

## Background

Empyema thoracis is defined as collection of pus in the pleural cavity, often caused by pulmonary infection. In developing countries, mycobacterial infection is still a common cause for empyema. According to WHO, in 2017, an estimated 10.0 million new tuberculosis (TB) cases were diagnosed worldwide, about 14% of them were extrapulmonary TB. The management of chronic empyema is space filling procedure to obliterate empyema cavity. Air plombage is one of space-filling procedure for chronic empyema. We will present three cases underwent air plombage in our institution and review it by current literature.

## Case 1

Female, 21 y.o., complained shortness of breath accompanied by productive cough, fever, night sweats, weight loss for the last 1 month. The patient was diagnosed with miliary TB and has been taking first category anti TB drug for seven months. On physical examination, right chest movement lagged behind, right lung breath sounds decreased, there were no crackles or wheezing. Thoracic ultrasound revealed a complex pleural effusion. Chest radiograph and CT scan showed chronic localized right pleural effusion with septation, pleural thickening accompanied by multiple calcifications. The patient underwent right thoracotomy and decortication. The pleura covered with thick peel and the lungs are unable to expand, thus air plombage was performed to fill the empyema cavity. Postoperative chest X-ray showed homogeneous opacity with an avascular hyperlucent area at the apicolateral basal right hemithorax, with a reduced fluid component and an air component. The patient was discharged nine days post operation.

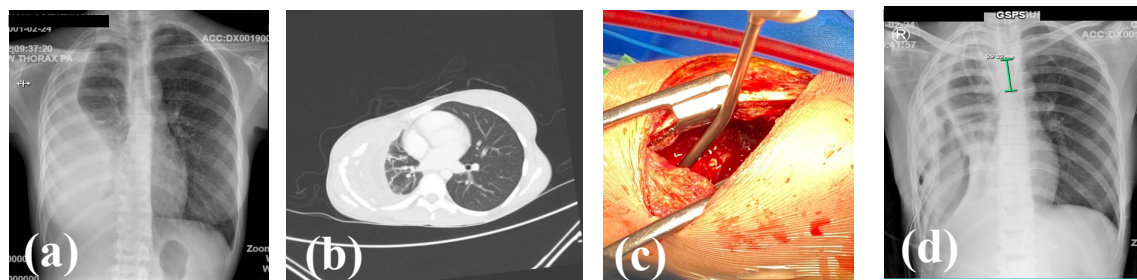


Figure 1. (a) and (b) Pre operative imaging, (c) Intraoperative, (d) Post operative imaging.

## Case 2

Male, 32 y.o., complained of shortness of breath for the last 1 week. Previously, the patient complained of productive cough with occasional haemoptysis, night sweats and weight loss since 6 months prior. The patient has been diagnosed with pulmonary TB and started taking anti tuberculosis drugs. On physical examination, left chest movement lagged behind, left lung breath sounds decreased, there were no crackles or wheezing.

Chest radiograph and CT scan showed left pyopneumothorax, left lung atelectasis, and multiple fibrosis of the left lung. The patient underwent a thoracotomy and decortication, after which the lungs can not expand. So it was decided to perform air plombage to fill the cavity of the empyema. Following the procedure, shortness of breath subsided. Patient was discharged on the ninth postoperative day.

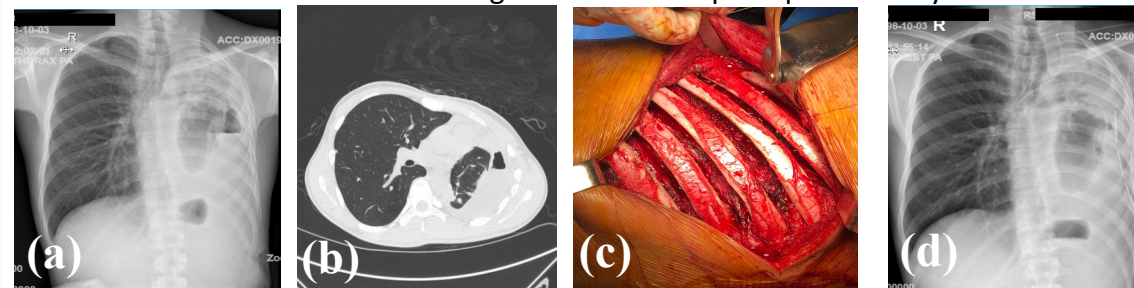


Figure 2. (a) and (b) Pre operative imaging, (c) Intraoperative, (d) Post operative imaging.

