

Secondary Empyema

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No conflict of interest to disclose



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Empyema

Pleural effusion with evidence on thoracentesis:

- Macroscopic purulent aspect
and / or
- Positive microbiological cultures



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Acute and Chronic empyema

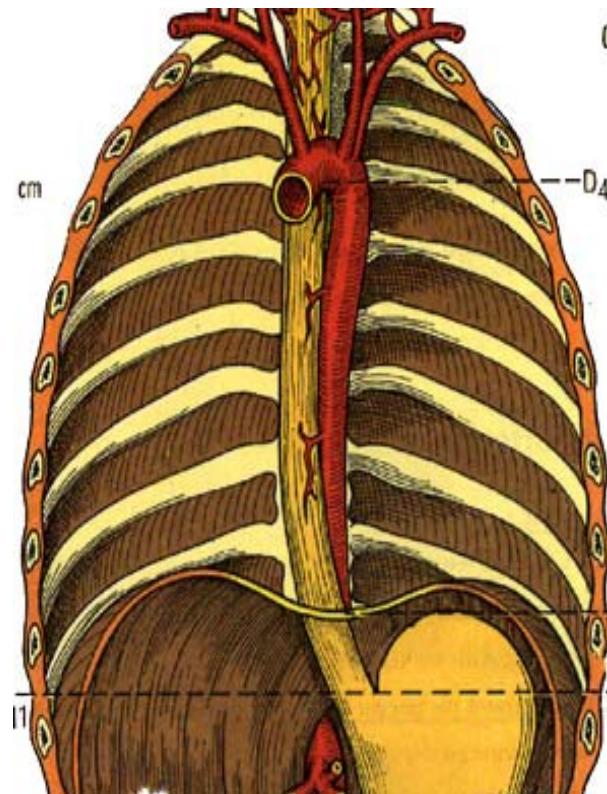
- Parapneumonic empyema
- Secondary empyema
 - *Complex situation*
 - *Multiple aetiologies*
 - *Chronic empyema*
 - *Complex surgery mandatory*



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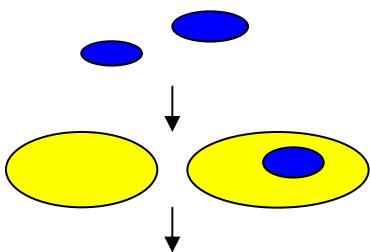
Secondary empyema

- Postoperative empyema after lung or esophageal surgery
- Tuberculosis sequelae
- Mediastinitis
 - DNM
 - Esophageal perforation
 - Spinal abscess
- Subphrenic abscess
- Pleural aspergillosis

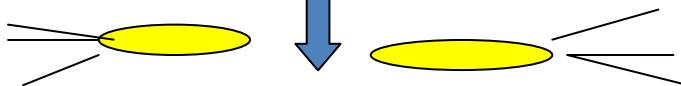




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IL-1 IL-8 TNF α NO TOM IF γ



Inflammatory cells

Lymphatic resorption

EXSUDATIVE PHASE

FIBRINOPURULENT PHASE

ORGANIZING EMPYEMA

Loculation

Trapped lung



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Mainstay of treatment

- 1) Appropriate antibiotic treatment
- 2) Evacuate and clean the pleural space
- 3) Reexpand the lung and fill the pleural space

Secondary objectives

- hospital stay
- duration of treatment
- duration of inability
- cost



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Appropriate antibiotic treatment

Bacterial

- **Gram negative Bacilli** : 20 - 30 %
- **Anaerobic org**: 15 - 20 %
- **Gram positive cocci** : 30 %
- **Polymicrobial** : 20 %
- **Sterile** : 10 %



Fungal or mycetoma





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Evacuate and clean pleural space

- Chest tube drainage
- Fibrinolysis
- Surgical debridement
 - VATS debridement
 - Open decortication
- Open window thoracostomy
- Spleostomy



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After pneumonectomy



After lobectomy



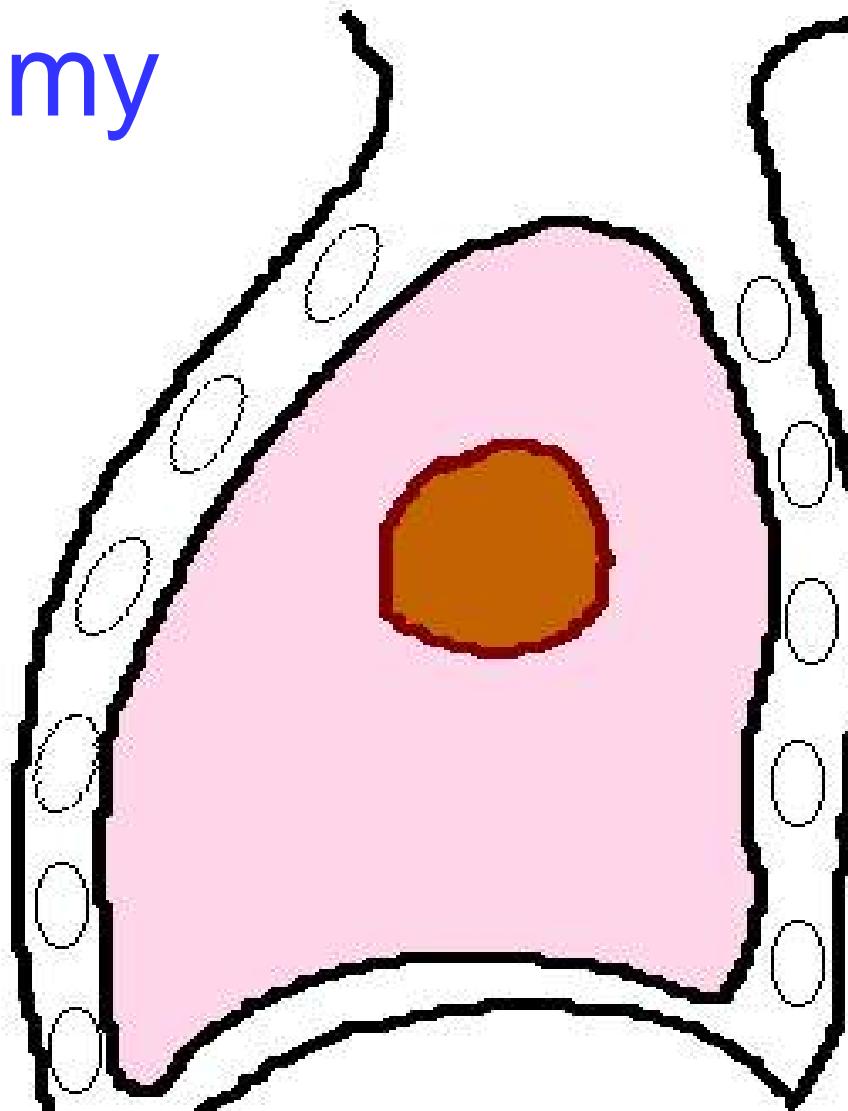


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Speleostomy

Surgical procedure in which a body cavity is opened, usually to provide drainage, as in the case of a lung abscess; also known as, cavernostomy.



