Surgical management of chronic empyema

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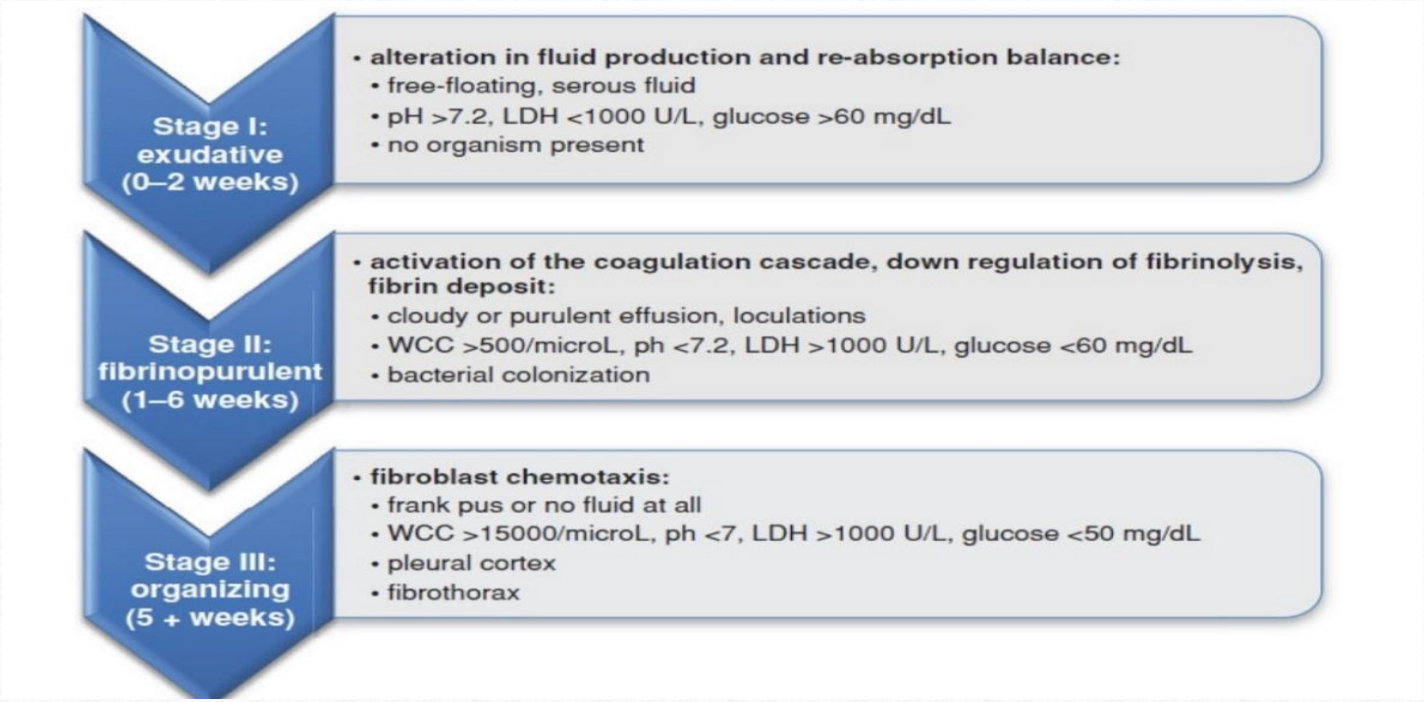
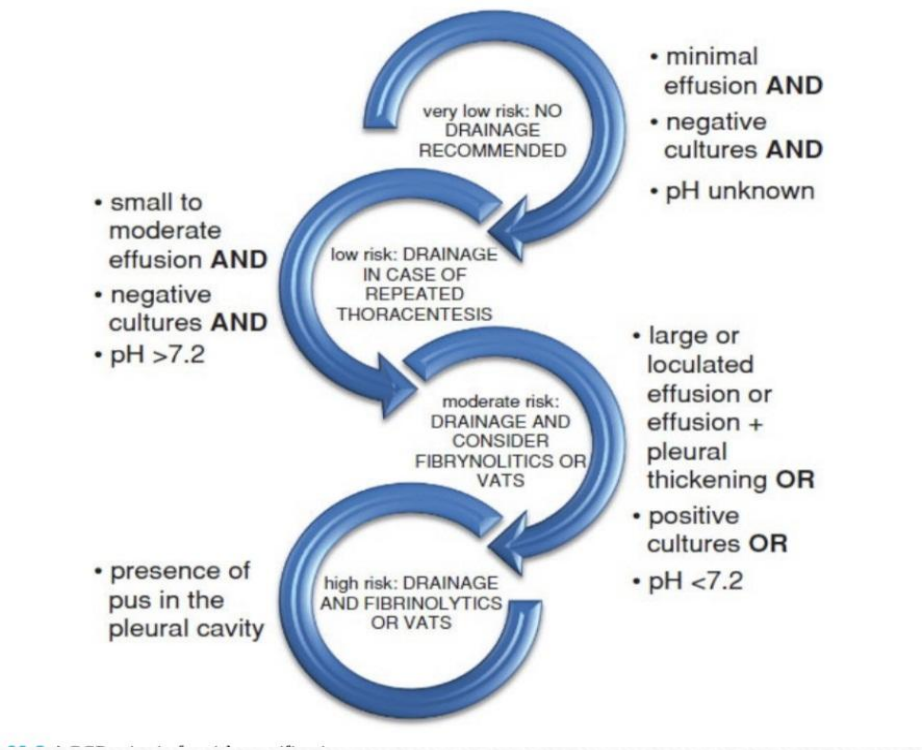
Empyema staging



