KEY DETERMINANTS GUIDING TREATMENT ALGORITHMS IN PEDIATRIC EMPYEMA: FIVE YEARS OF SINGLE-CENTER EXPERIENCE

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Objective:

This study evaluated pediatric empyema outcomes by stage and sought predictors for surgical decortication, particularly after intrapleural tissue plasminogen activator (tPA) therapy.

This QR code provides access to the management algorithm developed in our clinic based on our experience with pediatric empyema cases between 2020 and 2025.

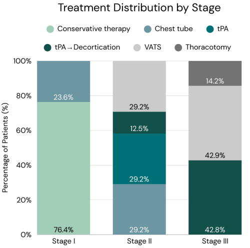
Materials and Methods:

Between **2020-2025**; 160 pediatric patients with parapneumonic effusion were evaluated. Empyema was diagnosed in 104 patients, with 8 excluded due to early mortality or external referral.

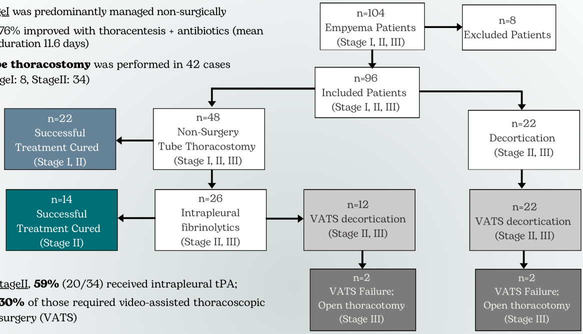
STAGE	Patient distribution by stage	Mean hospital stay (day)
Stage 1	**%35.4** (n=34)	14
Stage 2	**%50** (n=48)	26
Stage 3	**%14.6** (n=14)	30

The remaning **96 patients** were staged according to *American Thoracic Society (ATS) classification*

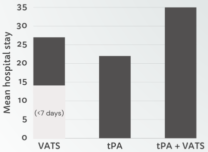
- Mean age 8,7 years
- 33% were female



- StageI was predominantly managed non-surgically
  - 76% improved with thoracentesis + antibiotics (mean duration 11.6 days)
- **Tube thoracostomy** was performed in 42 cases (StageI: 8, StageII: 34)



- In StageII, **59%** (20/34) received intrapleural tPA;
  - **30%** of those required video-assisted thoracoscopic surgery (VATS)
- Overall, tPA was given to 26 patients (20 StageII; 6 StageIII);
  - **46%** (n=12) required decortication (83% VATS, 17% thoracotomy); mean time to tPA initiation and subsequent surgery were 10.2 and 19.5 days, respectively.



- Hospital stay averaged 22 days with successful tPA alone versus 35.5 days when tPA failed and surgery was needed (p=0.002)
- Surgical decortication via VATS was performed in 30 patients (StageII: 20; StageIII: 10), with a mean stay of 29 days; early VATS within 7 days (n=6) yielded much shorter stays (13.6 days, p<0.001)
- All 4 patients who required thoracotomy due to VATS failure were Stage III cases; their surgical intervention was performed on approximately the 17th day, and the mean hospital stay was recorded as 38 days.

Results:

- ✓ Despite tPA, 46% of patients ultimately required surgery.

- ✓ StageIII, prolonged symptom duration, and necrotizing pneumonia predicted the need for decortication.
- ✓ Early surgical intervention (within 7 days) reduced hospital stay.
- ✓ These findings highlight the need for better algorithms to predict fibrinolytic therapy failure and for prompt surgery in high-risk patients to reduce morbidity.

REFERENCES

American Thoracic Society. Management of Parapneumonic Effusions and Empyema, ATS Guidelines. Am Rev Respir Dis. 1962;85:935-936.
Balfour-Lynn IM, et al. BTS guidelines for the management of pleural infection in children: 2023 update. Thorax. 2023;78(4):302–320.
Mansour A, et al. Video-assisted thoracoscopic surgery versus fibrinolytic therapy in pediatric empyema: a multicenter comparative study. Eur J Pediatr Surg. 2022;32(5):345–351.
Piccolo F, et al. Predictors of failure of intrapleural therapy in pleural infection: a systematic review. Chest.