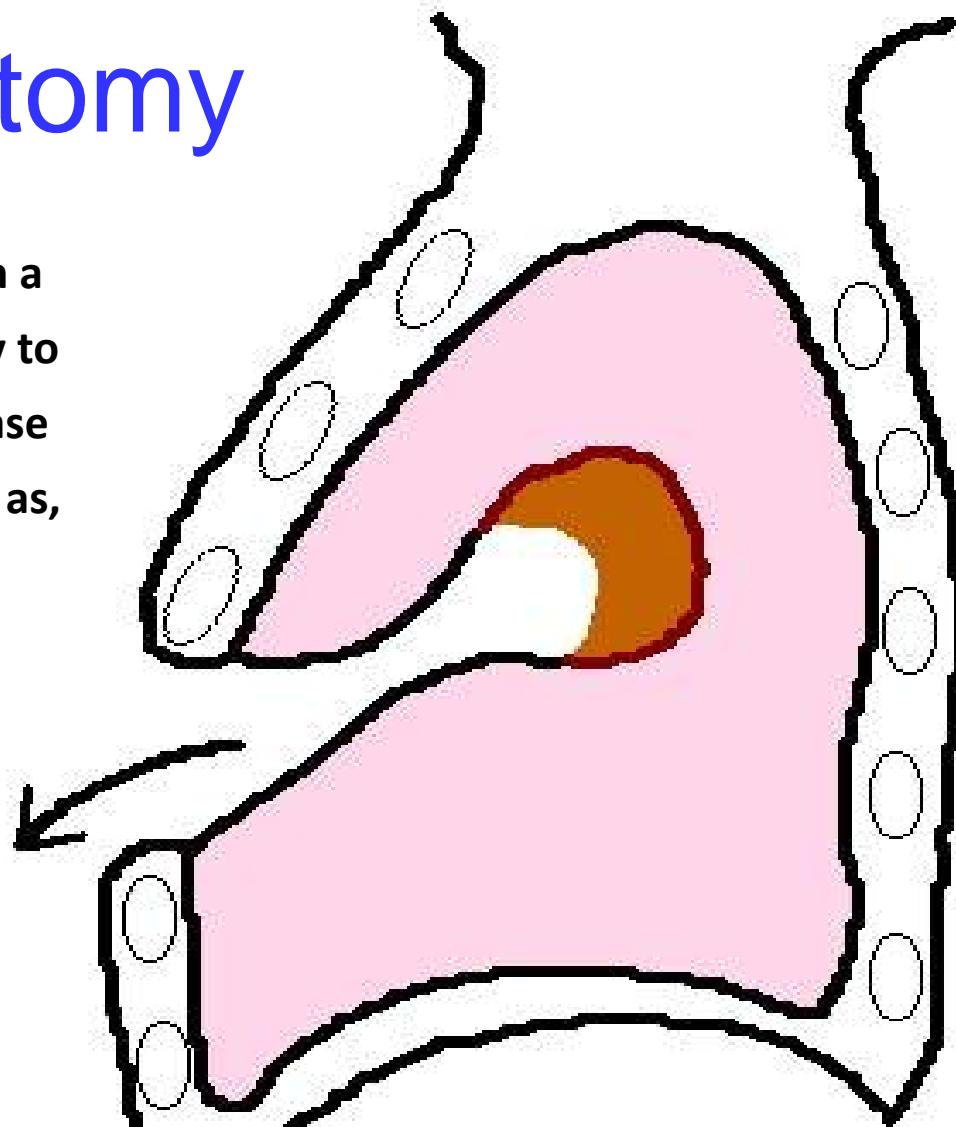


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Speleostomy

“Surgical procedure in which a body cavity is opened, usually to provide drainage, as in the case of a lung abscess; also known as, cavernostomy”





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- 2) Evacuate and clean the pleural space
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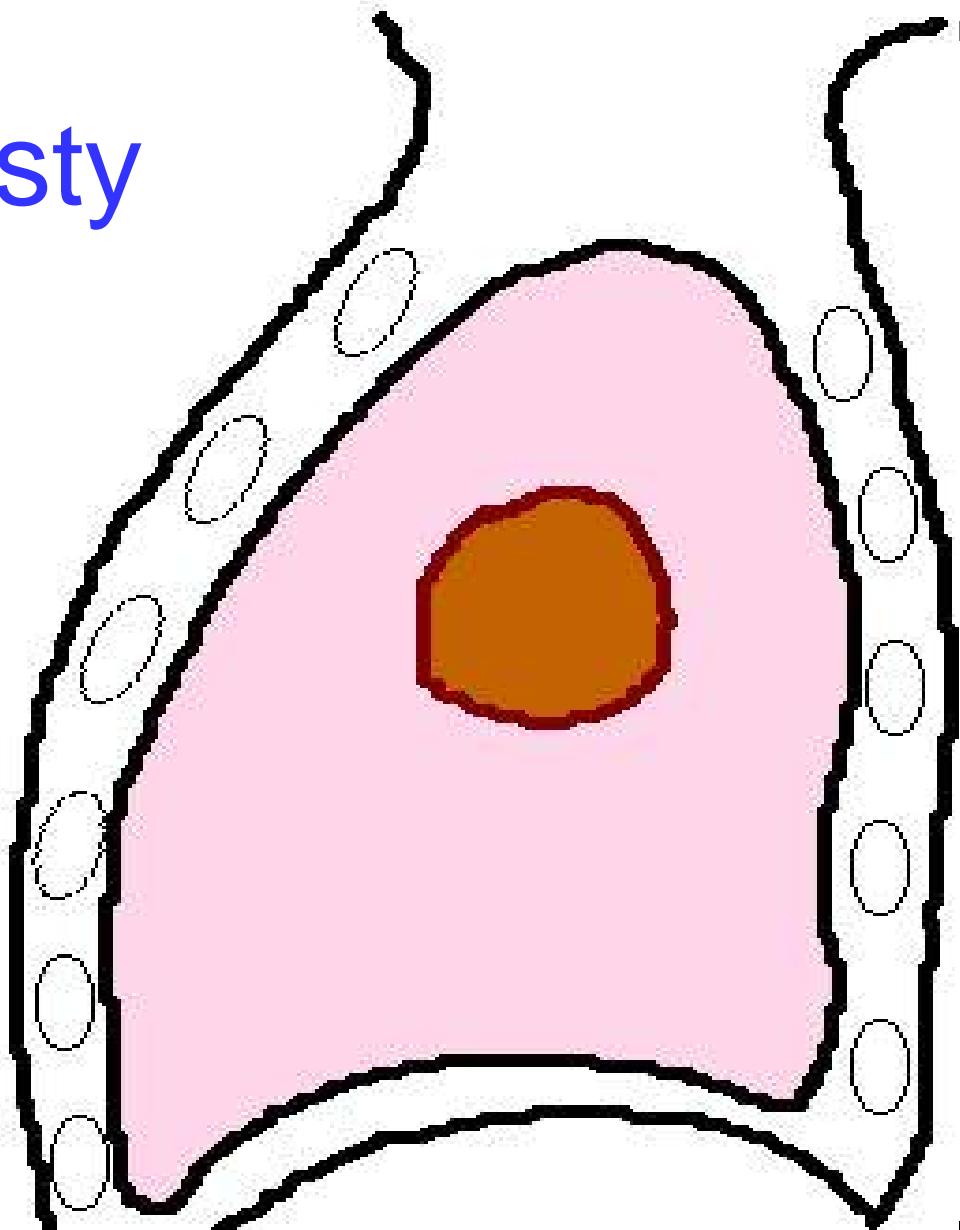
Reexpand the lung = fill pleural space

