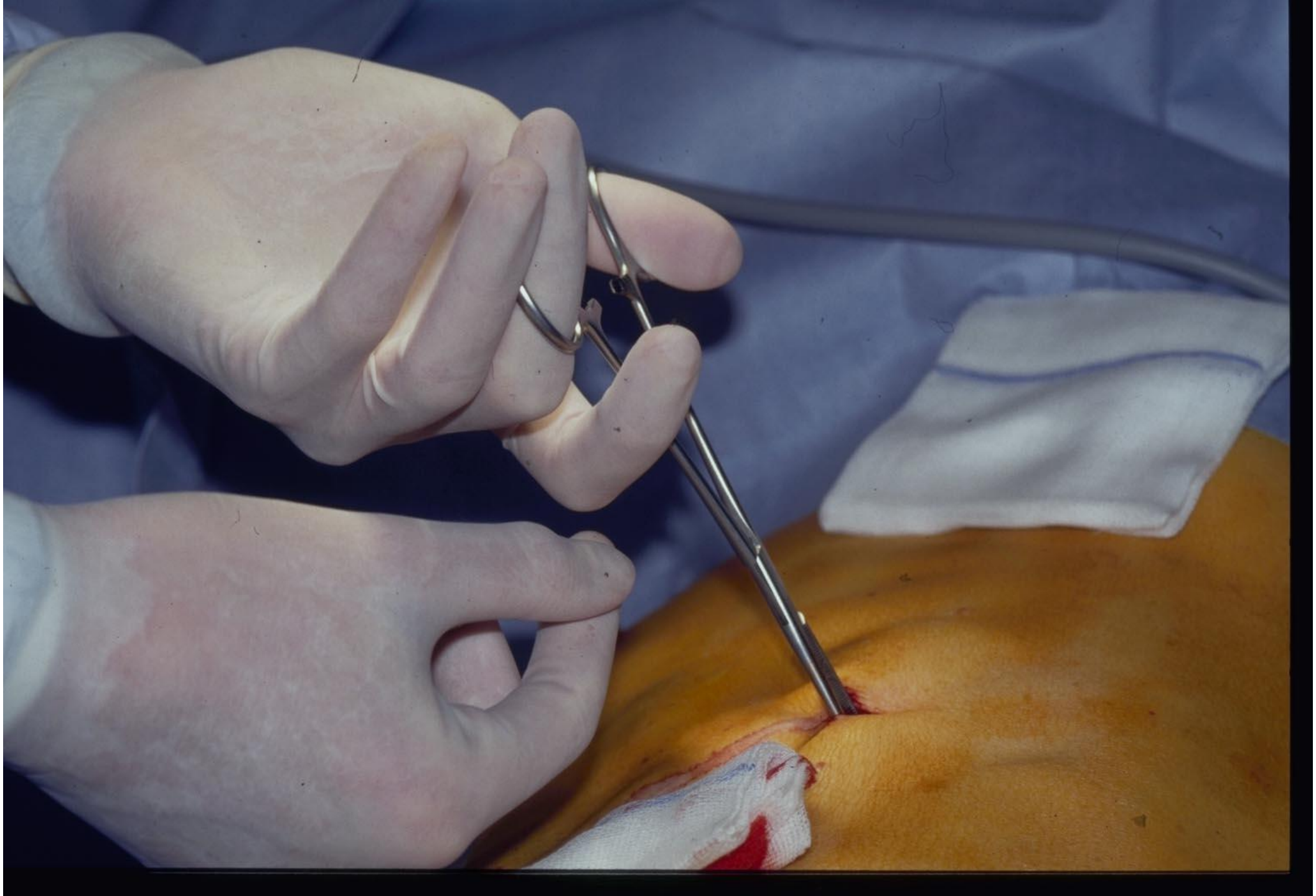
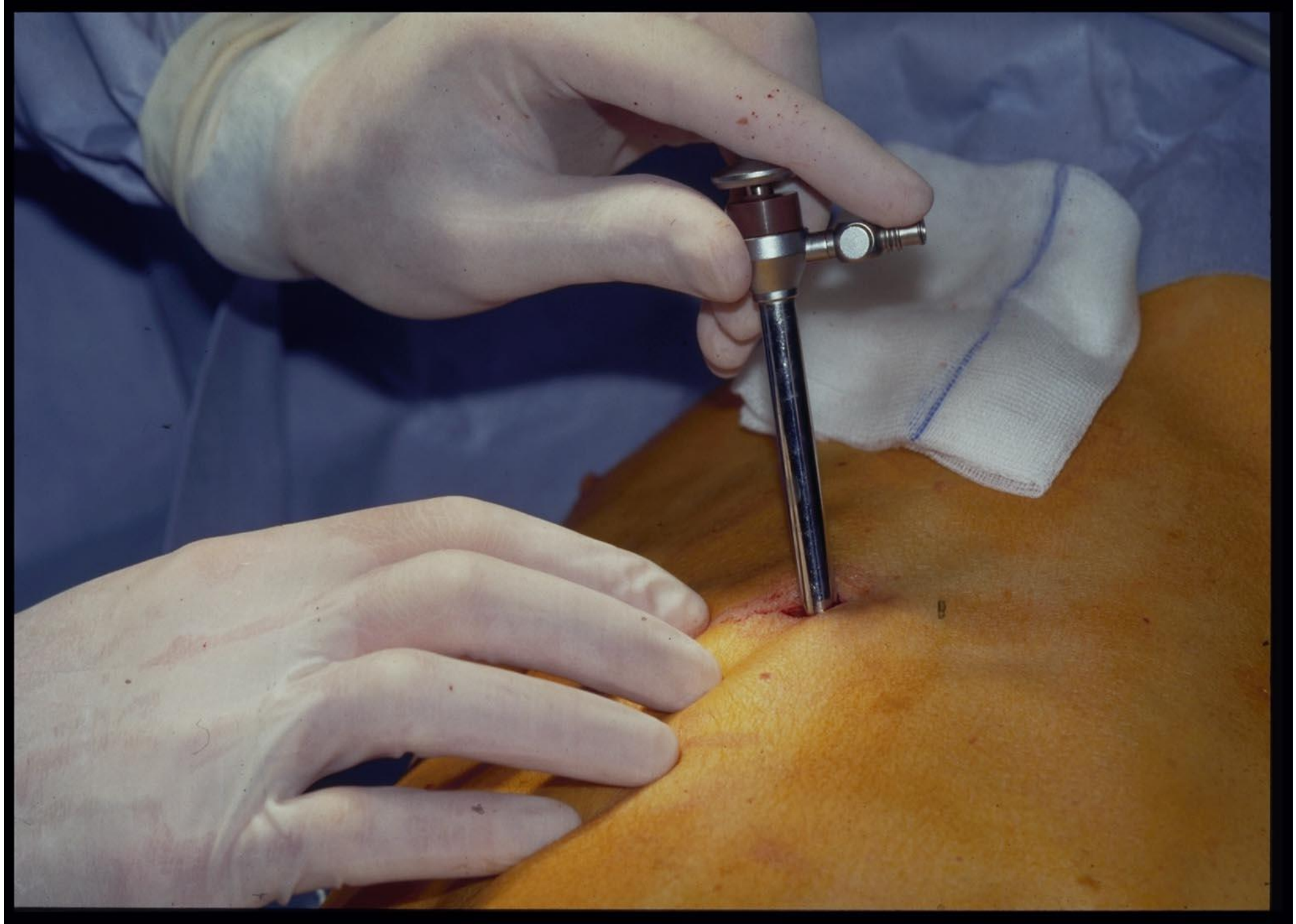


