# Surgical management of chronic empyema

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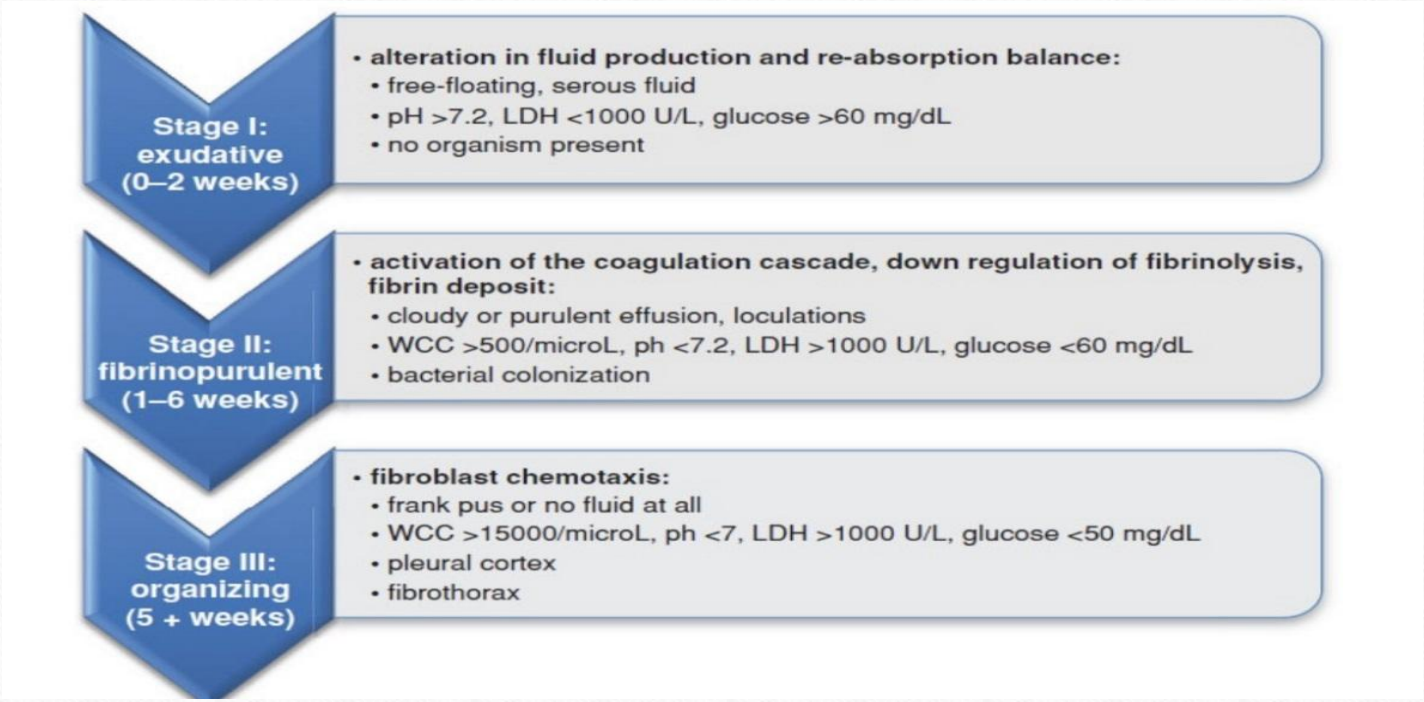
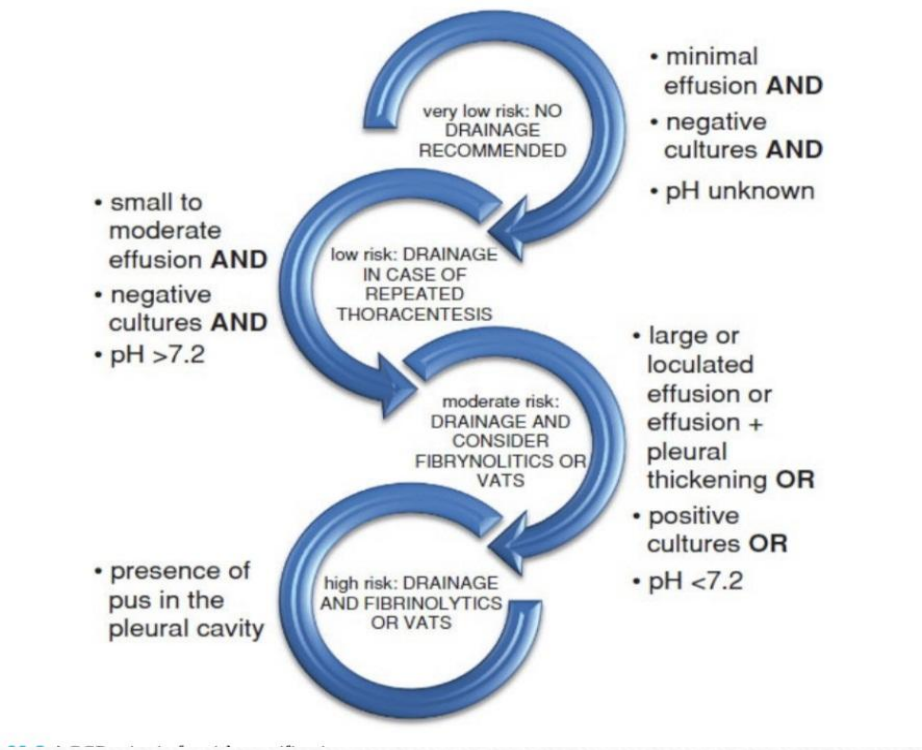
# Empyema staging



