MEDICAL VERSUS SURGICAL MANAGEMENT OF EMPYEMA –

"TO DO OR NOT TO DO"

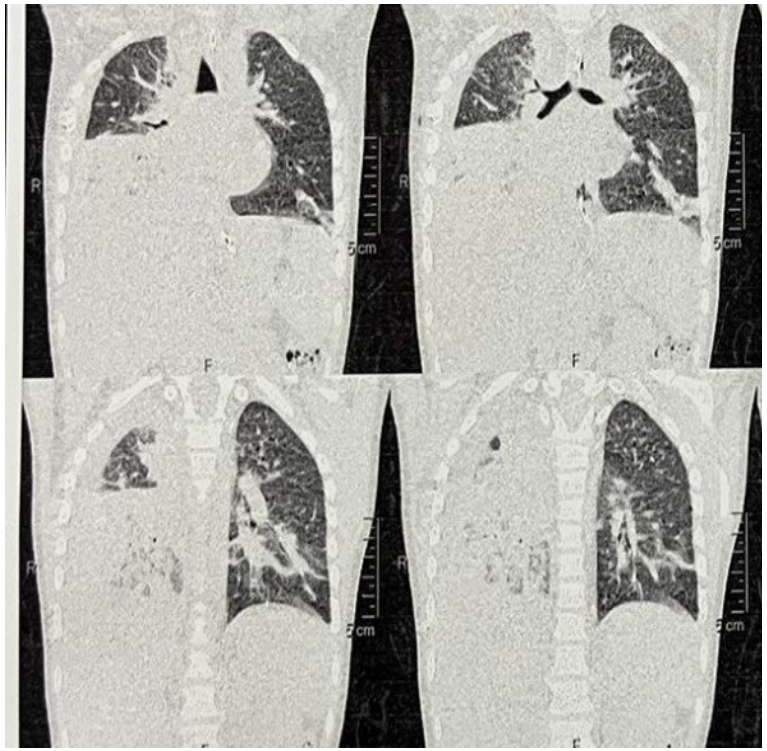
Dr.Apoorva Makan

Department of Paediatric Surgery

Empyema

- Empyema can be differentiated into three phases

1. Exudative (stage I)
2. Fibrinopurulent (stage II)
3. Organising (stage III)

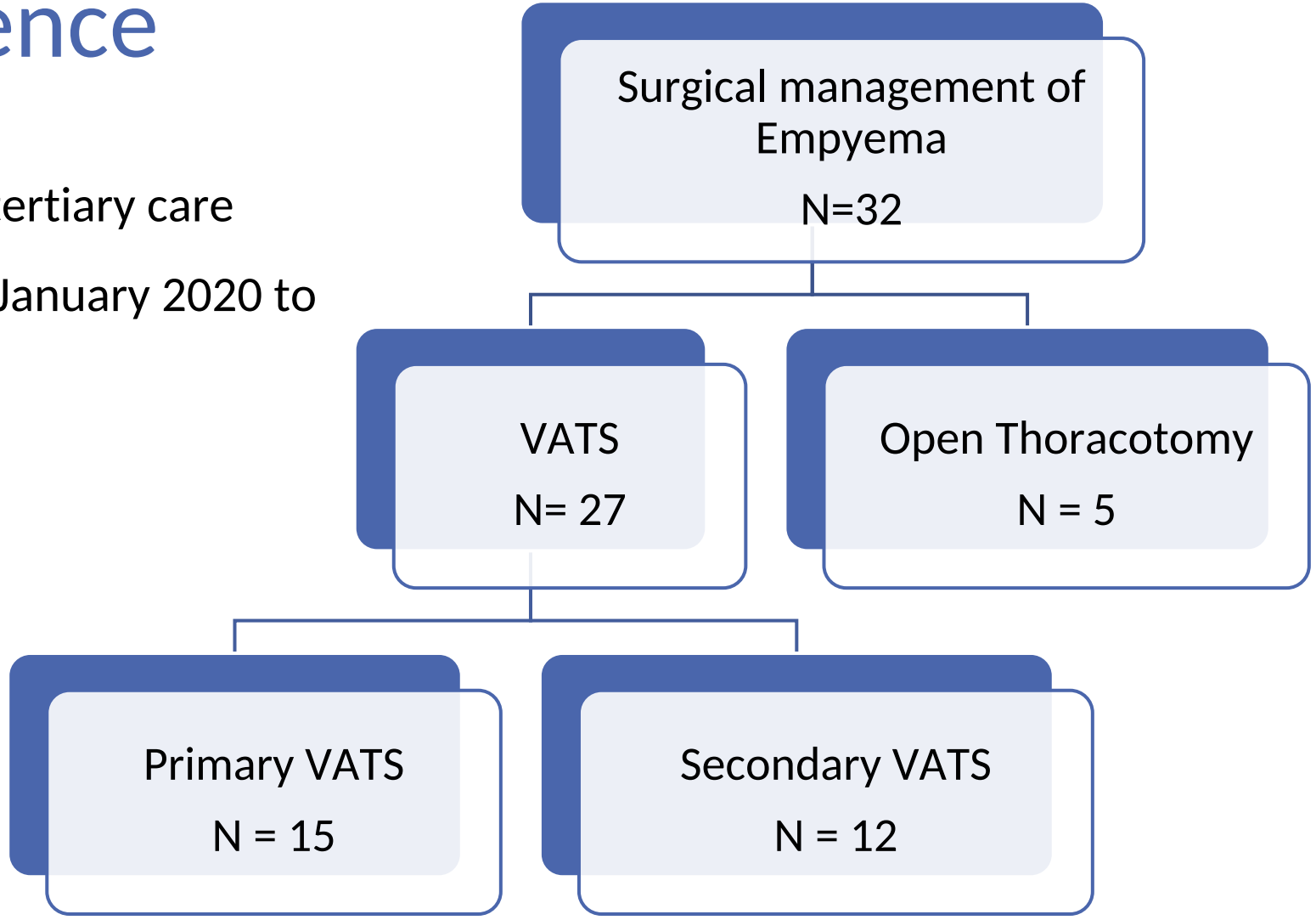


Lee RB. Empyema thoracis *In:* Sellke FW, del Nido PJ, Swanson SJ, eds. Sabiston and Spencer Surgery of the Chest. 7th Edn Philadelphia, Elsevier Saunders; , 2004; pp. 431–434.

- Fibrinopurulent empyema changes into an organising phase within 7–10 days of symptom initiation.
- In addition, lung entrapment should be suspected when the pleural infection process is known to have been ongoing for longer than 10–14 days

Our Experience

- Our experience in a tertiary care referral centre from January 2020 to March 2025



VATS

Advantages

- **Minimally Invasive:** Smaller incisions, less pain, shorter hospital stay, and faster recovery time.
- **Reduced Morbidity:** Lower risk of complications compared to thoracotomy.
- **Less pain –** Absence of rib spanning
- **Shorter Operative Time:** VATS procedures are generally faster than thoracotomy.
- **Improved Cosmesis:** Smaller incisions lead to less visible scarring. Rib removal not required.
- **Faster Recovery**

Disadvantages

- **Potential for Conversion to Thoracotomy:**
- If the empyema is very thick or complex, VATS may need to be converted to thoracotomy.
- **Limited Access in Some Cases:**
- VATS may not provide the same access as thoracotomy for extensive decortication or removal of thick adhesions.

Thoracotomy

Advantages

- **Complete Decortication:**

Allows for more extensive removal of adhesions and debris in complex cases.

- **Good Access:**

Provides better access for difficult cases.