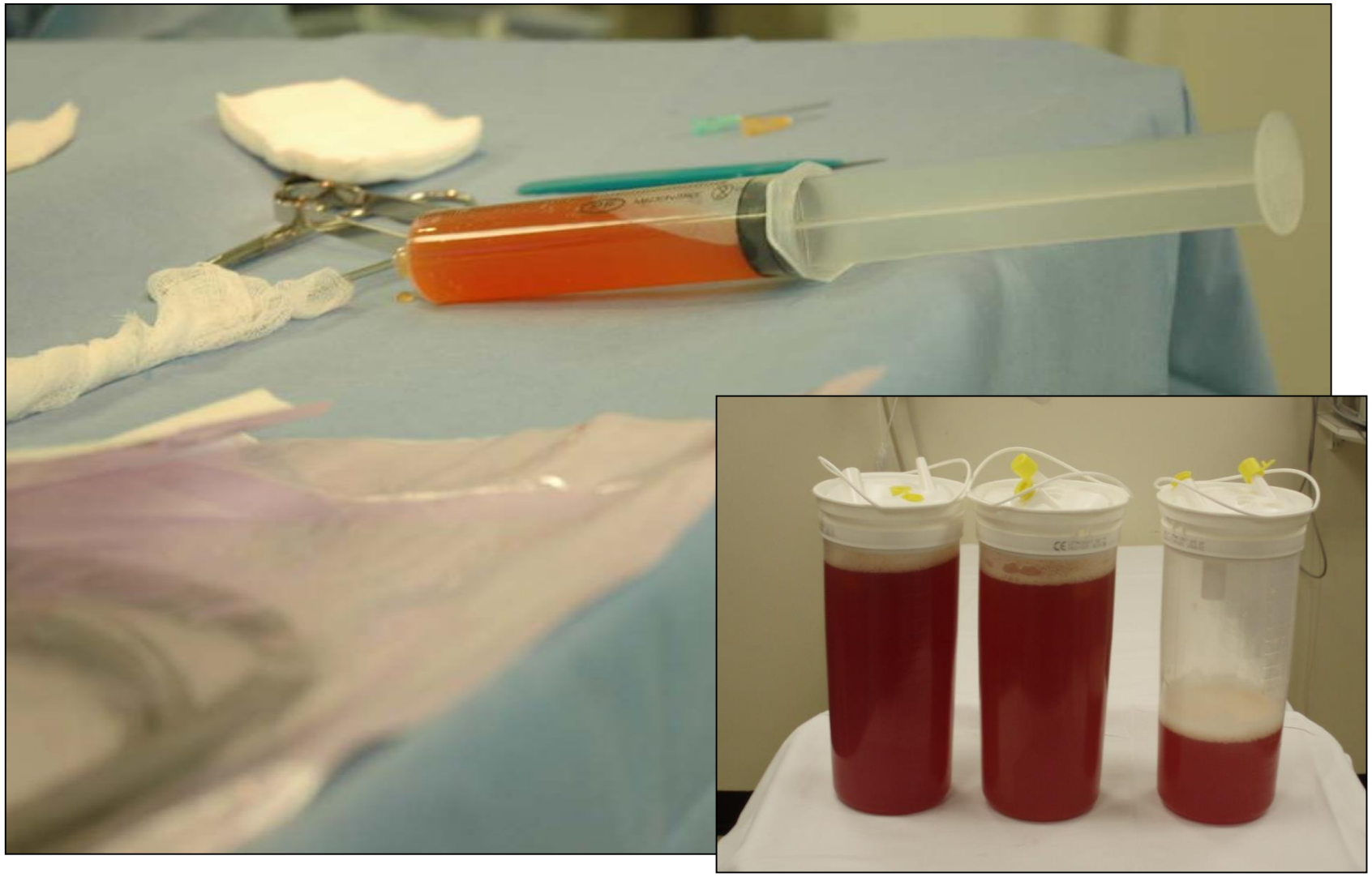
# Induce pneumothorax



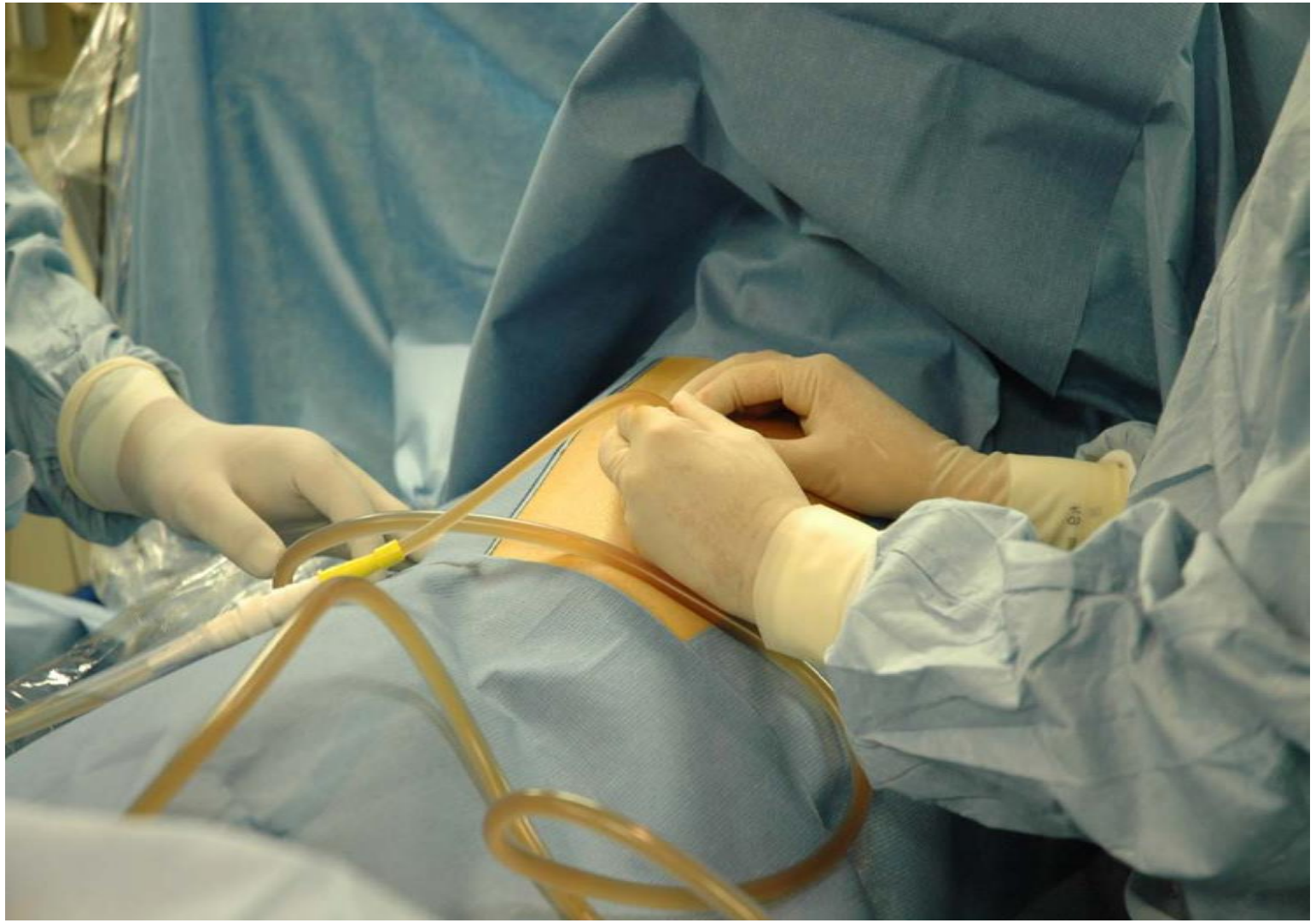


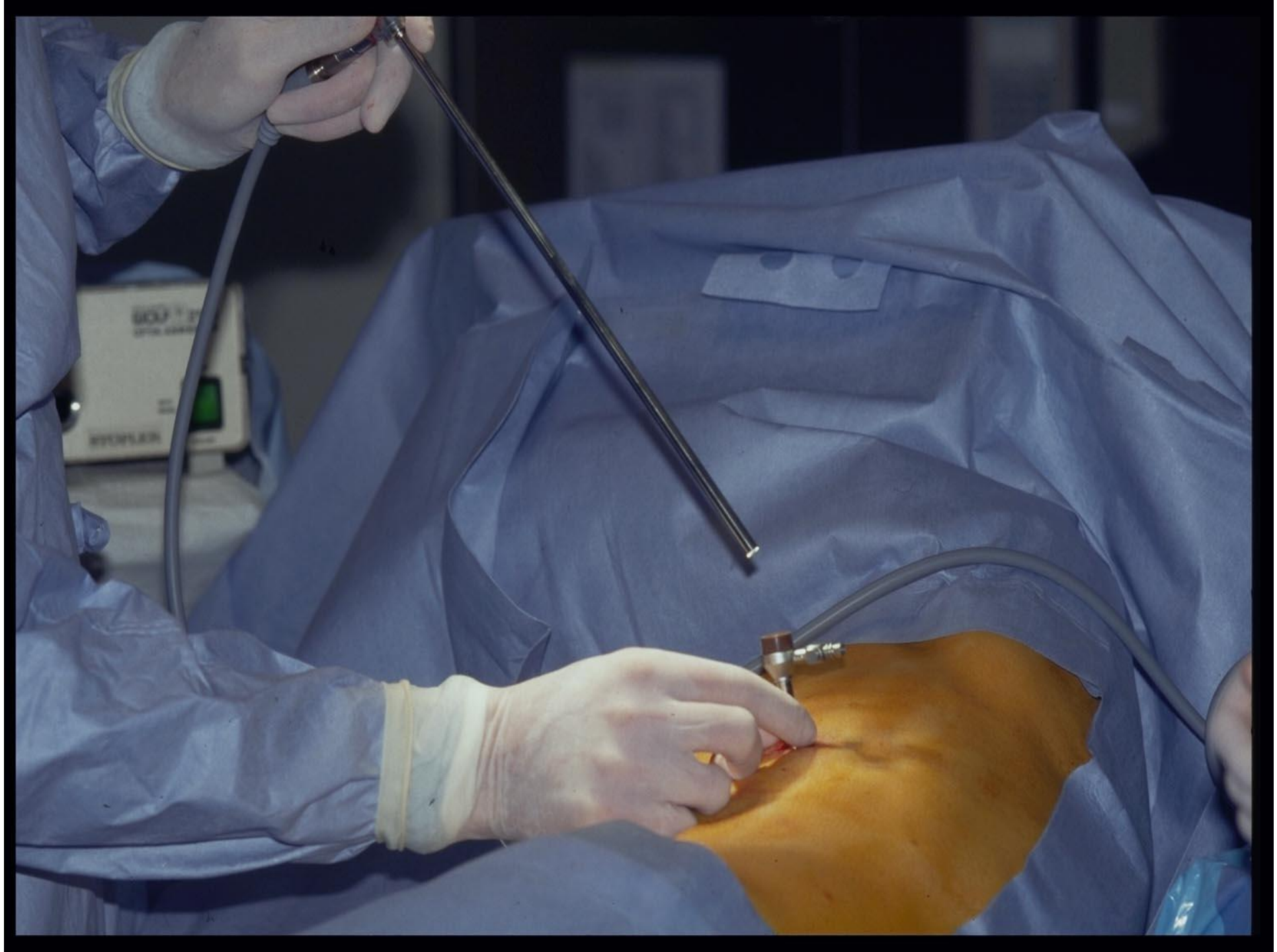


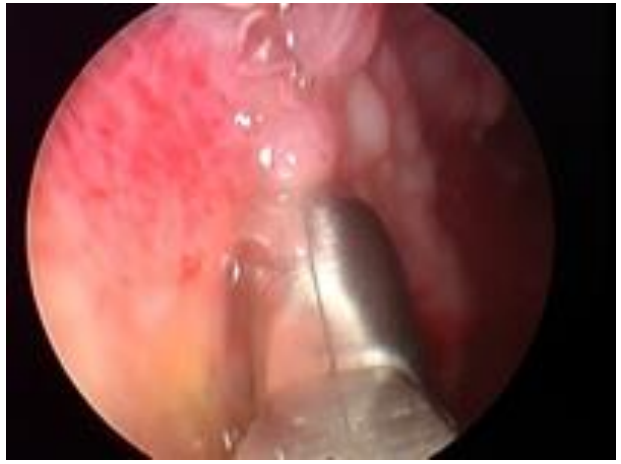