- Decortication
- Muscle plombage
- Thoracoplasty



Thoracoplasty

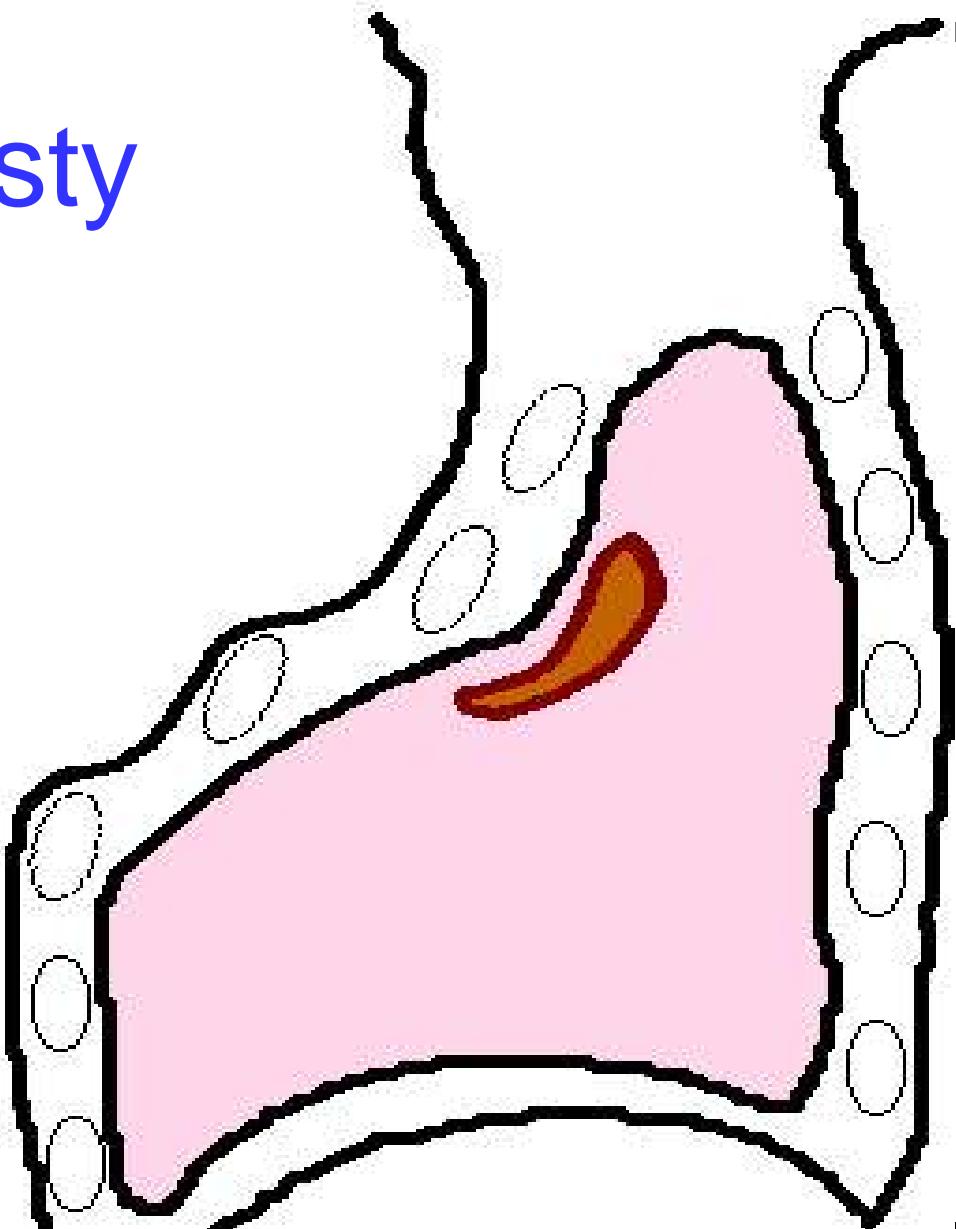
Collapse the chest wall onto the lung due to an untractable residual pleural space





Thoracoplasty

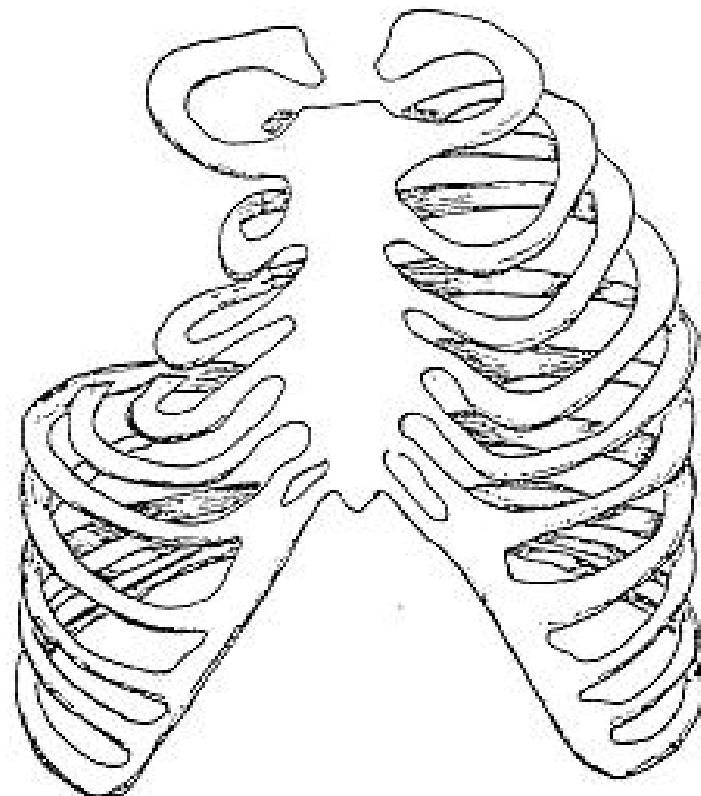
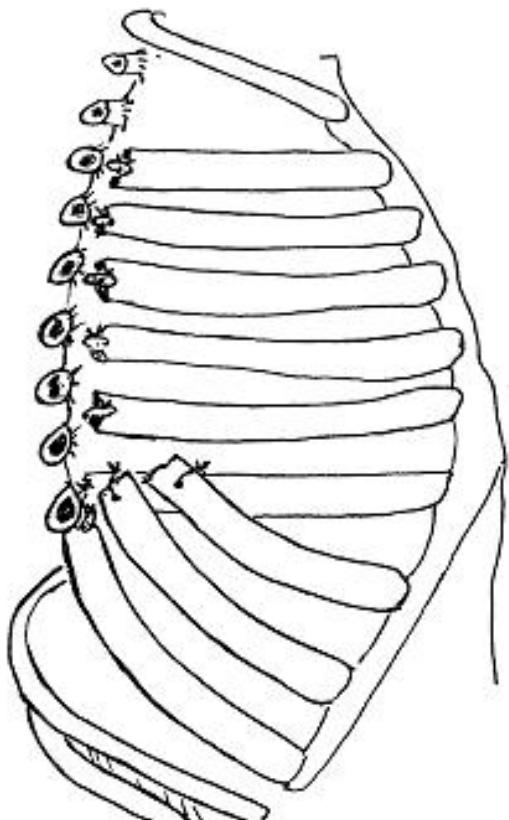
Collapse the chest wall onto the lung due to an untractable residual pleural space





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Thoracoplastie (Bjork)