ACCP criteria for risk stratification



Surgery indications in chronic empyema

- **Stage 2 empyema:**

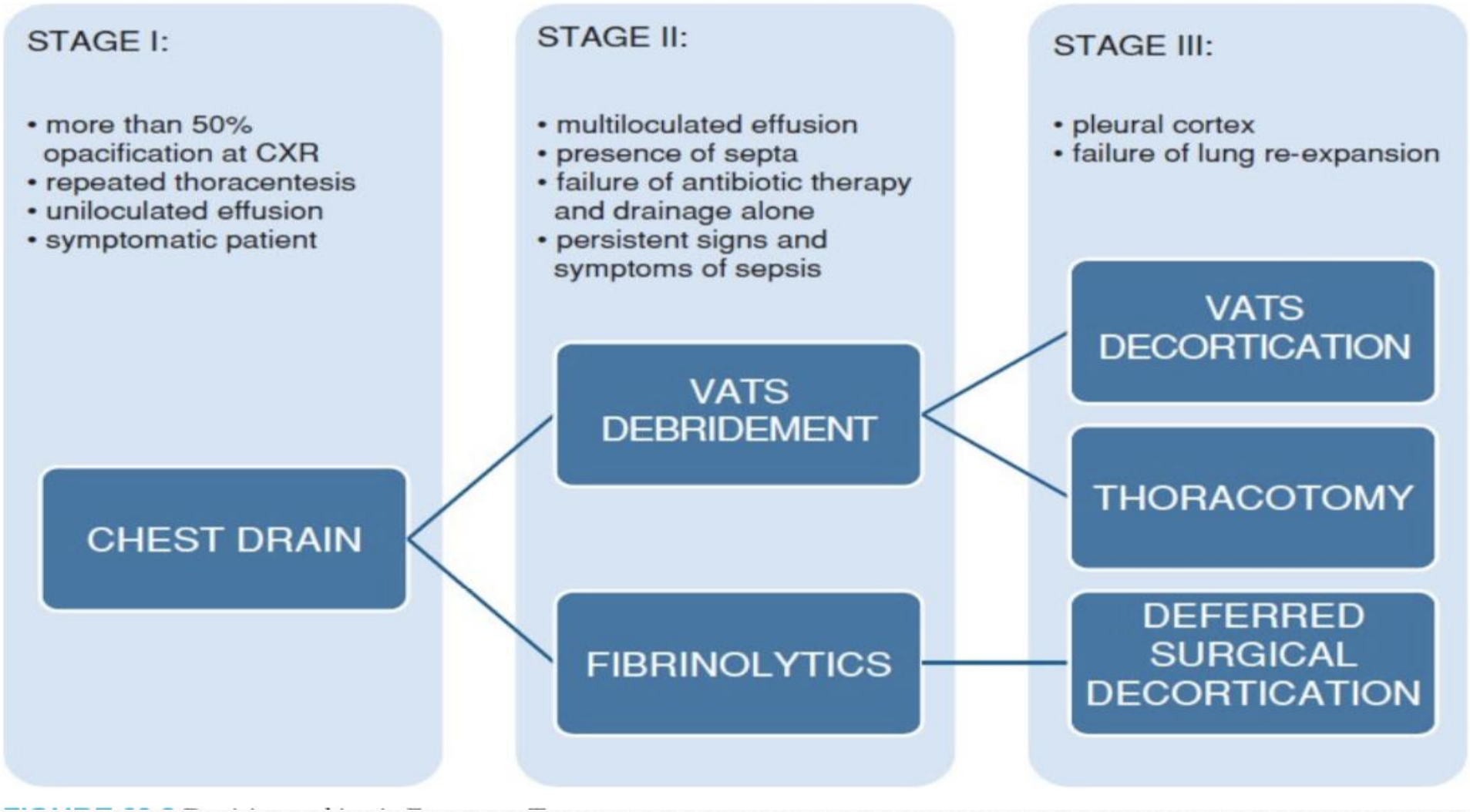
  VATS debridement

