Video Assisted Thoracoscopic Surgery (VATS)

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HISTORY

- Tulio Cesare Aranzi, **in 1585**, used a light source for endoscopic inspection focused the sunlight through the flask with water to the nasal cavity.
- **Two centuries after**, Phillip Bozzini realized the "Leichtleiter", an aluminium tube to visualize the urogenital tract illumined by candles and furnished with a mirror reflecting the light and image.
- **In 1865**, Francis Richard Cruise overlooked the pleural cavity of an 11-year-old girl with pleural empyema and pleurocutaneous fistula .
- Nevertheless, the history of thoracoscopy begins with artificial pneumothorax. In the same year when Robert Koch discovered the tubercle bacillus **[1882],** Forlanini noticed that tuberculous cavities collapsed healing when the patient developed a spontaneous pneumothorax or a massive effusion. Forlanini performed the first artificial pneumothorax inserting a needle obliquely in the anterior axillary line and inoculated air under pressure, and the technique became widely adopted .
- **In 1910**, Hans ***Christian Jacobaeus*** published the *Jacobaeus operation* (4): the creation of an artificial pneumothorax by severing adhesions with galvanocautery that, collapsing the lung, permitted safe access and inspection of the pleural space (5). In this era of enthusiasm, most patients suffered from pulmonary tuberculosis (6).
- Nonetheless, Jacobaeus used thoracoscopy in the treatment of adhesions, infections and effusions other than in the diagnose tumours, tuberculosis and other diseases. The use of thoracoscopy was expanded in the sequent years including the talc pleurodesis, the sympathectomy, and treatment of spontaneous pneumothorax. Nevertheless, after the arrival of antibiotics, the improvements in anesthesia and intra-operative oxygenation transform the thoracoscopic biopsies in a valuable tool before dropping into unemployment after ***1950*** in the era of neglect (6).

Adventage The advantages of VATS

- VATS was associated with a reduced :
- Need for pain medication.
- Shorter surgery time.
- Shorter length of stay.
- Less need for blood transfusion.

- **Initially**, VATS was used mostly for confirmation of the presence of empyema.
- **Later**, VATS debridement was found to be a very effective method of treating early fibrinopurulent empyema.
- **More recently**, VATS decortication has also been reported to successfully manage stage I/II empyema after failure of chest tube thoracostomy.
- **Finally**, its effectiveness in treating multiloculated and chronic empyemas has also been addressed

In reports with:

- the disease stage (stage II *versus* stage III) determined only by symptom duration (<3 weeks *versus* >3 weeks), a statement like "***VATS facilitates the management of fibrinopurulent or even organised pleural empyema***" may at first sight seem appropriate.

The retrospective study included 165 patients who underwent surgery for thoracic empyema.