Disadvantages

- **More Invasive:**

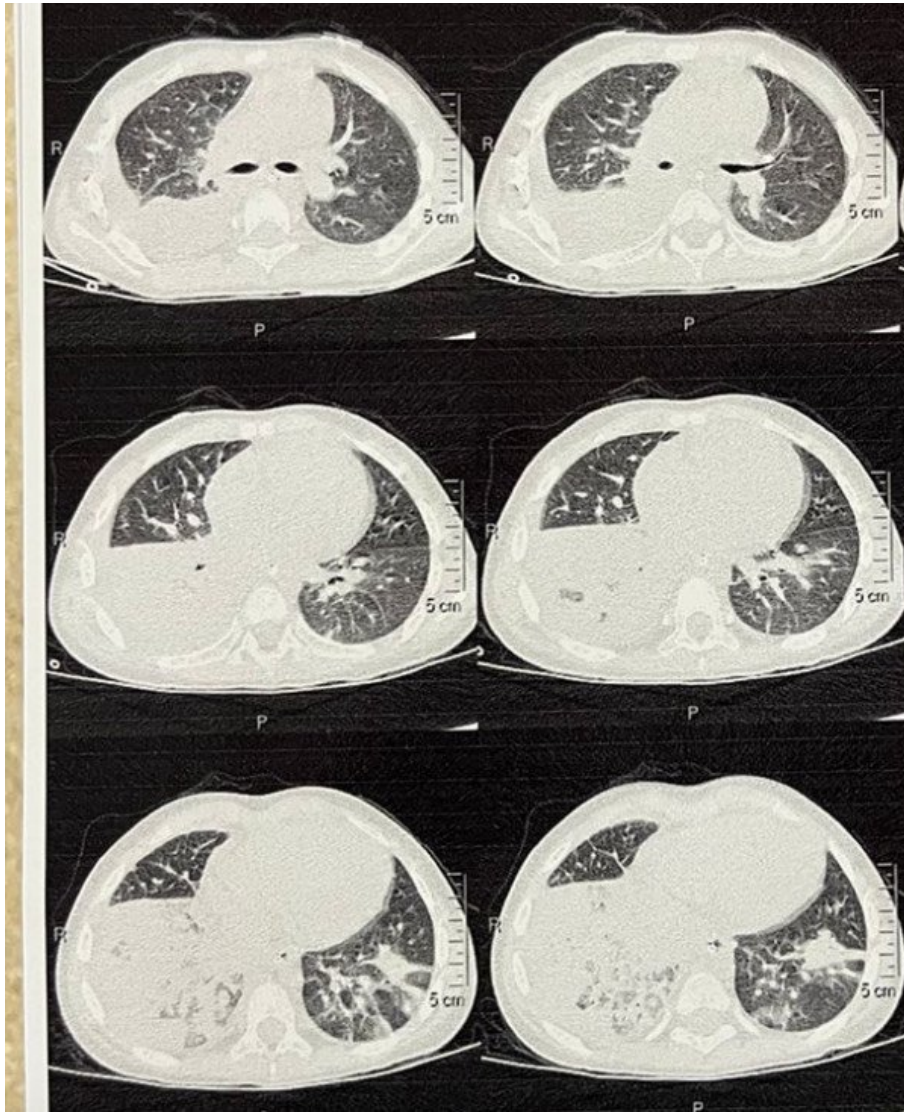
Larger incision, increased pain, longer hospital stay, and slower recovery.

- **Higher Risk of Complications:**

Increased risk of bleeding, infection, and other complications compared to VATS.

The Main Question ?

- Unlike the situation 15 years ago, where the main question related to the optimal time for open decortication, nowadays there is an additional question: when is the optimal time for VATS?
- The absence of clear guidelines for the use of VATS in pleural empyema influences the treatment outcome as well.



Timing for Surgery

- In the exudative stage, closed chest drainage with appropriate antibiotics can be effective and such an approach is widely accepted.

- The main problem in practice is with development of loculations and/or a visceral pleural cortex, when antibiotic treatment and tube drainage alone become ineffective for sepsis control and achieving full lung re-expansion.

- According to British Thoracic Society Pleural Disease Group published clinical guidelines, in the absence of clinical improvement of the sepsis at 5–7 days, patients considered fit for surgery should be referred for surgical treatment, either in form of VATS or open decortication

Davies CW, Gleeson FV, Davies RJ. BTS guidelines for the management of pleural infection. Thorax 2003; 58: Suppl. 2, ii18–ii28

It is important to point out that the appropriate VATS intervention at this stage comprises thorough lung liberation with removal of the peel not only from the visceral pleura, but also with complete debridement of the parietal pleura, costo-diaphragmal and costo-mediastinal recesses as well.

Reference Articles

- **EARLY** VATS drainage or decortication has been reported to offer better early results than treatment with fibrinolytics or thoracostomy alone

Petrakis IE, Kogerakis NE, Drositis IE, et al. Video-assisted thoracoscopic surgery for thoracic empyema: primarily, or after fibrinolytic therapy failure? Am J Surg 2004; 187: 471–474.

- LARDINOIS *et al*. clearly demonstrated that the **probability of conversion to thoracotomy for fibrinopurulent empyema increases** from 22% to 86% **between day 12 and day 16 of presentation.**

- Lardinois D, Gock M, Pezzetta E, et al. Delayed referral and Gram-negative organisms increase the conversion thoracotomy rate in patients undergoing video-assisted thoracoscopic surgery for empyema. Ann Thorac Surg 2005; 79: 1851–1856.