- **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

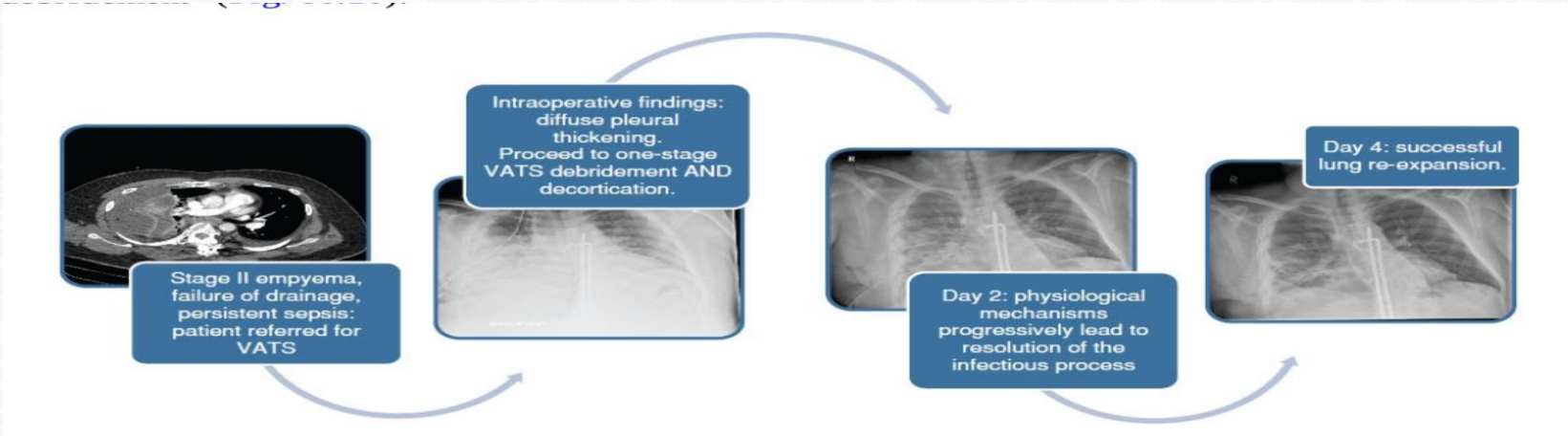
This can be achieved by a small rib resection, the creation of a thoracostomy, and VATS debridement via the stoma.