# ACCP criteria for risk stratification



# Surgery indications in chronic empyema

- **Stage 2 empyema:**

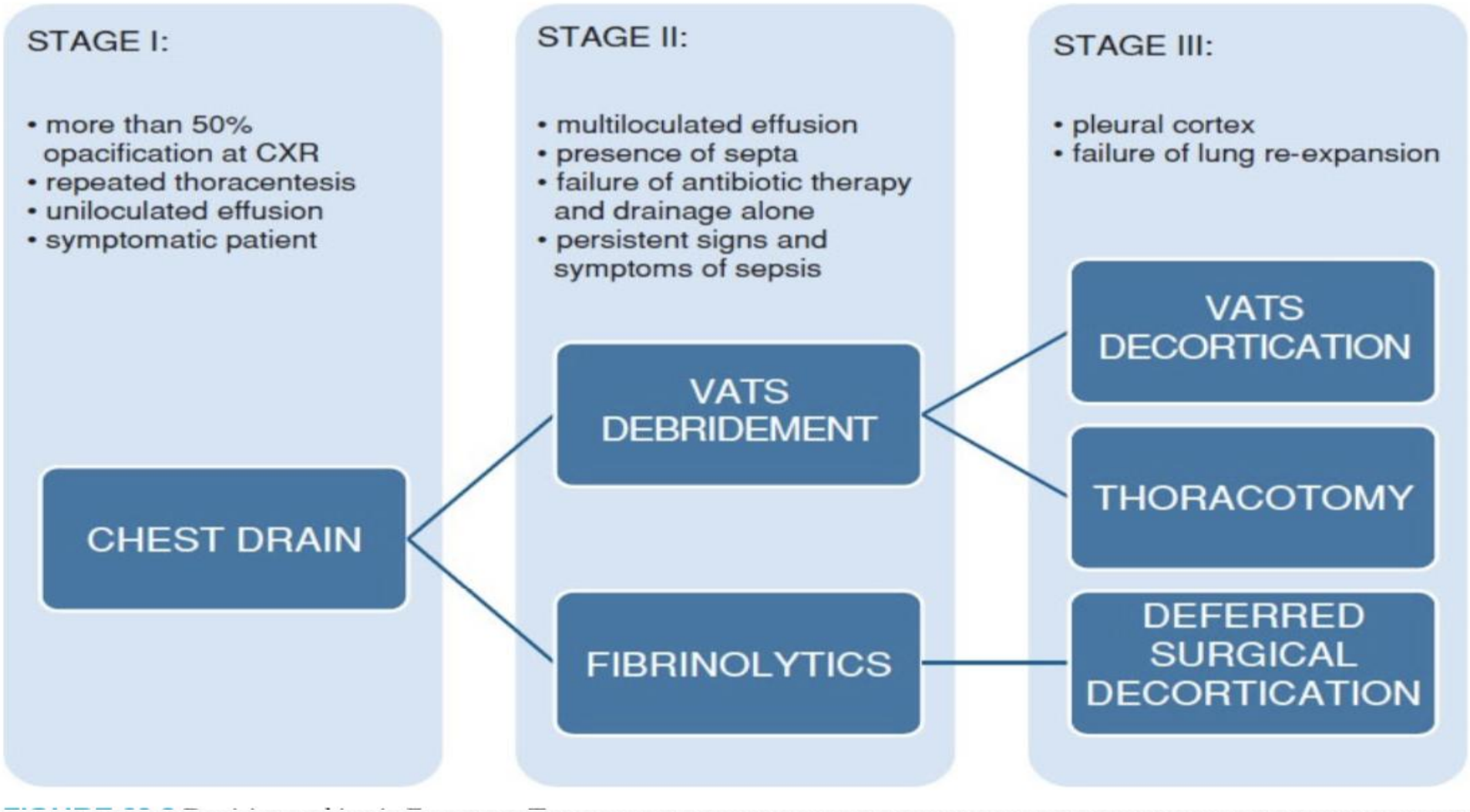
  **VATS debridement**

- **Stage 3 empyema:**

  **VATS debridement**

  **Thoracotomy**

  **Decortication**


STAGE I:
• more than 50% opacification at CXR
• repeated thoracentesis
• uniloculated effusion
• symptomatic patient
STAGE II:
• multiloculated effusion
• presence of septa
• failure of antibiotic therapy and drainage alone
• persistent signs and symptoms of sepsis
STAGE III:
• pleural cortex
• failure of lung re-expansion
CHEST DRAIN
VATS DEBRIDEMENT
FIBRINOLYTICS
VATS DECORTICATION
THORACOTOMY
DEFERRED SURGICAL DECORTICATION

# Type of surgery

**VATS Debridement**

**Decortication: via VATS**

**Thoracotomy**

**Open drainage**

# STAGE II EMPYEMA TRAETMENT

- The American College of Chest Physicians in 2000 reviewed stage II empyema patients treated with

(1) no drain

(2) thoracentesis

(3) chest tube

(4) fibrinolytics

(5) VATS

(6) thoracotomy

# STAGE II

- **Failure rate** :

  **40%** for chest drain alone

  **15%** for chest drain in association with fibrinolytics

  **10%** for thoracotomy

  **none** for VATS debridement.

# STAGE II

- **Risk factors for unsuccessful chest drainage in stage II**

  large effusions

  lobulated  effusions

  frankly purulenteffusions

  positive cultures

# STAGE III EMPYEMA TRAETMENT

- Stage III empyema typically occurs 4 to 6 weeks from the development of a pleural effusio
- That is characterized by a rigid cortex encasing the lung, the chest wall, and the diaphragm.
- The progressive thickening of the pleura involving all pleural surfaces define a condition named "fibrothorax."

# STAGE III

Nevertheless, at this stage chest drain and antibiotics can remove fluid and control infection, but respiratory impairment requires surgical removal of the peel to restore physiology.

# STAGE III

- Identification of the transition from the purely fibrinopurulent stage into the formation of an organized pleural cortex may not be easily achieved preoperatively.

- Imaging techniques including thoracic ultrasound and CT may not accurately identify the thickness of the visceral cortex as there will inevitably be a layer of exudate over any cortical rind.

# STAGE III

- The actual chronicity of the pleural sepsis may not therefore become apparent until VATS debridement has been performed.

- The surgeon must then assess whether full lung re-expansion can be achieved by VATS decortication or whether an open procedure is necessary.