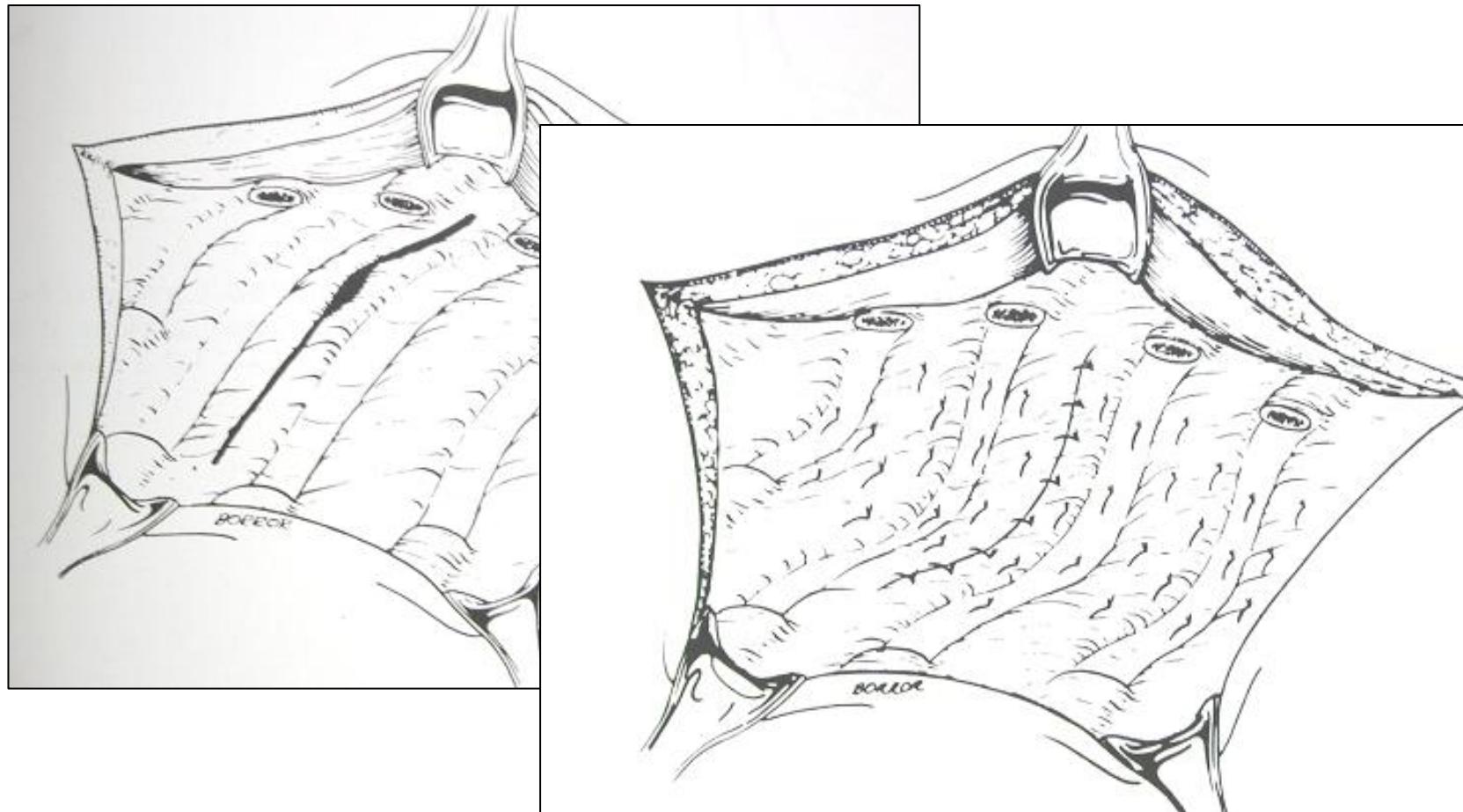




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Thoracoplastie (Andrews)





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Some important questions

How is the underlying disease

- Chronic pulmonary disease
- Previous partial resection
- Previous pneumonectomy

Is there a chronic fistula

- Bronchial fistula
- Esophageal fistula
- Bilio-pancreatic fistula
- Gastro-entero-colonic fistula



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Some important questions

❑ Is there any specific intercurrent infection ?

- Tuberculosis
- Aspergillosis

❑ How is the nutritional status?

- Weight loss
- Quality of chest muscle
- Type of previous thoracotomy if any



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1) Empyema after lung resection



Residual air space : « pulmonary » factors

- Air leak > drainage
- Failing lung expansion
 - decreased compliance
 - visceral peel
- Upper lobectomy
- Loss of volume
 - bilobectomy
 - lobectomy + segment
- Suppurative / granulomatous disease
- Stiff mediastinum / diaphragm

Residual air space : clinical evaluation

Benign space

- No fever
- no sputum
- normal WBC
- radiology :
 - Progressive regression
 - thin walled cavity
 - no or little fluid

Malignant space

- fever, illness
- purulent sputum
- leukocytosis
- radiology :
 - enlarging space
 - thick peel
 - increasing fluid

Barker et al, Ann Thorac Surg 1966 ; 2 : 299-312



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Classic treatment : Thoracoplasty

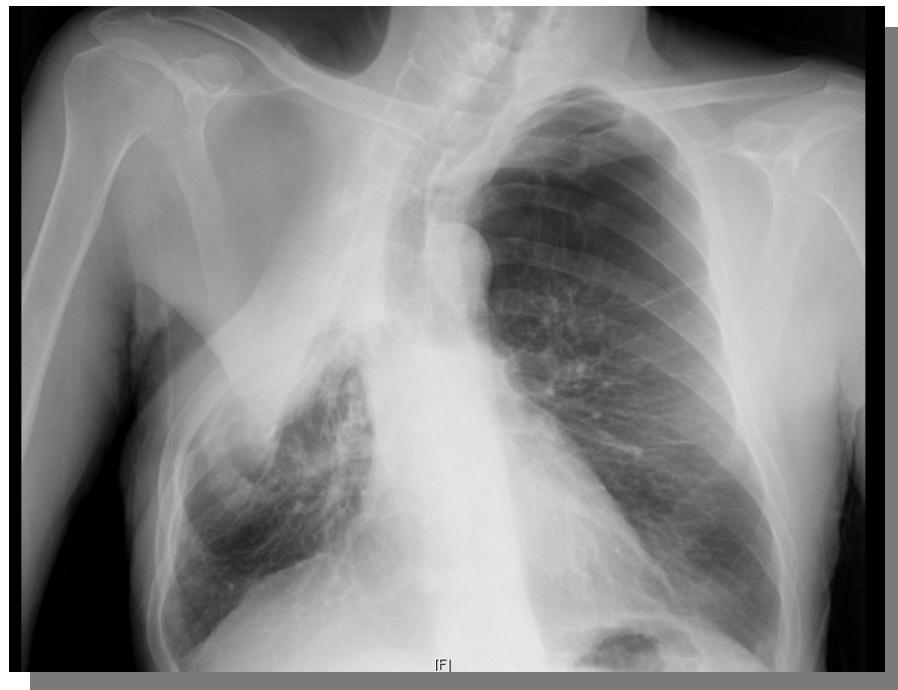
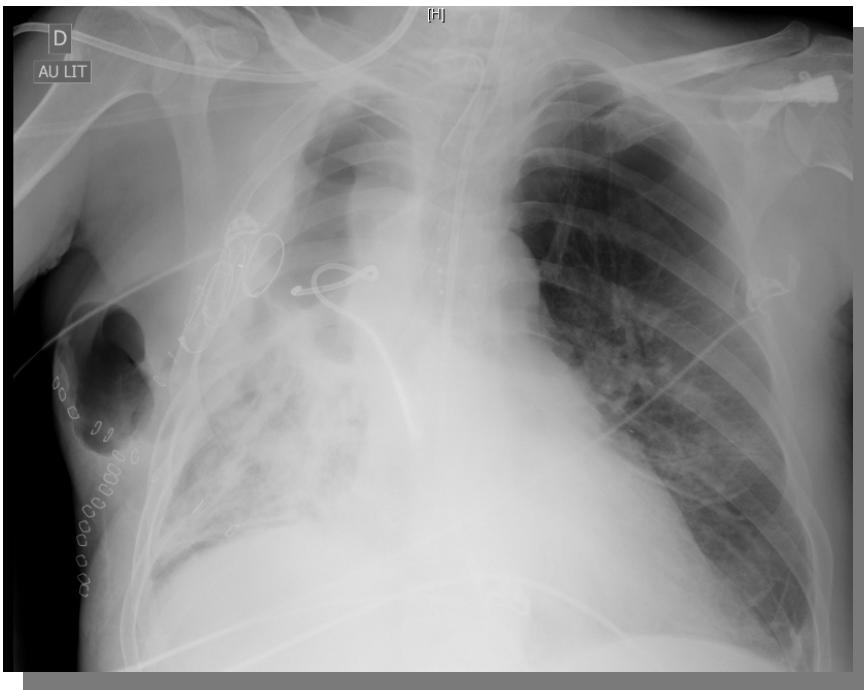
Resection of 1st rib mandatory

- Flail chest ? (sheet wrapping)
- Chronic pain ?
- Frozen shoulder ?