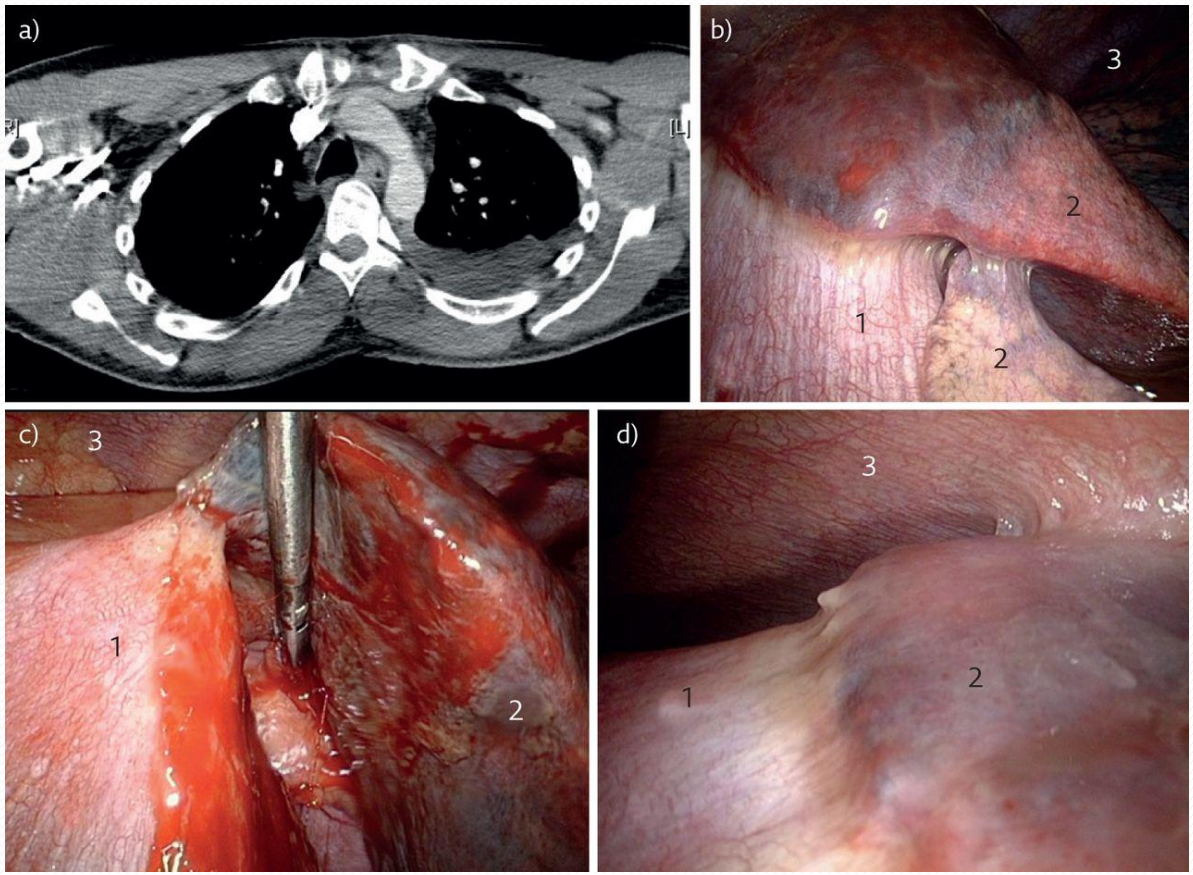
- **Pneumonia** was the the commonest cause 77%.
- **elective lung** and **esophageal surgery** 11%.
- **trauma** in 9%.
- **intraabdominal infection** in 3%.

- The subjects were diagnosed with thoracic empyema stage II or III either prior to the procedure on CT examination, or during the procedure.

- VTS is the method of choice in the treatment of stage II thoracic empyema, with a potential for the infectious focus removal, targeted drainage and lung reexpansion.

- VATS is an alternative thoracotomy method for decortication in the early stage III empyema.

VATS debridement in pleural empyema stage I. a) Pre-operative CT of the thorax; b–d) operative views. 1: -diaphragm; 2: lung; 3: chest wall.



- Videothoracoscopy (VTS) and video-assisted thoracoscopic (VATS) decortication is commonly used in the treatment of early thoracic empyema.

- The theoretical advantage of early surgery is that patients undergo rapid, definitive treatment.

- surgery can ensure optimal drain placement

In addition to appropriate antibiotic therapy, PROMPT drainage is indicated in patients when there is clinical concern for or evidence of infection in the pleural space.

Indication:

- ●Empyema (overtly purulent pleural fluid)
- ●Positive pleural fluid Gram stain or culture
- ●Loculated pleural effusion
- ●Large free-flowing effusions (≥0.5 hemithorax)
- ●Effusions associated with thickened parietal pleura
- ●Sepsis from a pleural source
- A pleural fluid pH of <7.2 is also an indicator of infection in the pleural space

VATS is often indicated:

- in symptomatic patients with parapneumonic effusion or empyema that fails to resolve with antibiotics, tube thoracostomy, and a course of tPA/Dnas.

- VATS is preferred over open thoracotomy since outcomes are similar and morbidity and hospital length of stay is lower

Some surgeons prefer to proceed directly with open thoracotomy in some cases !!