# Obtain cytology

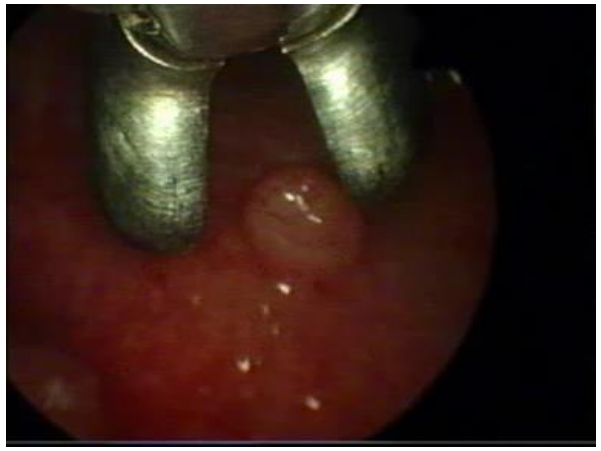


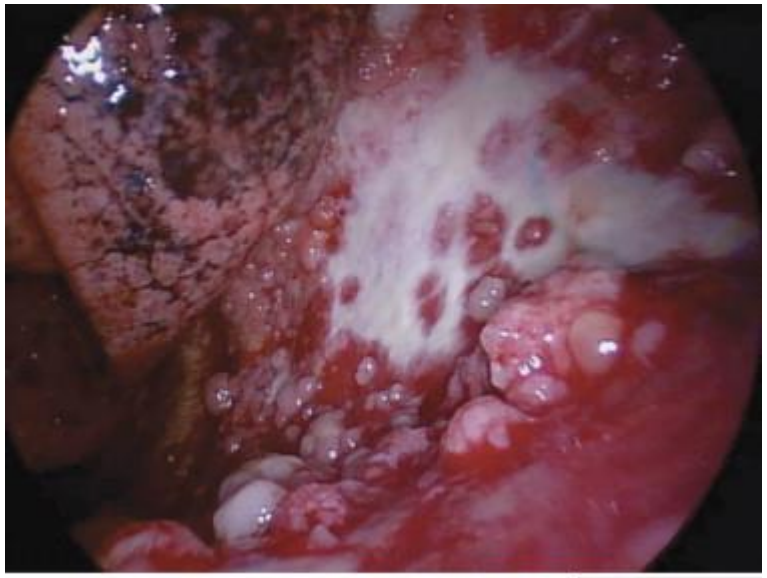
# Drain pleural space



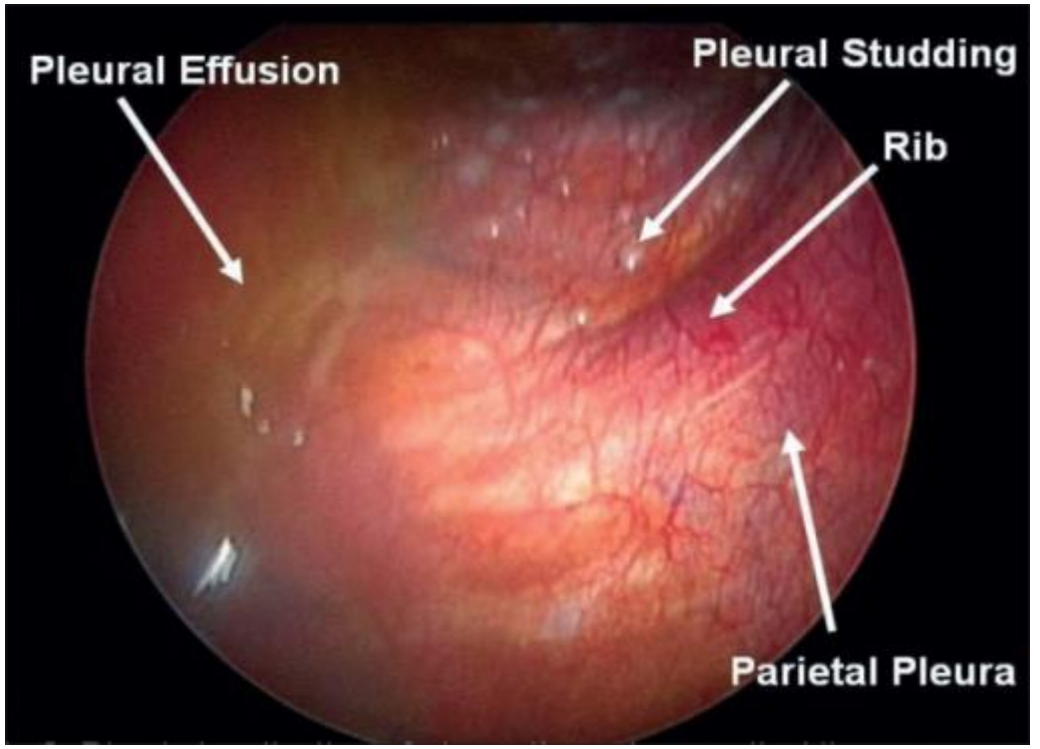




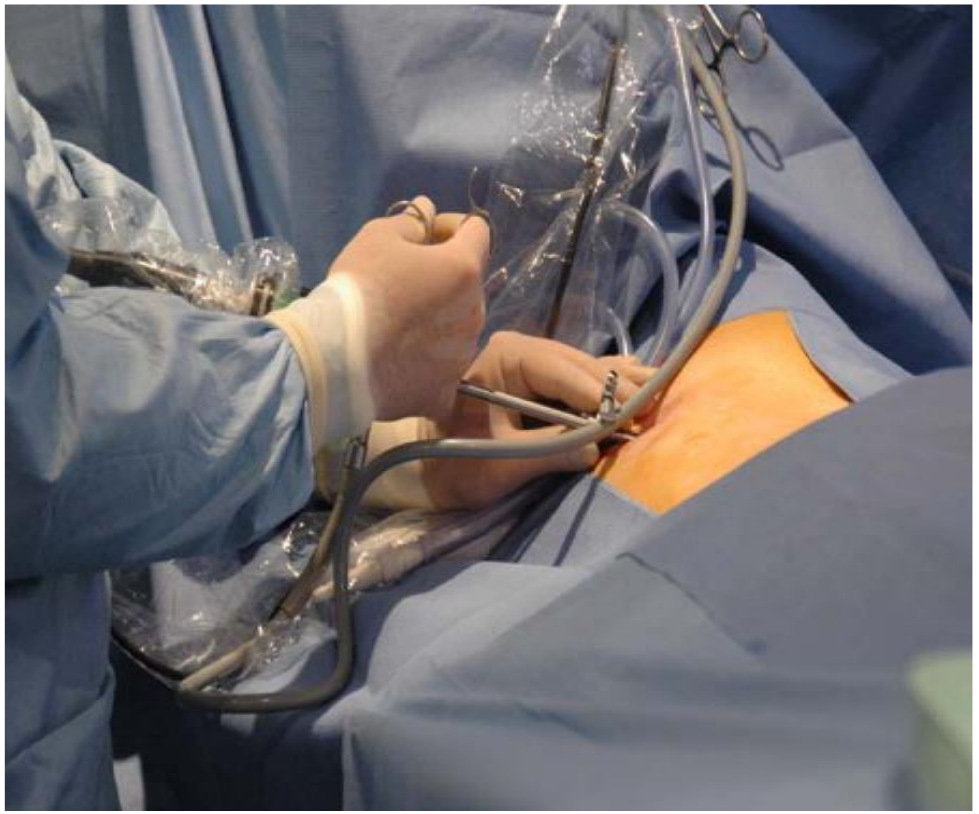


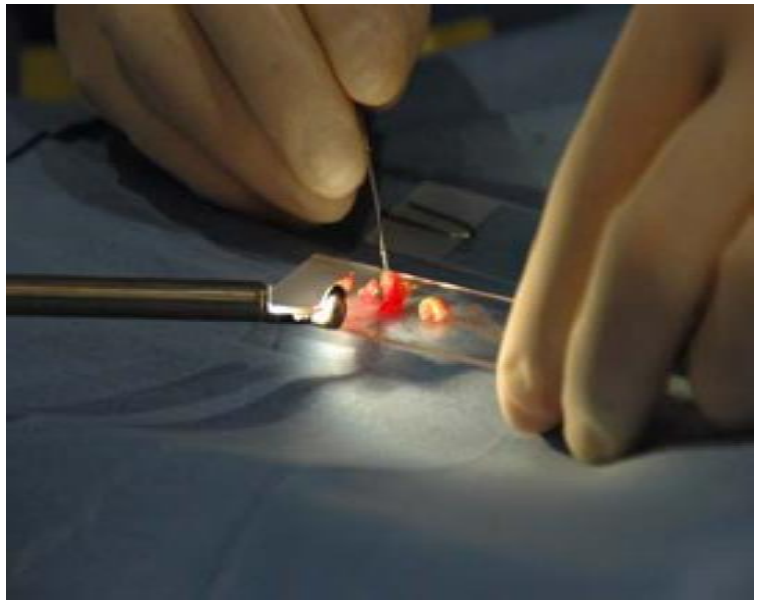