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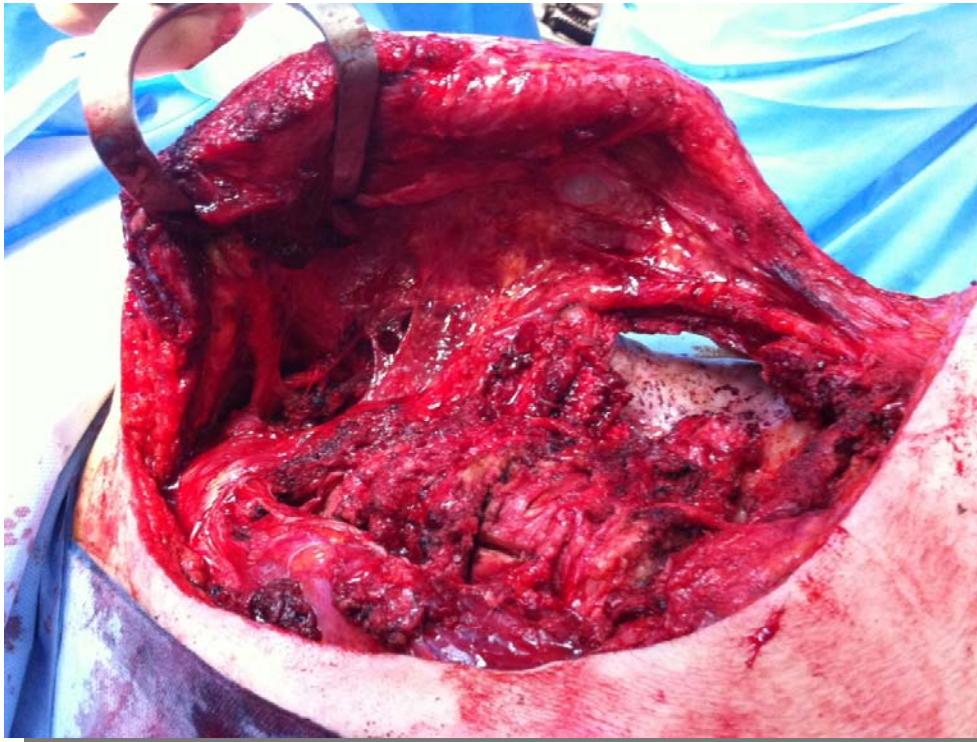
Thoracoplasty after right upper lobectomy





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Thoracoplasty after right upper lobectomy

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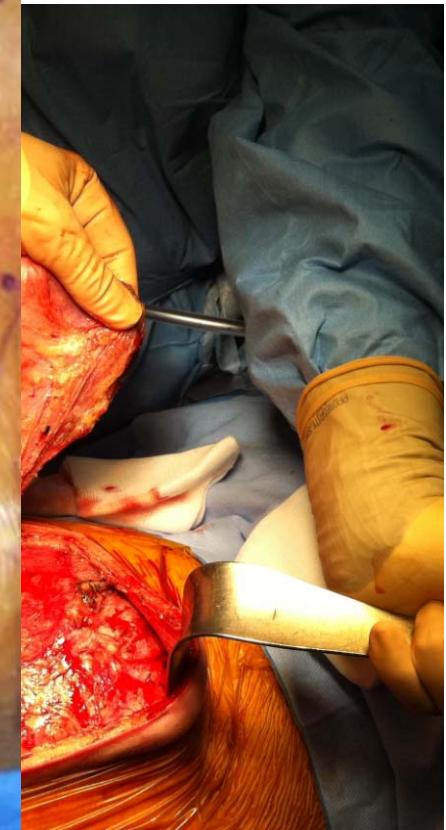
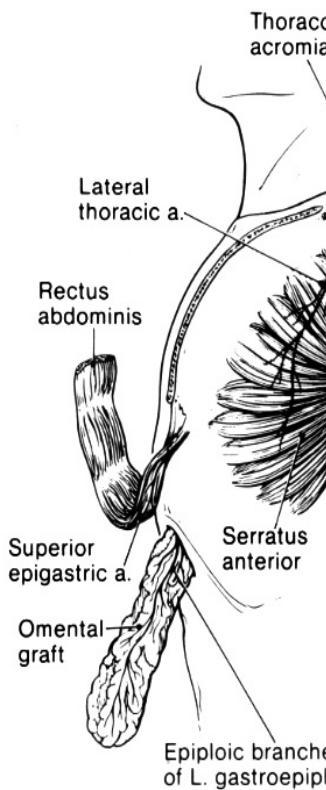




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Mycosis an alter-

ty:
ty ?





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2) Late Empyema after pneumonectomy

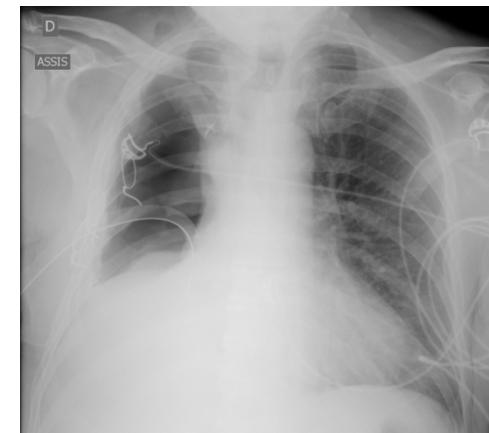


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Empyema following pneumonectomy

- 2 - 16 % of pneumonectomies
- increase following neoadjuvant therapy ?
- Mortality 12 - 40 %



Deschamps et al., Ann Thorac Surg 2001
Schneiter et al, Ann Thorac Surg 2001



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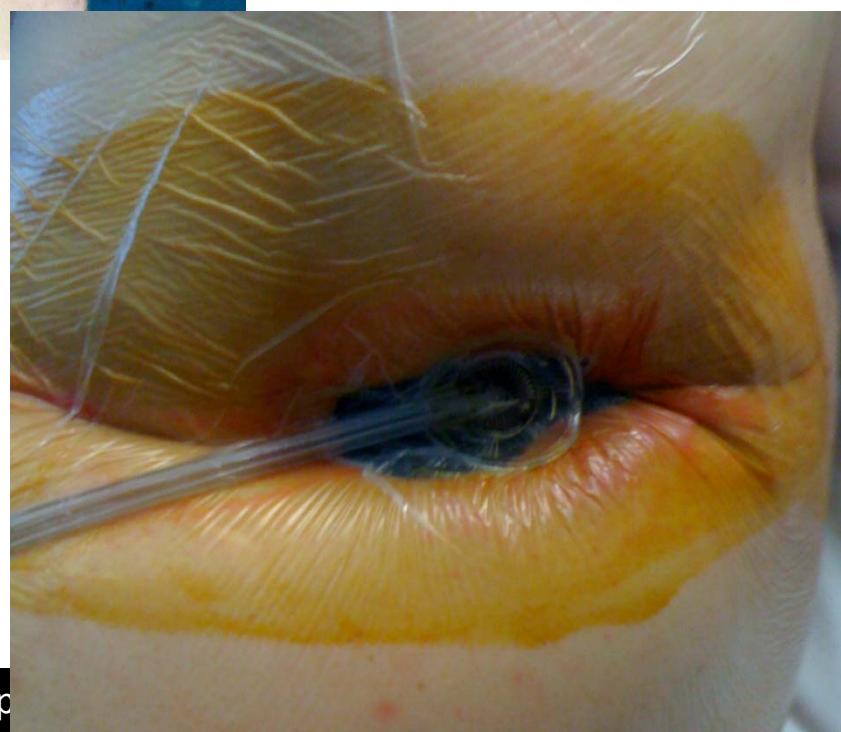
Empyema following pneumonectomy: mechanisms

- Benign disease !
- Aspergillosis ++
- Corpus alienum ?
- Technical problems
- Previous neoadjuvant CRT



Basis of treatment

- Tube thoracostomy & lavage seldom successful
- Modified Clagett procedure :
 - detersion : thoracostomy + VAC
 - obliteration :
 - Simple closure ?
 - Myoplasty or Omentoplasty ?
 - ***Thoracoplasty***





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Various modes of fistulization !