- patients with significant adhesions
- greater visceral pleural thickness
- or larger empyema cavity size
- **others** prefer to start with VATS and convert intraoperatively to open thoracotomy

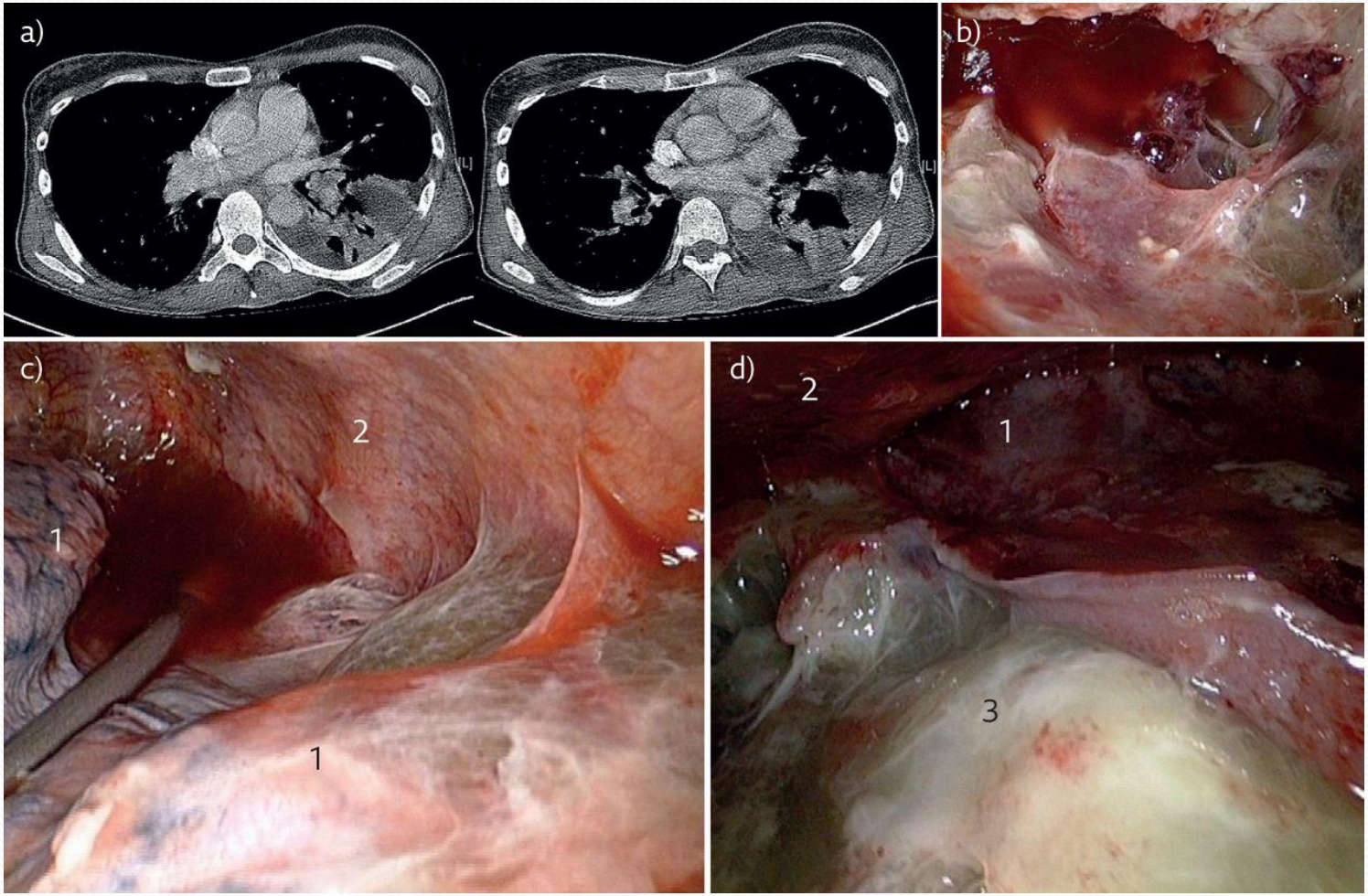
Conversion TO OPEN!!

- 1- some patients in whom stage 2 disease is suspected (fibropurulent stage) who turn out to have components of stage 3 (chronic organization) may need an open procedure for complete decortication
- 2- intolerance of single lung ventilation
- 3- uncontrollable bleeding
- 4- needing access to structures not amenable to VATS repair.
- 5- in patients with delayed referral (>2 weeks) for VATS
- 6- gram-negative bacteria causing empyema.
- 7- if underlying necrotic lung is discovered, parenchymal resection may need

the use of CT scan as a guide to indicate the need for VATS debridement has demonstrated::

that up to 30% of patients were understaged by preoperative imaging and required intraoperative conversion to thoracotomy to achieve decortication.