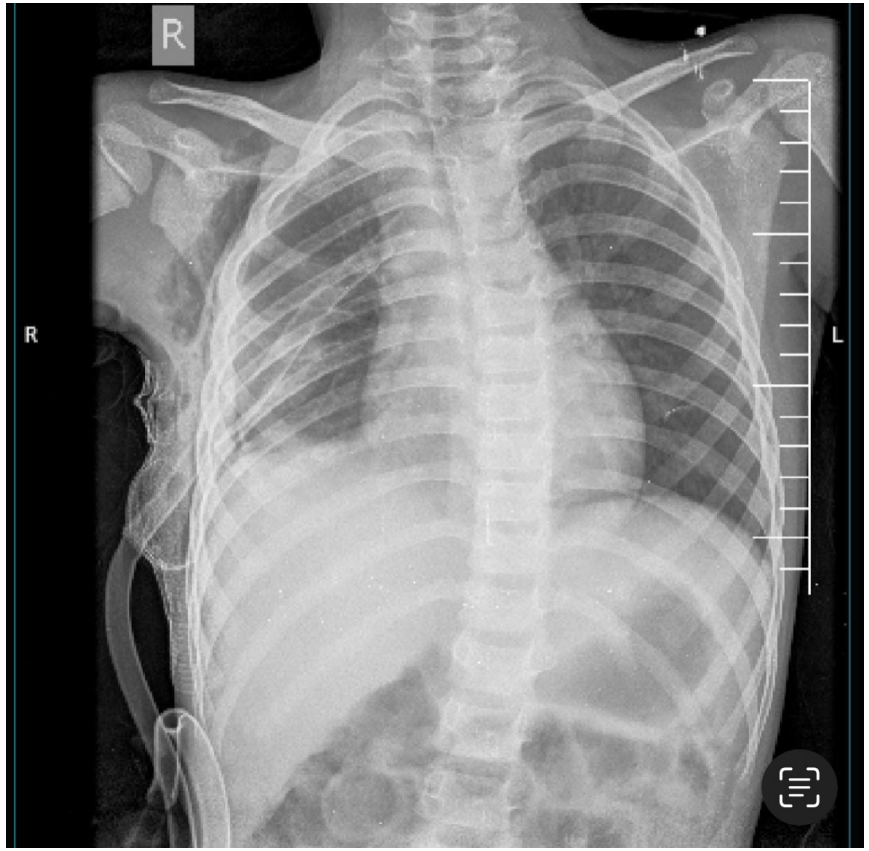
- CHUNG *et al*. , in their recent retrospective analysis of 120 cases of VATS empyemectomies, confirmed the **importance of early referral to surgery**, demonstrating that patients with a symptom duration of <4 weeks had **better early results compared with a symptom duration >4 weeks.**

- Chung JH, Lee SH, Kim KT, et al. Optimal timing of thoracoscopic drainage and decortication for empyema. Ann Thorac Surg 2014; 97: 224–229.

- Setting aside the benefits of the early application of VATS, it seems that VATS could be considered an option not only in the treatment of early-stage empyema, but also for later stages.

- Tong and colleagues advocated **at least a trial of VATS drainage for empyema of all stages and complex or recurrent pleural effusions**, considering that the functional results are comparable with open decortication and **in light of benefits** in terms of length of stay, fewer prolonged air leaks, blood transfusion requirements, postoperative respiratory complications, and 30-day mortality

- To date, there have only been two randomised controlled trials comparing VATS and tube thoracostomy as the primary intervention. Both reported that **patients undergoing VATS as the primary management had fewer treatment failures and shorter length of hospital stay.**



Postoperative Chest xray imaging on Day 0 (post VATS)

- Wozniak CJ, Paull DE, Moezzi JE, et al. Choice of first intervention is related to outcomes in the management of empyema. Ann Thorac Surg 2009; 87: 1525–1530.
- Wait MA, Sharma S, Hohn J, et al. A randomized trial of empyema therapy. Chest 1997; 111: 1548–1551.