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Broncho-esophageal fistula

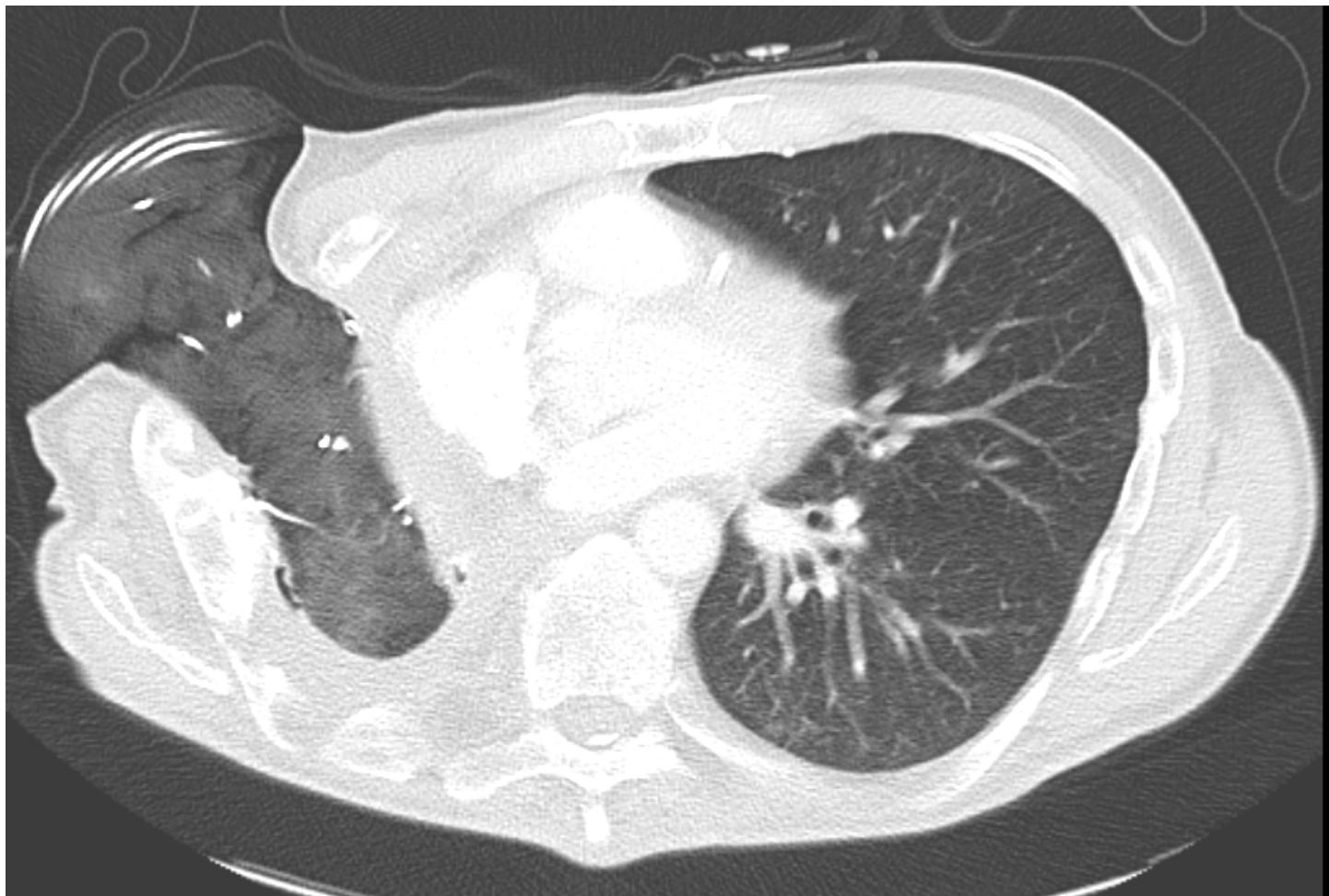
- Fever, illness
- Pain while swallowing, foulish taste
- High WBC count and CRP
- Air-fluid level
- Multiple bacteria + candida
- Contrast esophagram +++
- *Rule out local recurrence*
- Thoracoplasty & muscle flap





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3) Late complications of collapse therapy



Treatment of lung TB < 1960

- Intrapleural pneumothorax
- Extrapleural pneumothorax
- Extramuscular plombage
- (*thoracoplastie*)

→ late infectious complications !

Massard et al, Ann Thorac Surg 1995;60:888-95
Massard et al, Ann Thorac Surg 1997;64:220-5



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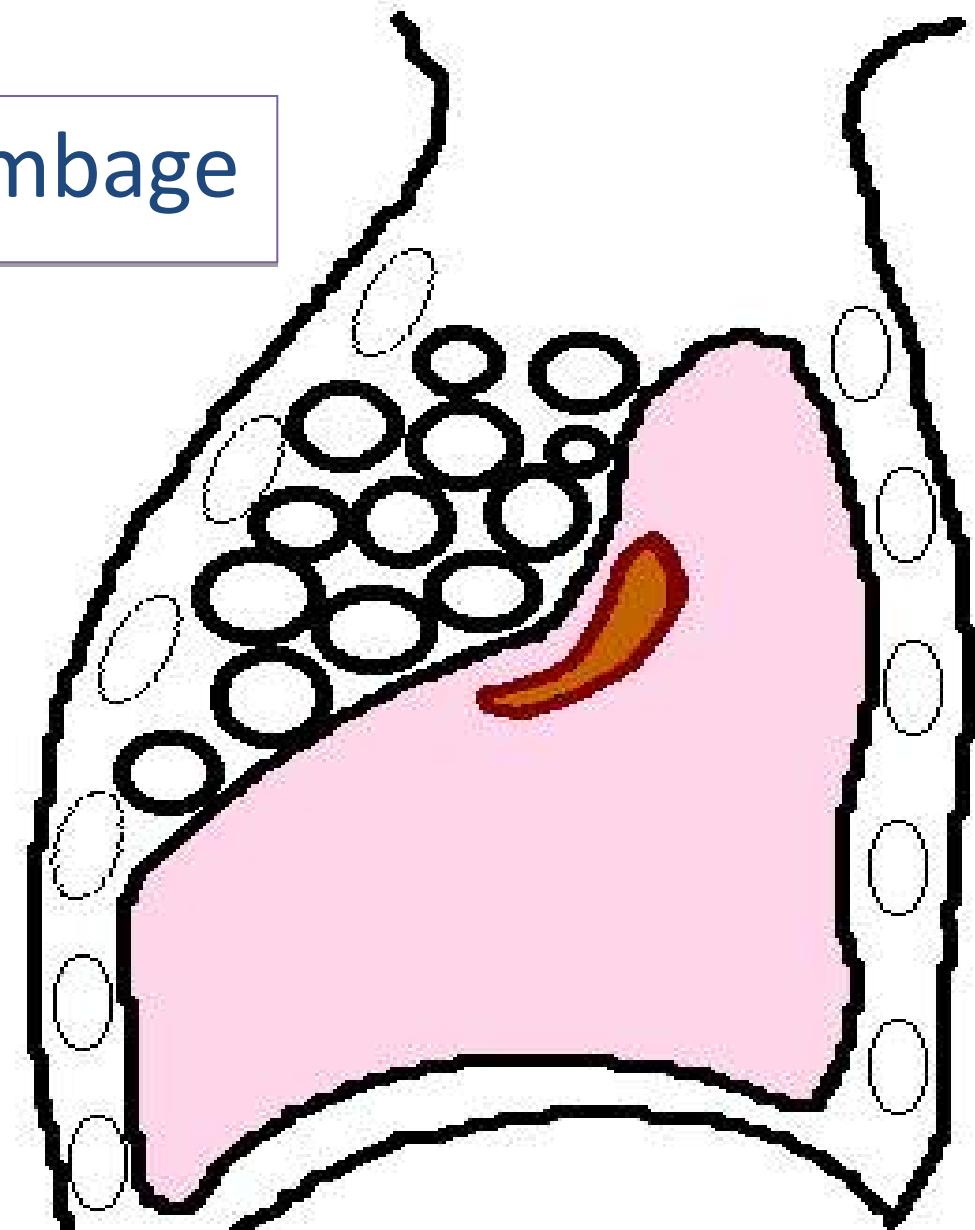
Intrapleural Pneumothorax : decortication a valuable option