VATS decortication in pleural empyema stage II. a) Pre-operative CT of the thorax; b–d) operative views with multiple intrapleural loculations. 1: lung; 2: chest wall; 3: sub-pulmonary fibrin collection.



VATS & fibrinilysis:

- ***VATS had 91% success rate in treating stage II empyema, while fibrinolysis only worked in 41% of patients.***

- ***The mean hospital stay in the VATS group was also shorter (8.7 vs. 12.8 days) with obvious cost saving.***

Imaging techniques including:

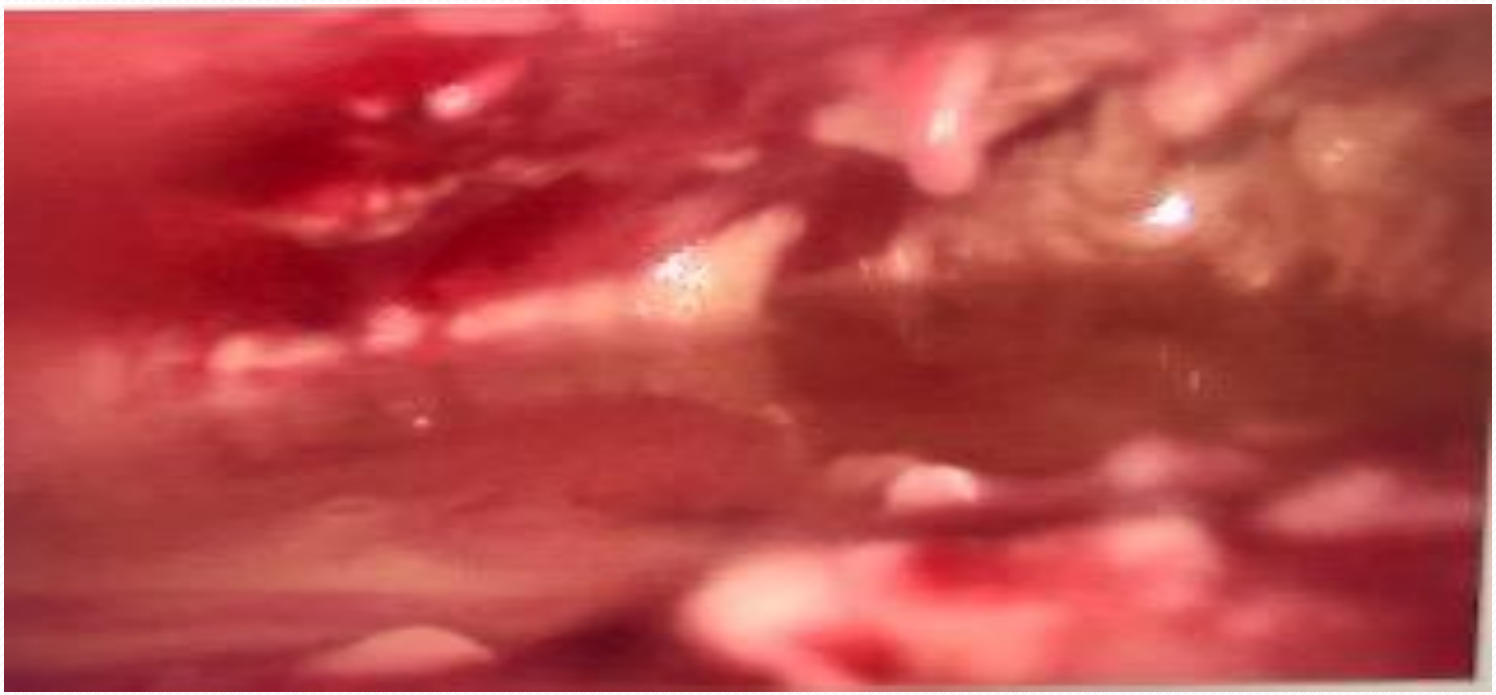
- ***thoracic ultrasound***
- ***CT may not accurately identify the thickness of the visceral cortex as there will inevitably be a layer of exudate over any cortical rind***.