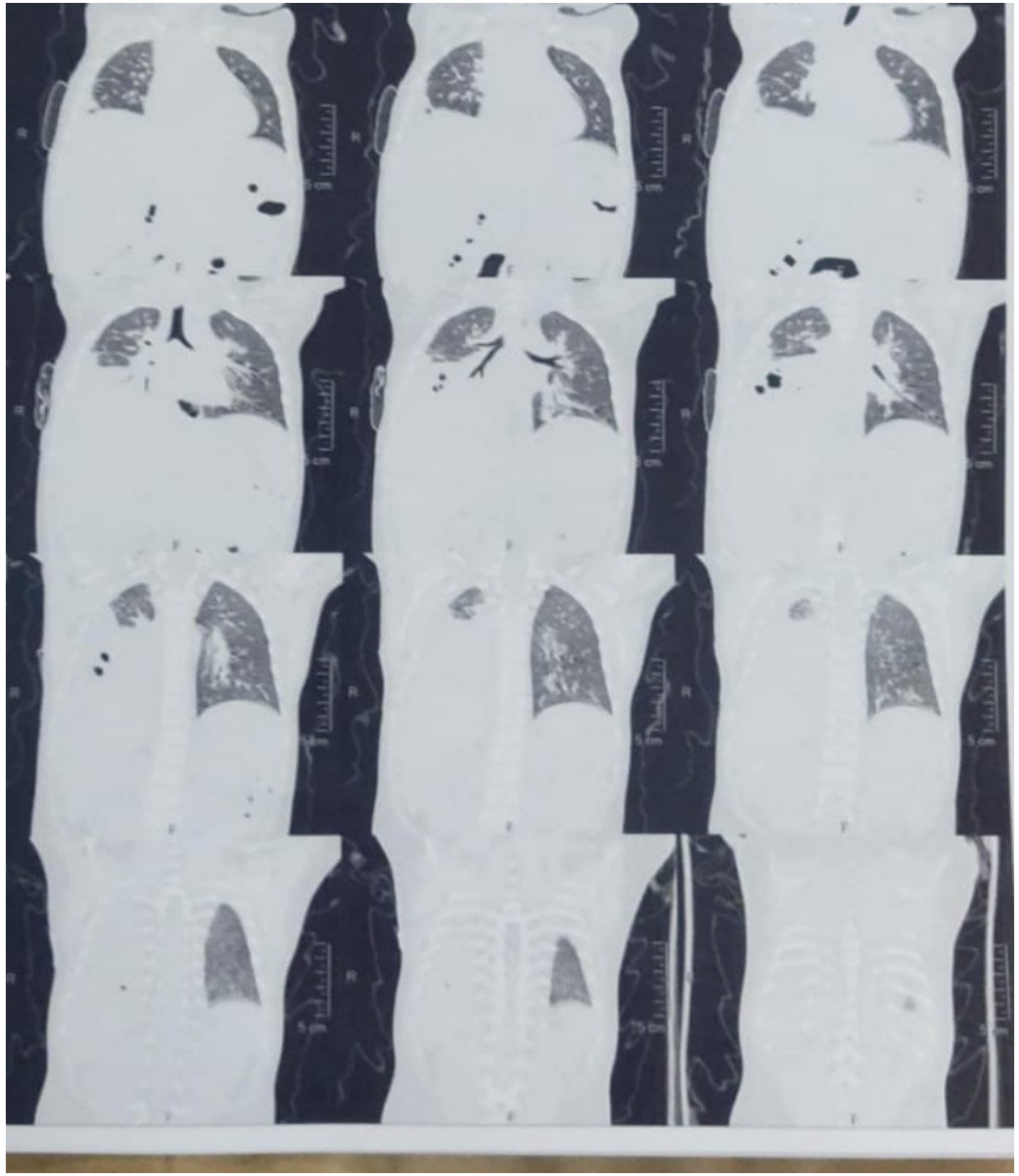
- In brief, the existing evidence suggests that aggressive, early treatment including VATS improves the outcome of stage I–II pleural empyema.

- These studies have led some researchers to advocate a paradigm shift in empyema treatment and propose VATS as the treatment of choice at diagnosis for all patients with fibrinopurulent empyema.

- However, international guidelines recognise a definite role for VATS only after failure of conservative treatment.

Difference of Opinion

- The 2015 European Association for Cardio-Thoracic Surgery (EACTS) guidelines favoured VATS in patients with stage II–III pleural empyema, although this approach was considered controversial, especially in patients with stage III empyema with a long (>5 weeks) symptomatic clinical history



- Scarci M, Abah U, Solli P, et al. EACTS expert consensus statement for surgical management of pleural empyema. Eur J Cardiothorac Surg 2015; 48: 642–653.