Drug Discovery Today

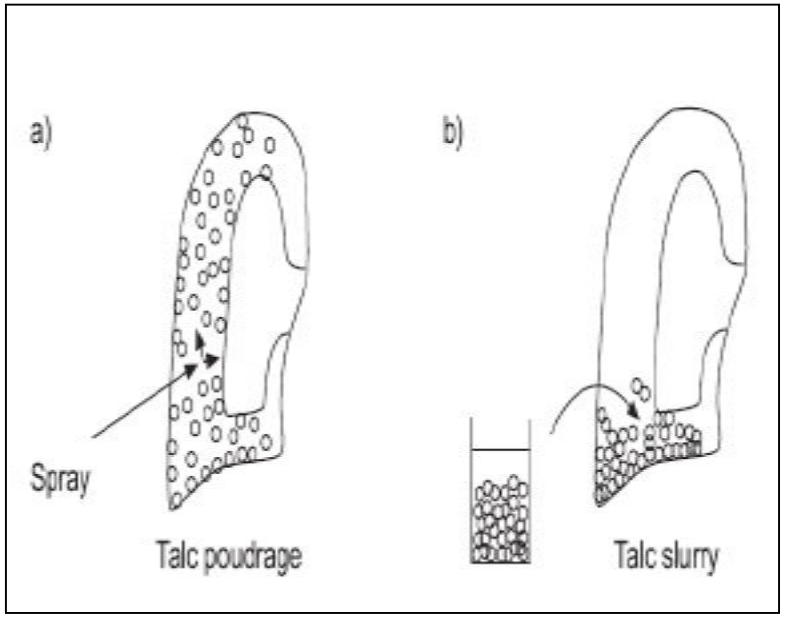


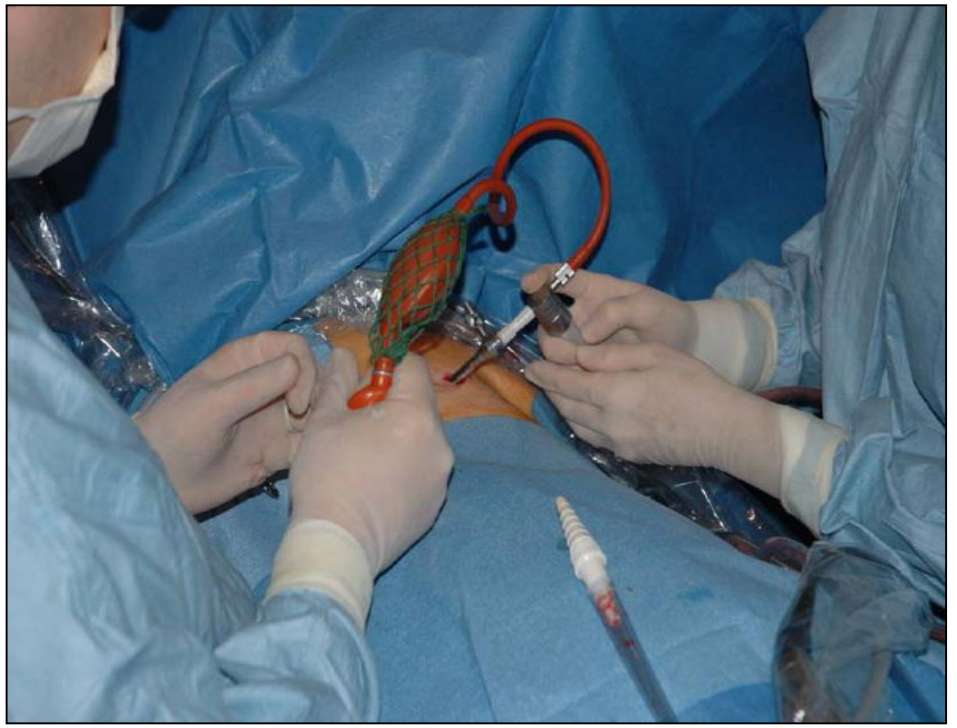
# Biopsies…





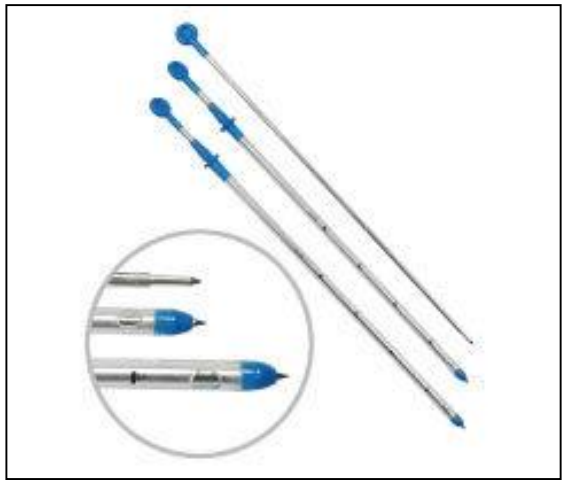
# Talc Poudrage (If indicated…)