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

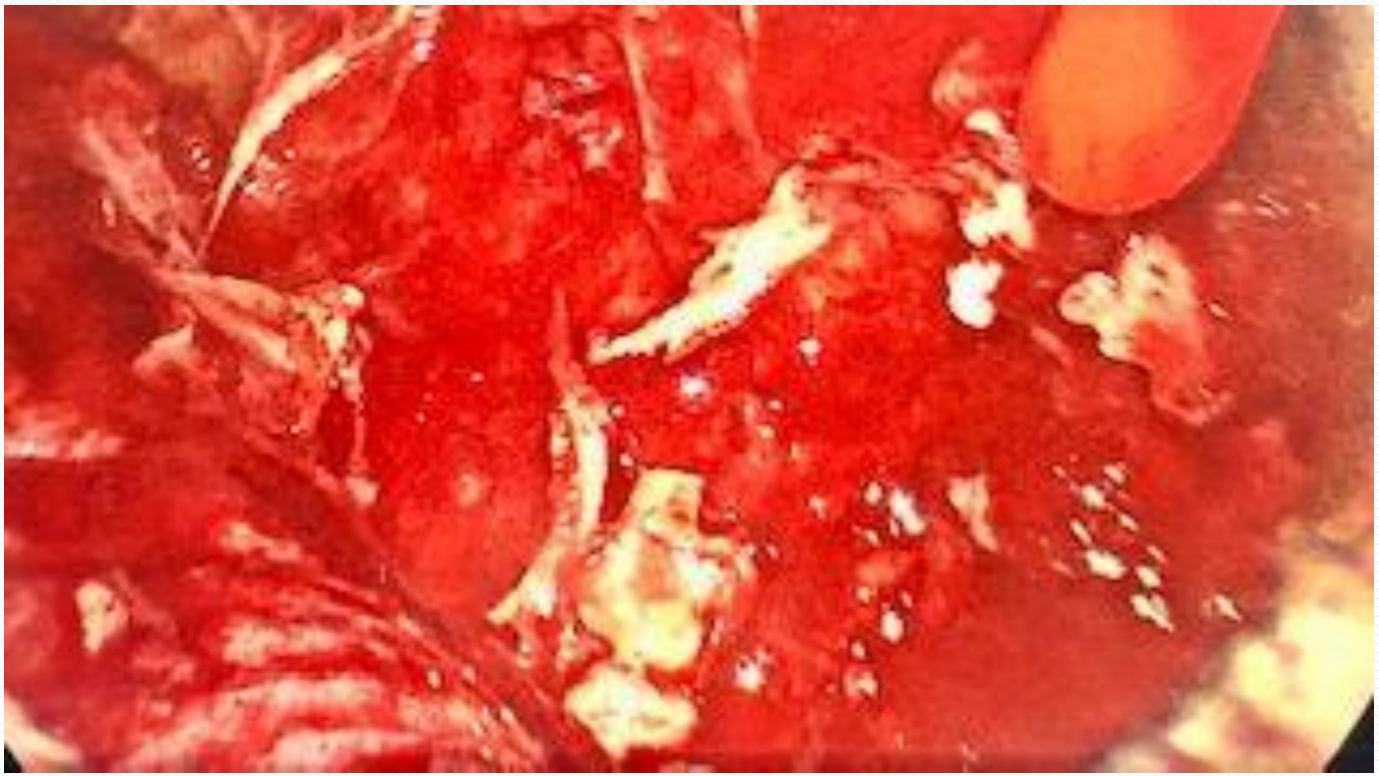
- The surgeon must then assess whether full lung re-expansion can be achieved by VATS decortication or whether an open procedure is necessary.

- the role for VATS in 328 patients with stages II and III empyema: VATS approach was successful in patients with fibrinopurulent effusion, with a conversion rate of 44% in unexpected stage III disease.