## Case 3

Male, 55 y.o., with severe shortness of breath accompanied by cough and fever since 1 months. Pleural puncture was performed, draining 1.5 L purulent fluid. The results of the examination ADA pleural fluid 289 U/L, so the patient was given anti tuberculosis drugs. Chest X-ray and CT scan thorax showed a thick-walled cystic lesion with air-fluid level on the left hemithorax suspected for empyema or abscess. The patient underwent an exploratory thoracotomy that exposed left thoracic empyema with pleural thickening and bronchopleural fistula. It was decided to perform air plombage. Postoperatively, the shortness of breath subsided while fever was absent and there is no air bubbling in water sealed chamber. The patient was discharged on the ninth postoperative day.

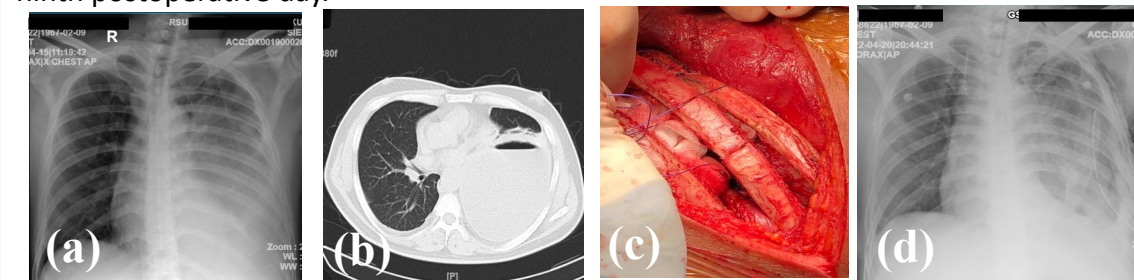


Figure 3. (a) and (b) Pre operative imaging, (c) Intraoperative, (d) Post operative imaging.

## Discussion

In chronic empyema, progressive thickening involving all pleural surfaces leads to fibrothorax, a condition in which the lung cannot be expanded. In case 1 and 2 lung could not expand due to pleural thickening. Decortication is not effective because the pleura had overly thickened.

In case 1-3 fibrosis in the lung was noted, which cause resistance to pulmonary expansion. Hinderance of lung expansion in the presence of empyema space will cause reaccumulation of infected pleural fluid.

Thoracoplasty was the first space-filling procedure to obliterate empyema space. This procedure was performed by stripping intercostal muscle periosteally from the ribs, thus collapsing chest wall and filling the empyema space. Thoracoplasty will cause severe deformity, permanently decreased lung function, and massive bleeding. Each rib removal causes 2-5% decrease in lung function. Air plombage is technique which the parietal pleura, periosteum, and intercostal muscles were collapsed without rib resection. This procedure created an extraperiosteal space filled with blood and serum. The exudate will be reabsorbed slowly. This is recommended for individuals who, due to their general condition, could not sustain a more formidable decortication or extended thoracoplasty. The technique tends to better preserve pulmonary function and precludes deformity.

In our case 1-3 we performed air plombage to obliterate empyema space. We chose this procedure because this does not cause severe deformity, especially in case 1 and 2, considering how patients in their productive age will benefit from increased pulmonary function provided by air plombage. In case 3 with bronchopleural fistula, we performed air plombage because it could also effectively manage bronchopleural fistula by sealing multiple minute air leaks, and prevent overexpansion which may result in persistent leaks.

## Conclusion

Air plombage is recommended in these three cases because it is not cause deformity, increase pulmonary function, and it can manage bronchopleural fistula. We recommed air plombage as one therapy of choice for chronic empyema. The limitations in our study are we haven't done spirometry examination in our patient due to limited time. For next study we suggest to evaluate effectiveness of air plombage and recurrence rate of empyema with CT scan Thorax.

## References

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