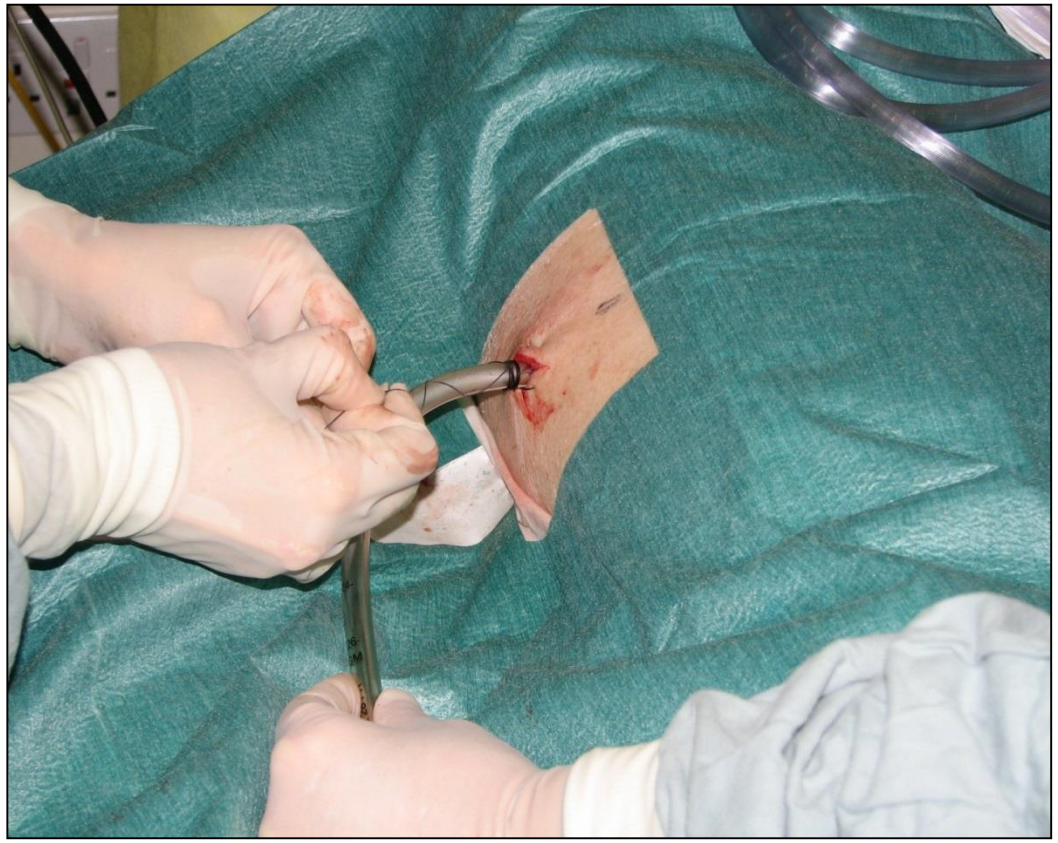


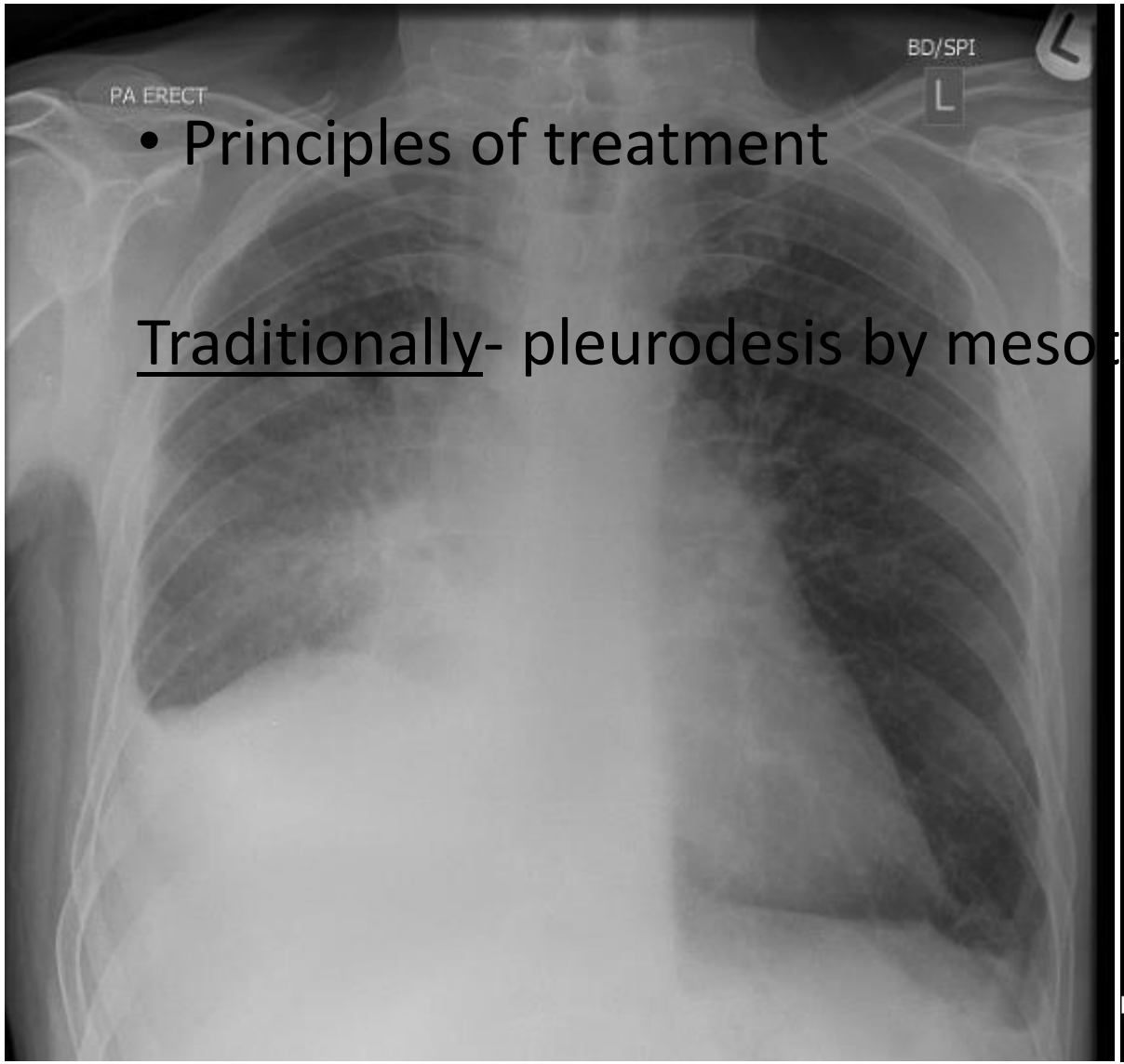
# Chest drain

- 24 / 28 F:



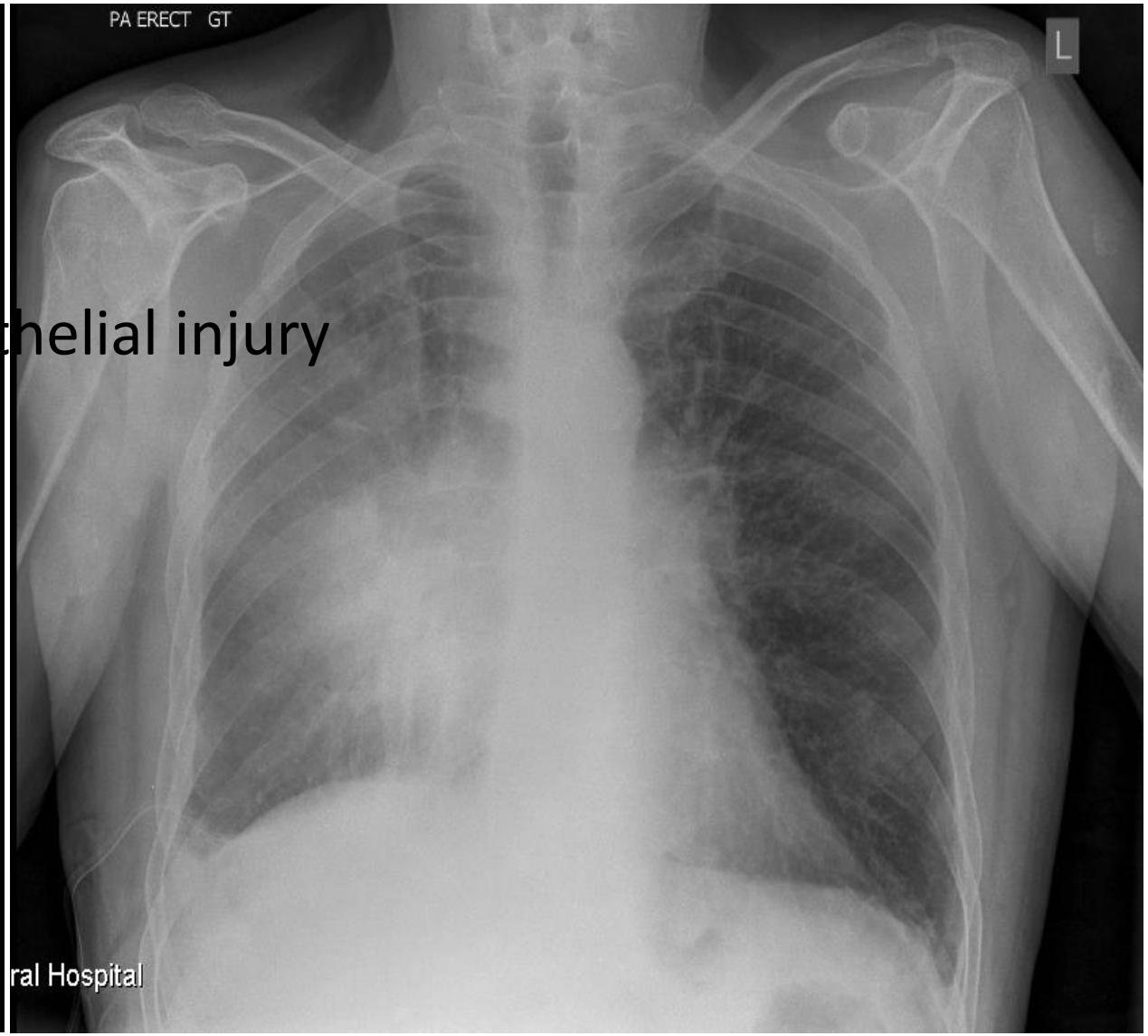


# Malignant pleural effusion




- Principles of treatment

Traditionally- pleurodesis by mesothelial injury

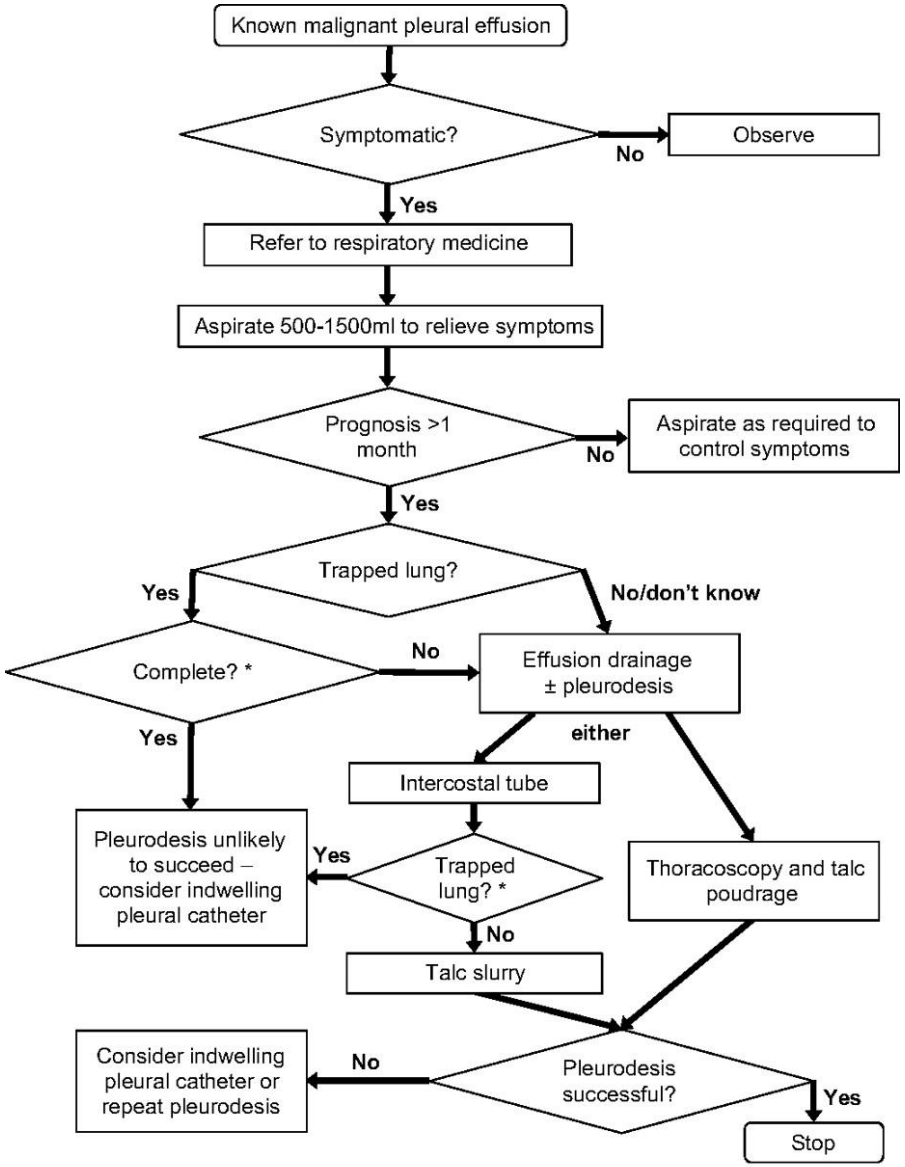


# Malignant pleural effusion

| Primary site | Approx Freq. |
|---|---|
| Lung | 37% |
| Breast / Ovary | 21% |
| Lymphoma | 10% |
| Mesothelioma | 10% |
| G-U | 9% |
| G-I | 7% |

About 40,000 new cases per year in UK

# Management algorithm for malignant pleural effusion.




* There is no evidence as to what proportion of unapposed pleura prevents pleurodesis. We suggest that <50% pleural apposition is unlikely to lead to successful pleurodesis