# VATS Versus Open Decortication

- VATS approach was successful in patients with fibrinopurulent effusion, with a conversion rate of 44% in unexpected stage III disease.
- VATS approach is therefore recommended in patients:

who are promptly referred for surgery after failure of conservative treatments (less than 2 weeks since admission)

and when gram-negative organisms are not involved.

- In all other cases open decortication (OD) via posterolateral thoracotomy should be preferred, even with intraoperative conversion if pleural cortex is identified.

# VATS Versus Open Decortication

- OD may become necessary whenever adequate decortication cannot be accomplished thoracoscopically.

- Most of these studies confirm a superior outcome of VATS versus thoracotomy in terms of length of stay, chest tube duration, postoperative complications, pain, and mortality

# Thoracostomy (open drainage)

- In the more frail patient who may not tolerate a thoracotomy and either decortication or empyemectomy, the objective of surgery should be merely debridement and drainage of the infected cavity.

- This procedure can also be achieved in the spontaneously ventilating patient.

# Thoracostomy

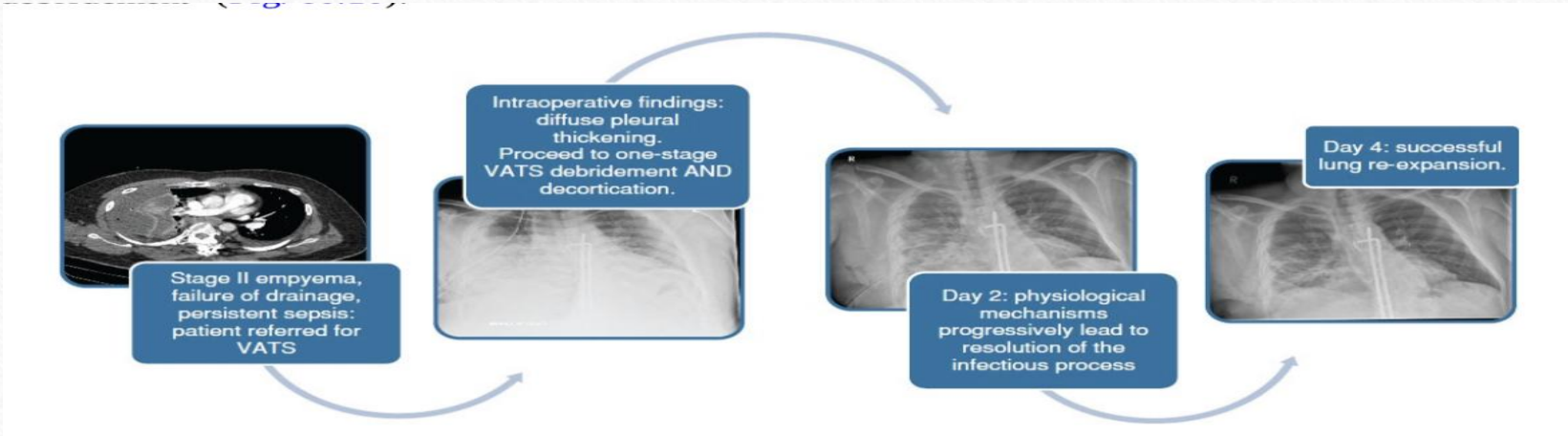
This can be achieved by a small rib resection, the creation of a thoracostomy, and VATS debridement via the stoma.