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Extraperiosteal Plombage





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Extraperiosteal Plombage

Long-Term Complications of Extraperiosteal Plombage

Gilbert Massard, MD, Pascal Thomas, MD, Pierre Barsotti, MD, Pierre Riera, MD,
Roger Giudicelli, MD, Eugène Reboud, MD, Georges Morand, MD,
Pierre A. Fuentes, MD, and Jean-Marie Wihlm, MD

Department of Thoracic Surgery, University Hospital of Strasbourg, Strasbourg, and Department of Thoracic Surgery, Hôpital Sainte Marguerite, Marseille, France

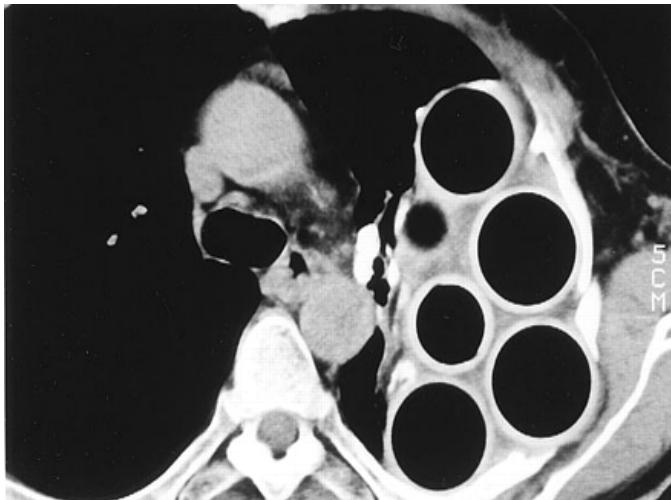


Massard et al, Ann Thorac Surg 1997;64:220-5



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Migration first sign of infection !



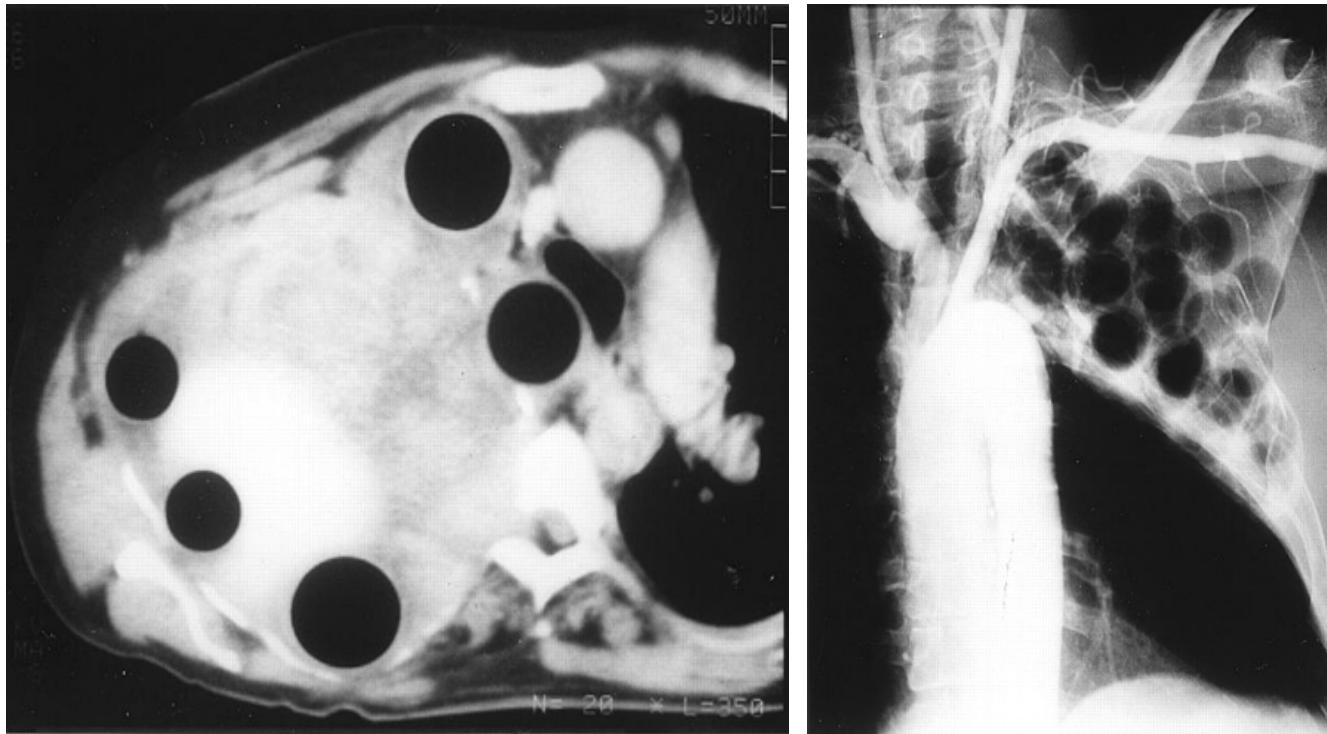
Massard et al, Ann Thorac Surg 1997;64:220-5



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Caveat : mediastinum & great vessels



Massard et al, Ann Thorac Surg 1997;64:220-5



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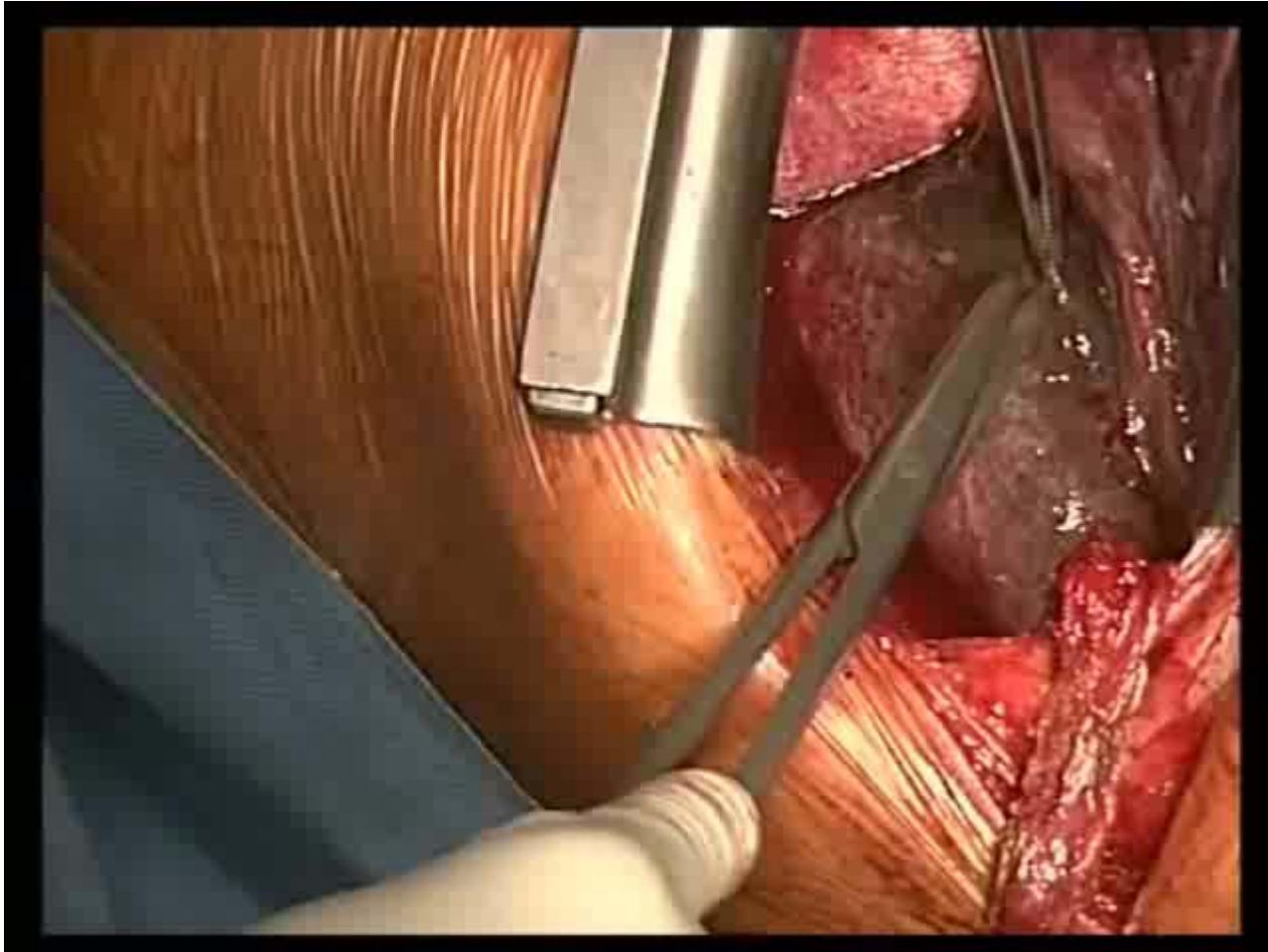
4) Mediastinitis