Discussion

- The limitations of VATS and the reasons for conversion to thoracotomy are presence of strong adhesions between parietal and visceral pleura and/or the inability to obtain an adequate pleural decortication to achieve lung re-expansion

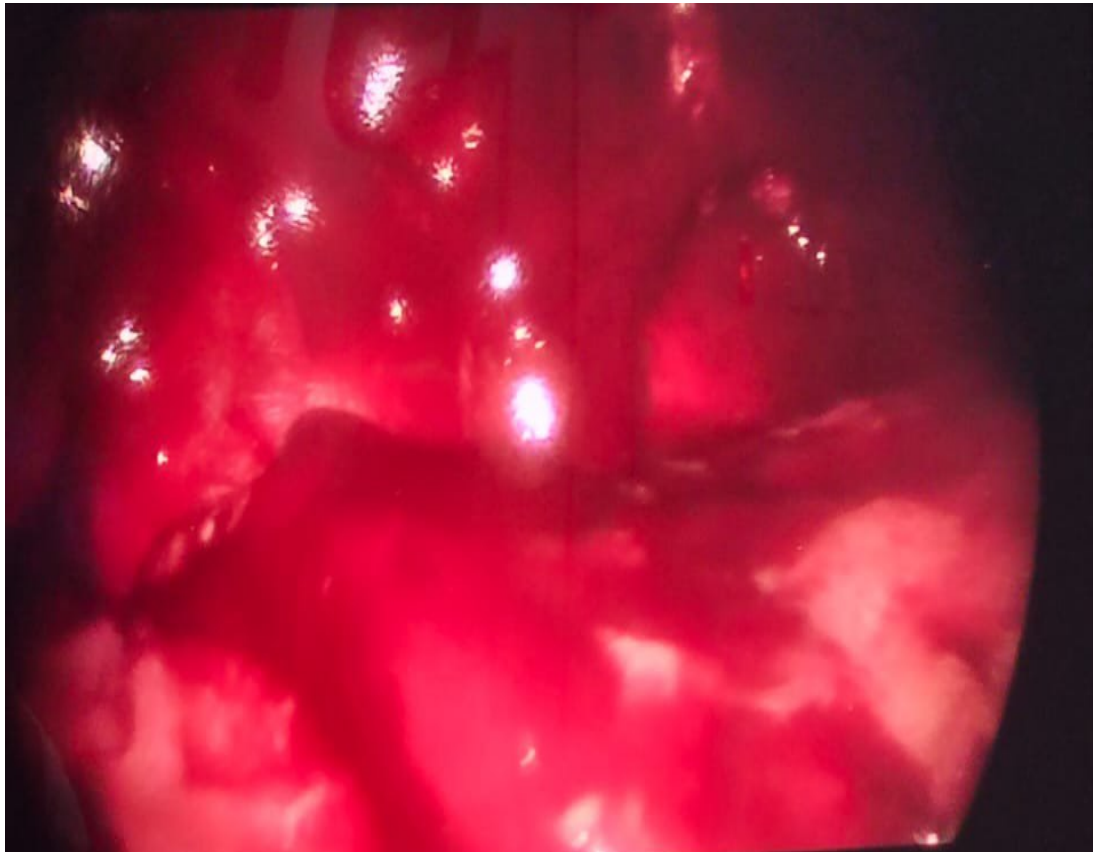
- In clinical practice, it is difficult to identify when an advanced stage disease will need conversion to thoracotomy. This evaluation is usually performed at the time of operation

- In all situations, the patients are informed that a VATS approach will be attempted, and informed consent is obtained to proceed with thoracotomy in case of VATS failure

- Lardinois D, Gock M, Pezzetta E, et al. Delayed referral and Gram-negative organisms increase the conversion thoracotomy rate in patients undergoing video-assisted thoracoscopic surgery for empyema. Ann Thorac Surg 2005; 79: 1851–1856.

CONCLUSION

- VATS and open decortication are considered effective surgical treatment modalities
- **VATS** when performed at the proper time is reported to be **more efficient and have lesser postoperative morbidity than other treatment modalities** such as closed thoracostomy, fibrinolytics only, or open decortications.
- Therefore, it is imperative that the **optimal timing of surgical treatment not be missed during the management** of patients with empyema.



THANK YOU