# EFFECTS OF DECORTICATION ON LUNG FUNCTION AND CHEST WALL REMODELING

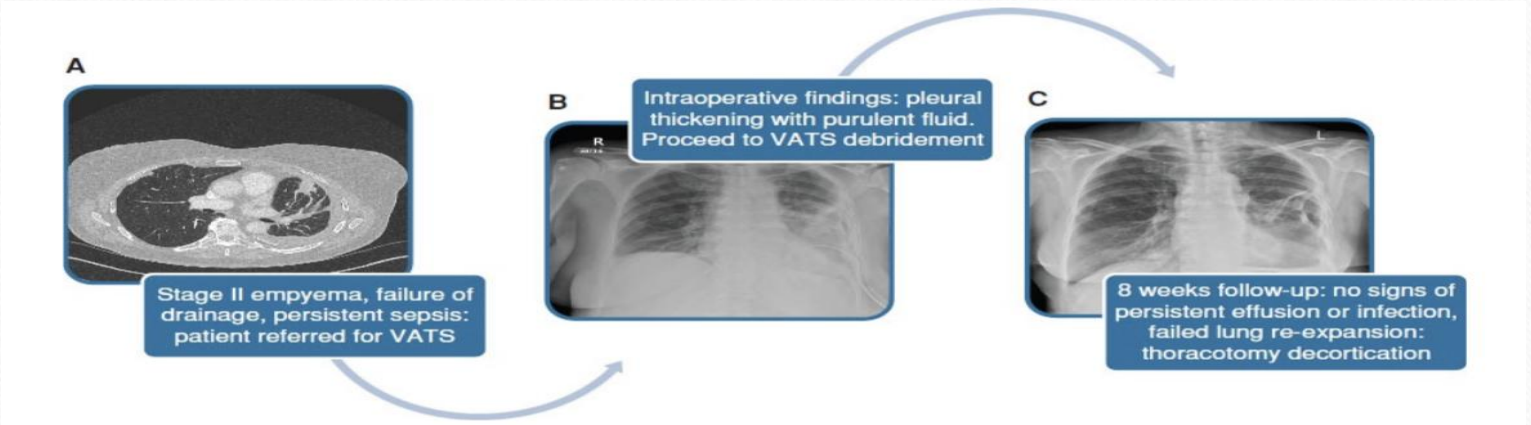
- **Pulmonary function tests** have **increased** significantly after OD in most treated patients

- with an effect on chest wall remodeling (**enlargement of intercostal spaces**) assessed with diameter measurements on CT scan.

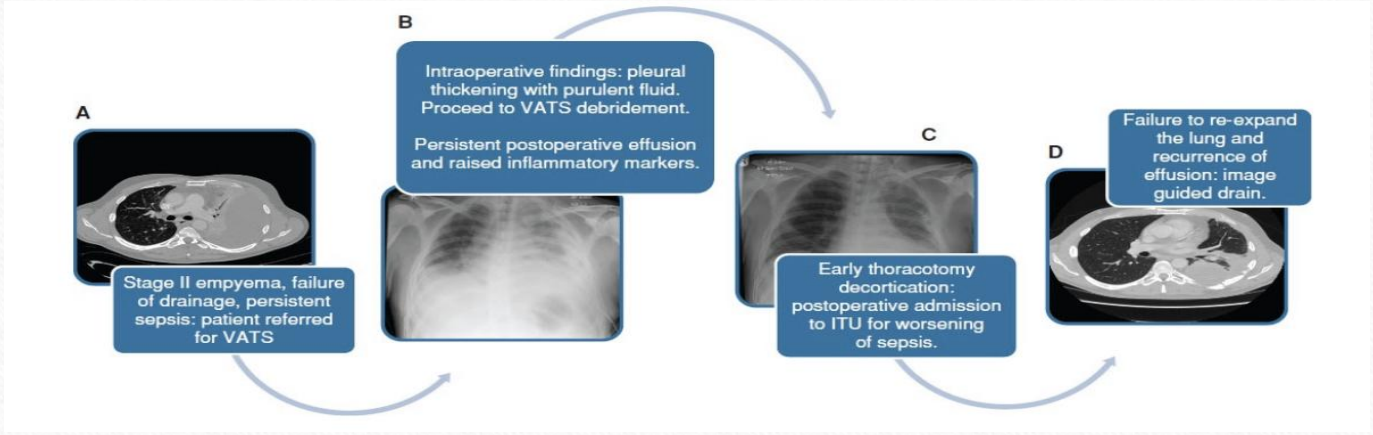
# Successful one-stage VATS debridement and decortication.



# Successful VATS debridement



# Early thoracotomy decortication with failure of lung re-expansion and recurrence



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