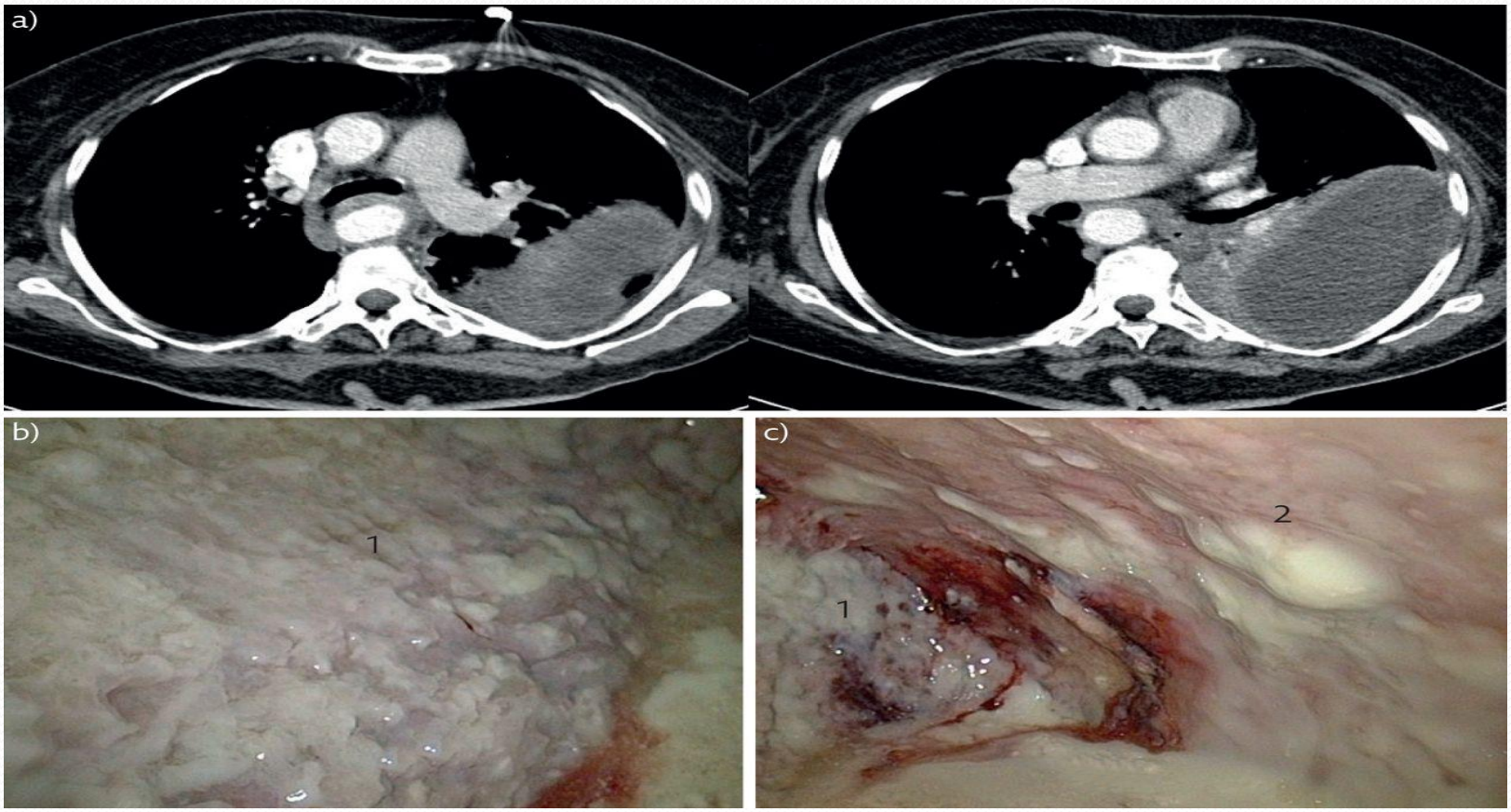
Purulent & peel



Loclulated empyema



VATS decortication in pleural empyema stage III. a) Pre-operative CT of the thorax; b and c) operative views with thick fibrin layer over the parietal pleura and cortex overlying the lung. 1: lung; 2: chest wall.



از اینکه حوصله به خرج دادید و گوش فرا دادید متشکر هستم .

خدا نگهدار.