- Esophageal perforation
- Descending necrotizing mediastinitis
- Spinal abscess



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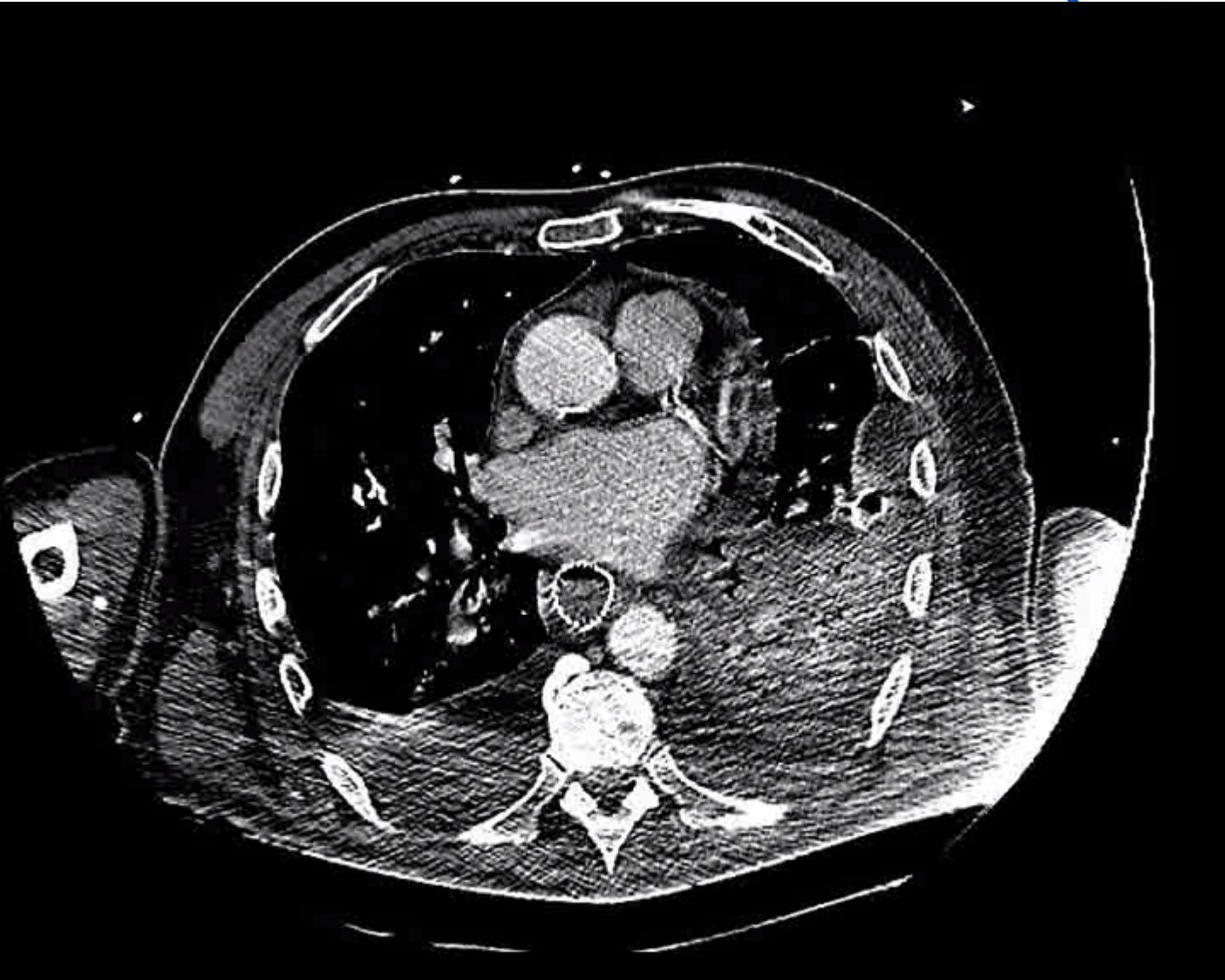
Esophageal perforation





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5) Subphrenic abcess

- Upper GI surgery
- Colonic surgery
- Bilio-pancreatic fistula



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6) Pleural aspergillosis



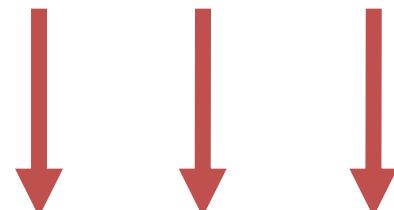
Pathophysiology

- Early post-operative
 - > intra-operative seeding
 - + failure of reexpansion
- Late
 - > broncho-pleural fistula
 - + residual pleural space

Healing requires obliteration of the pleural space

Treatment option

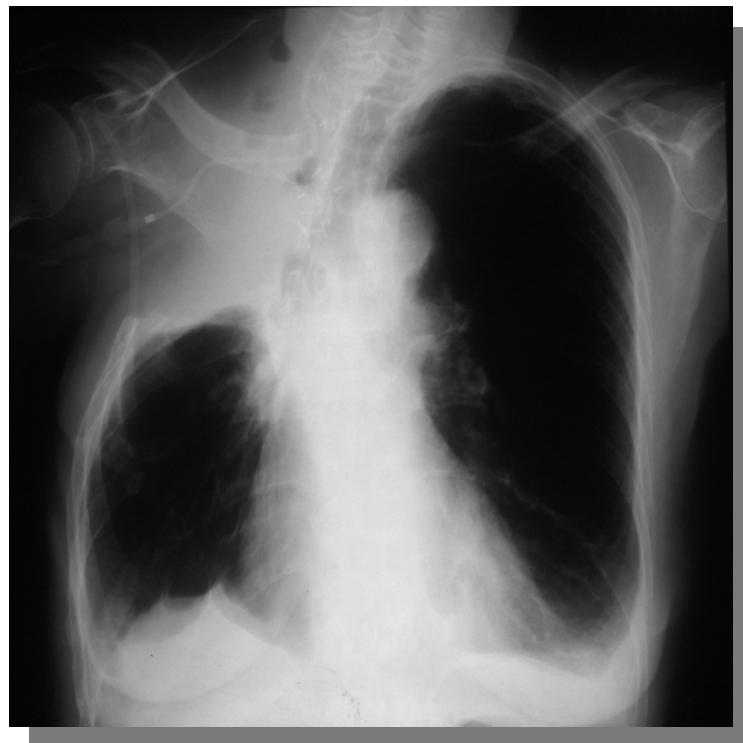
- Decortication
 - efficient if no loss of volume !
- Myoplasty
 - debatable :
 - Previous thoracotomy
 - Size of pleural space
 - Nutritional status.
- « Open window thoracostomy »
 - palliation ...



Thoracoplasty !!!!!



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Conclusions

- Sevreal aetilologies
- Chronic empyema
- Complex situation
- Complex treatment
- Thoracostomy and thoracosplasty