EFFECTS OF DECORTICATION ON LUNG FUNCTION AND CHEST WALL REMODELING

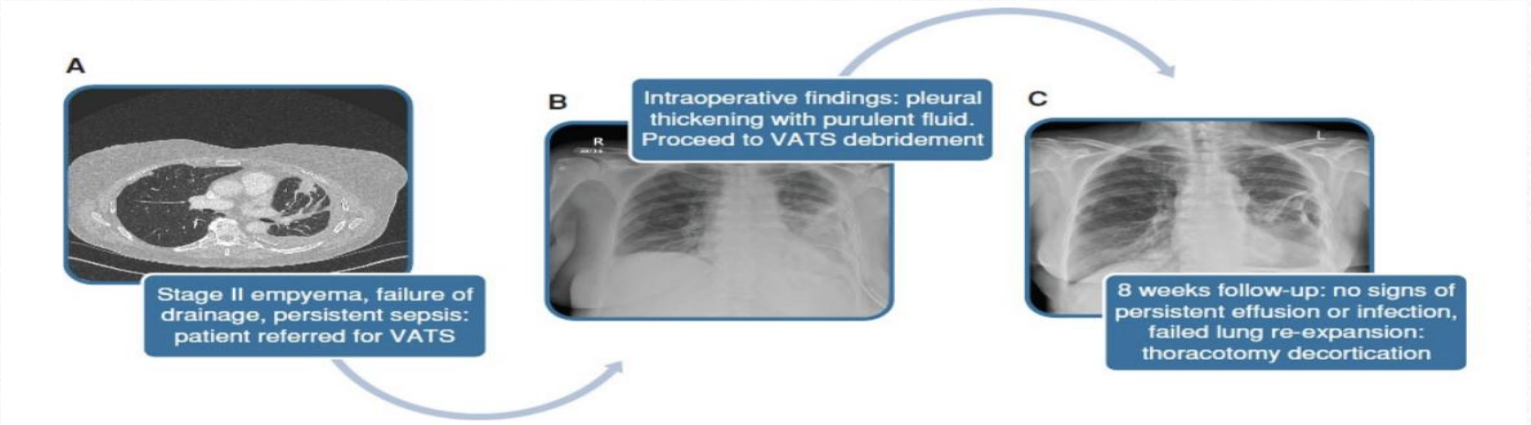
- **Pulmonary function tests** have **increased** significantly after OD in most treated patients

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

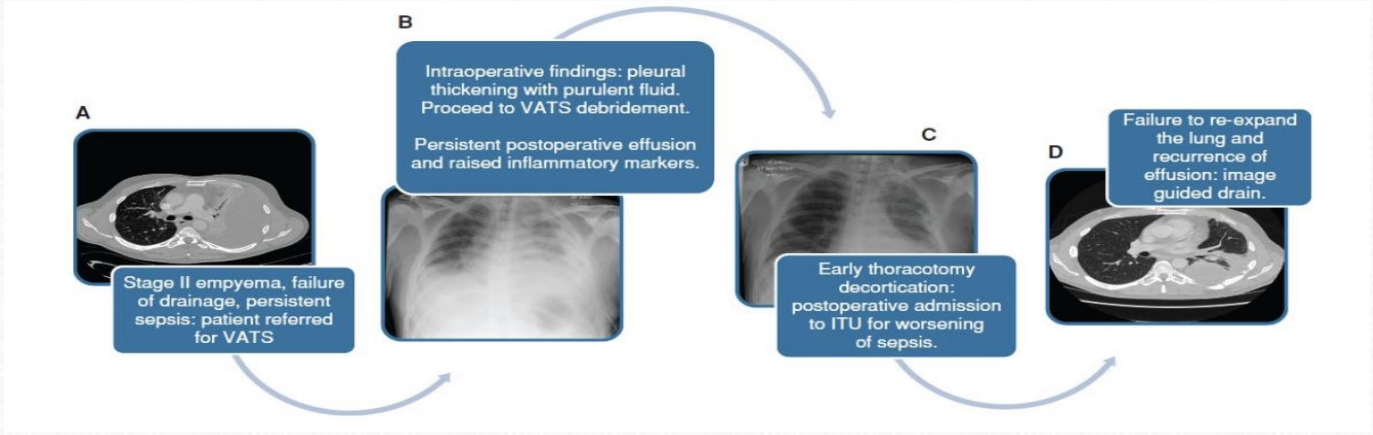
Successful one-stage VATS debridement and decortication.



Successful VATS debridement



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



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