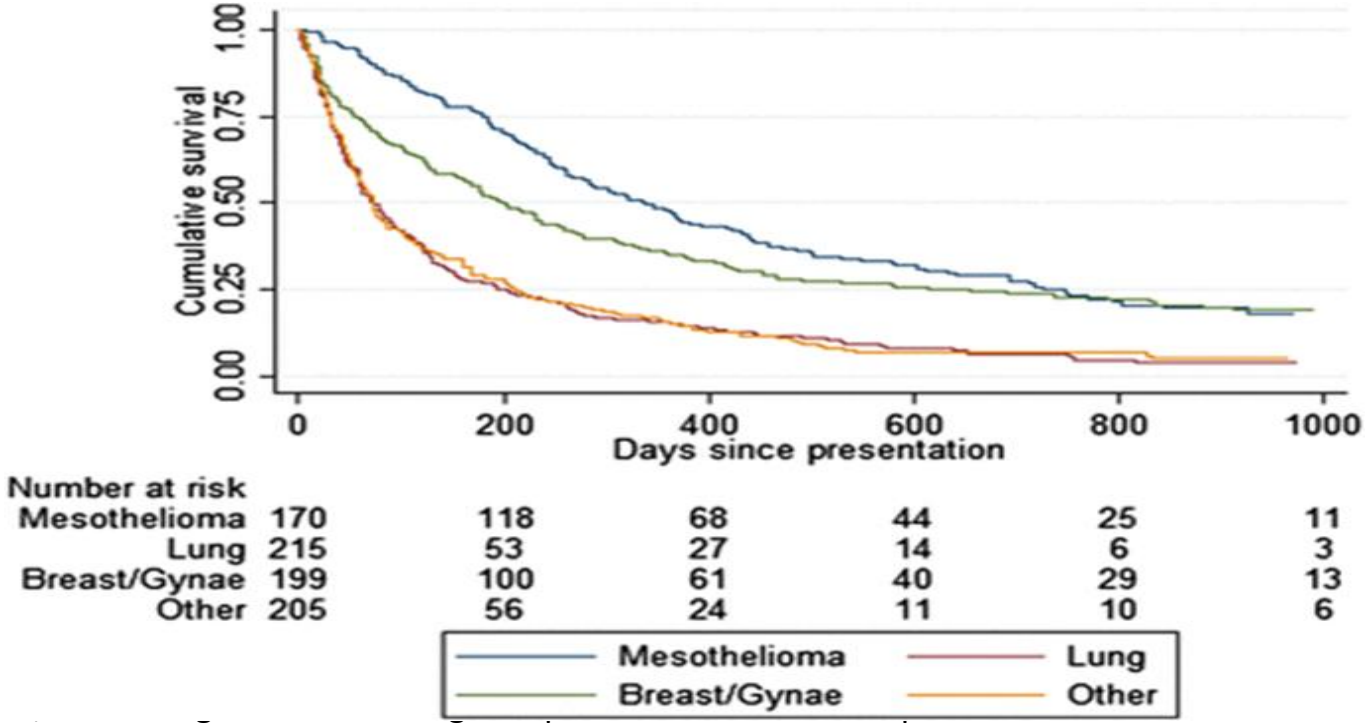
**Mark E Roberts et al. Thorax 2010;65:ii32-ii40**



THORAX

# Malignant effusions

- Median survival MPEs 4 months (3-12)

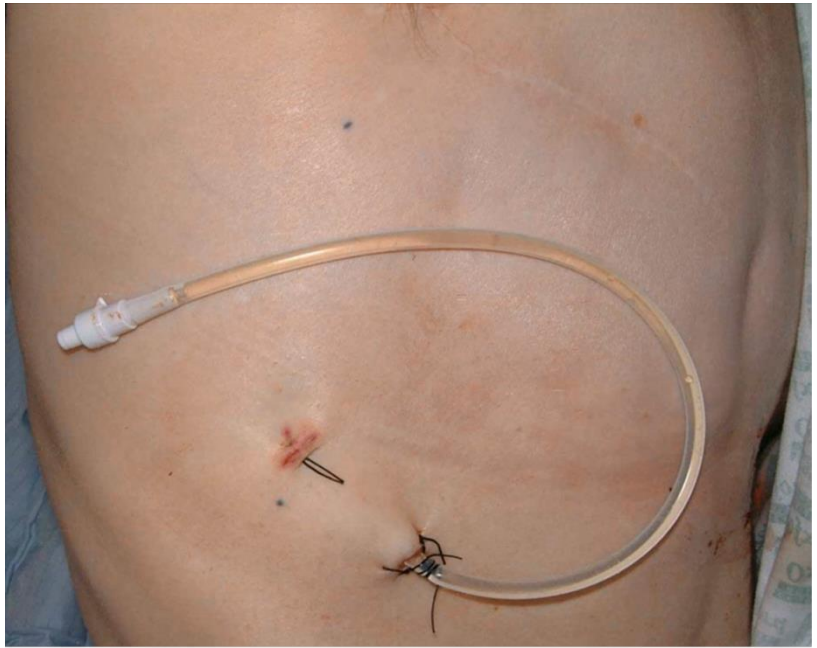



Clive et [illegible] NT prognostic score, Thorax 2014

# Changing Principles of treatment

Direct drainage strategy

- Patient centred- improve symptoms and QOL, patient in control
- Effective and timely, day case?
- Minimal side effects
- Reasonable cost



# Evidence

- Relief of dyspnea in 90% of patients with IPCs placed for MPE (1)
- Idea of offering IPCs as a first-line alternative to inpatient pleurodesis (2)
- 100 pts - IPC insertion as a first-line therapy (suitable for pleurodesis) - improvement in symptoms in all patients 2 weeks after IPC insertion (3)


1. Van Meter MEM, McKee KY, Kohlwes RJ: Efficacy and safety of tunneled pleural catheters in adults with malignant pleural effusions: a systematic review. J Gen Intern Med 2011; 26: 70–76
2. Tremblay A, Michaud G: Single-center experience with 250 tunnelled pleural catheter insertions for malignant pleural effusion. Chest 2006; 129: 362–368.
3. Tremblay A, Mason C, Michaud G: Use of tunnelled catheters for malignant pleural effusions in patients fit for pleurodesis. Eur Respir J 2007; 30: 759–762.

From: **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**

JAMA. 2012;307(22):2383-2389. doi:10.1001/jama.2012.5535

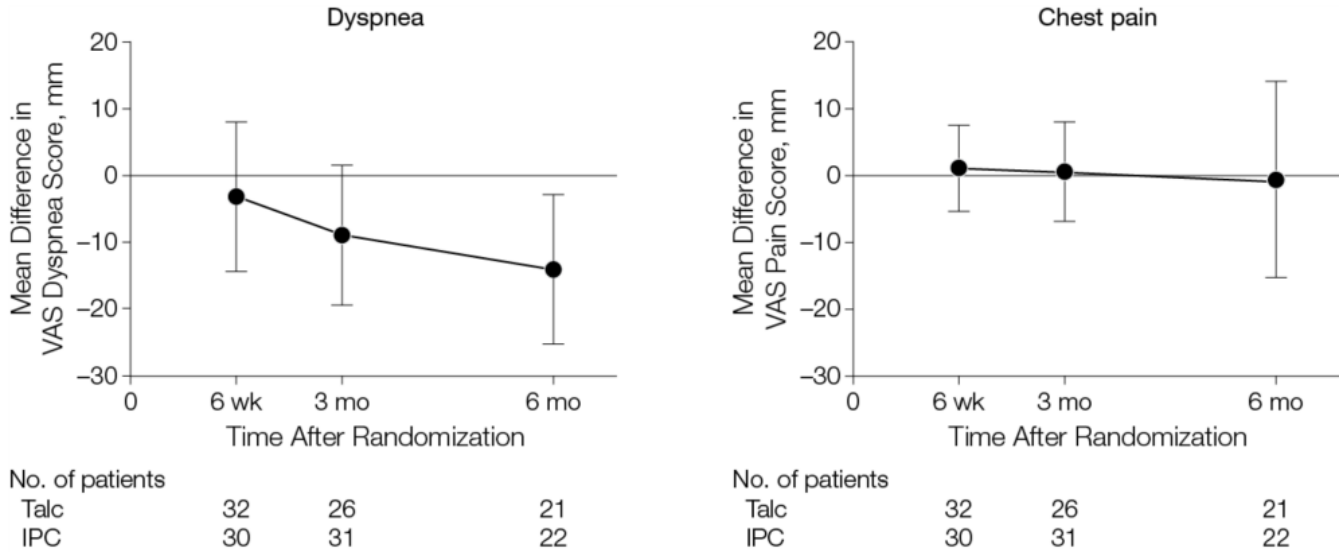



Figure Legend:

The error bars represent 95% confidence intervals.

# TIME 2 trial

- Secondary endpoints favouring IPC group

1. Proportion of patients who achieved a clinically significant relief in their symptoms (86 vs. 74%)
2. Median length of initial hospital stay (0 vs. 4 days)
3. Median number of days spent in hospital for drainage over the following 12 months (1 vs. 4.5 days).

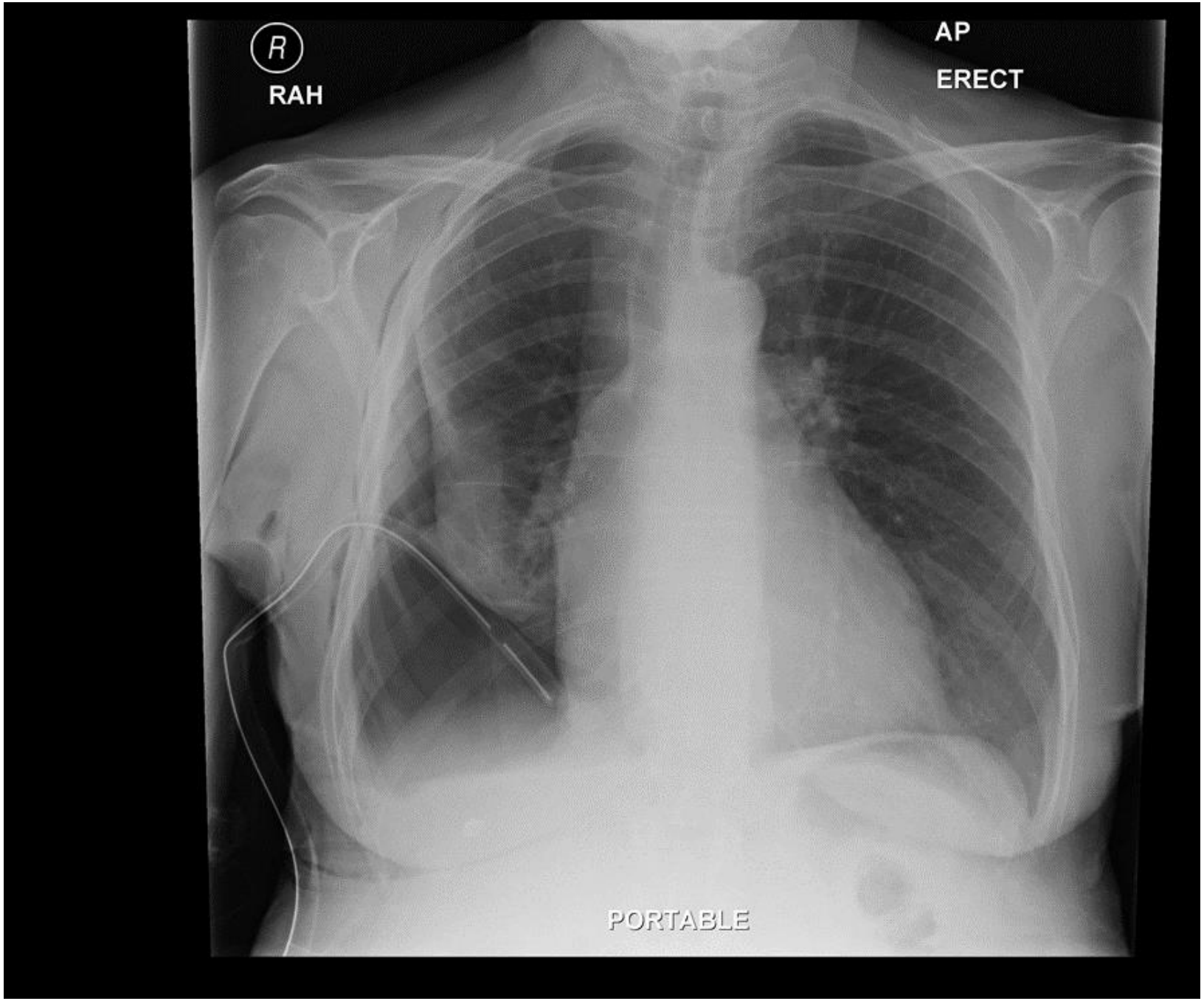
From: **Effect of an Indwelling Pleural Catheter vs Chest Tube and Talc Pleurodesis for Relieving Dyspnea in Patients With Malignant Pleural Effusion: The TIME2 Randomized Controlled Trial**

JAMA. 2012;307(22):2383-2389. doi:10.1001/jama.2012.5535

**Table 2.** Summary of Adverse Events by Treatment Group[a]

| | IPC | | Talc | |
|---|---|---|---|---|
| Type of Adverse Event | Serious | Nonserious | Serious | Nonserious |
| Pleural infection | 5 | 2 | 1 | 0 |
| Cellulitis | 1 | 5 | 0 | 1 |
| Symptomatic fluid loculation requiring fibrinolytics | 1 | 2 | 1 | 0 |
| Catheter site metastases | 0 | 1 | 0 | 0 |
| Catheter blockage | 1 | 9 | 1 | 0 |
| Other[b] | 1 | 0 | 2 | 3 |
| **Total** | **9** | **19** | **5** | **4** |

Abbreviations: IPC, indwelling pleural catheter; talc, chest tube and talc slurry pleurodesis.
[a] This table represents the total number of adverse events. A single patient may have had more than 1 adverse event.
[b] The serious adverse events included in the "Other" category were chest pain requiring readmission (1 IPC), surgical emphysema (1 talc), persistent air leak (1 talc). The 3 nonserious adverse events in the talc group were all chest tube displacement prior to pleurodesis. The complications of symptomatic fluid loculation requiring fibrinolytics, cellulitis, and blocked catheter in the talc group were observed in 2 patients who had IPCs inserted following failure of pleurodesis.


R
RAH
AP
ERECT
PORTABLE

Outcome of patients with nonspecific pleuritis/fibrosis on thoracoscopic pleural biopsies

Eur J Cardiothorac Surg, 38 (2010), pp. 472–477

- Retrospective case-note study
- N=142
    - 44=CFP (31%) - follow up until death/mean 21 months
        - Mean protein 41/LDH 602
    - 5 (12%) of these malignant
        - Mean interval 9.8 (+/-4.6) months
        - No correlation with thoracoscopic suspicion etc

Advise vigilant follow-up

# PSP – ambulatory management

- How is it done?
- Evidence base
  - Safe?
  - Effective?
- The future

# Outpatient management of PSP: a prospective study
# Massongo, 2013

- Observational, prospective
  - No control
- All patients >16 with 1st PSP (n=60)
  - 20% small (BSP criteria)
    - Observed
  - 80% large (BSP criteria)
    - 8.5ch pigtail + Heimlich
- Primary endpoint – success at day 7
- 2 year follow-up for recurrence

# Outpatient management of PSP: a prospective study
# Massongo, 2013
# Conclusions

- 2 Complications
  - 1 REPO, 1 effusion
- 50% patients fully ambulatory/OP
- Effective – compares to standard drain
- Reduced LOS
  - Compared to IP drain, 24 x large PSP estimated saving ≥114,000 euro

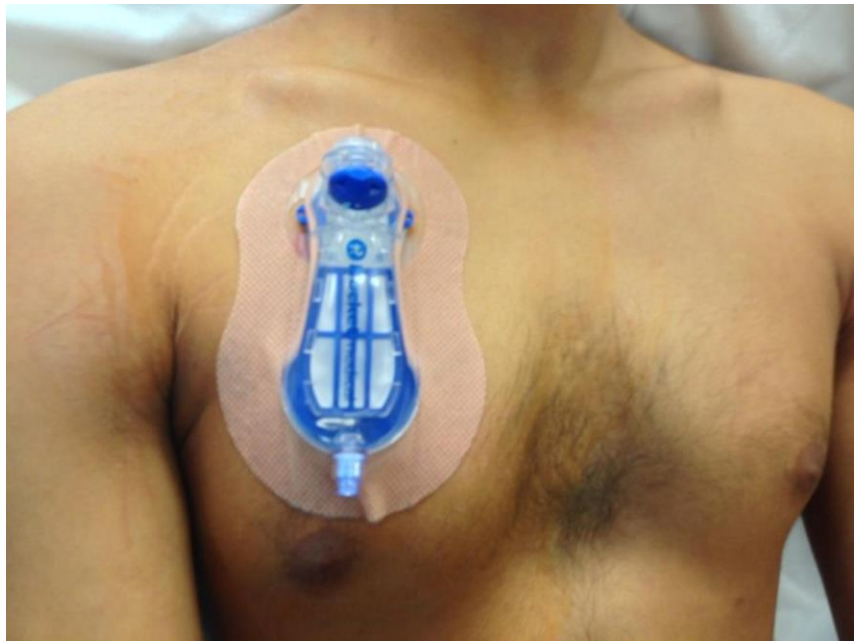
- **Rocket Medical R54565 Pleural Vent**

# Contents of the Pleural Vent

- Needle mounted (Verres Needle)
- 8fg Catheter
- Self contained one way valve and vent (Heimlich Valve)
- Indication Diaphragm
- 26ml volume container
- Self closing valve
- +ve Pressure release valve
- Needless port
- Hydrocolloid Dressing
- Insertion kit
- AND A CE Mark…….

# How does this work and why is it different?

- Self contained device that allows complete ambulation during use.



# Questions?