

# Re-expansion pulmonary edema

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## Learning Objectives

- Identify patient with Re-expansion pulmonary edema (RPE) post-thoracocentesis
- Describe the management of a patient with Re-expansion pulmonary edema

## Case Report

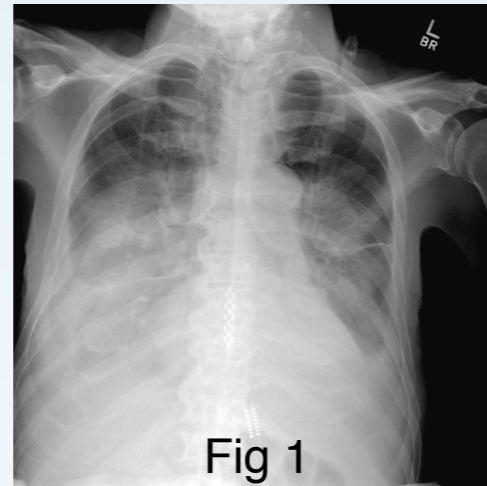
### Case Presentation:

An 80-year-old man with history of hypertension, atrial fibrillation, congestive heart failure with preserved ejection fraction, and sacral decubitus ulcer was hospitalized for surgical debridement of his ulcer.

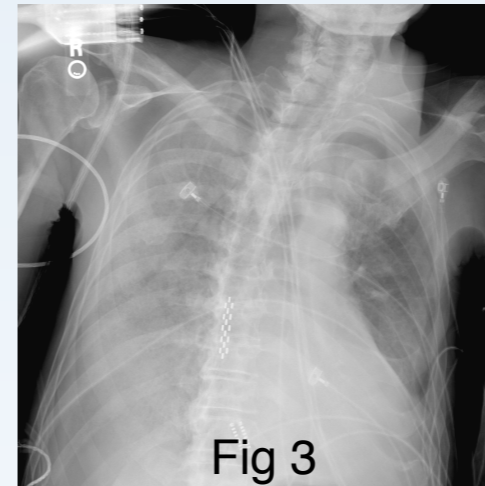
### Hospital Course

- The patient developed health-care associated pneumonia and was treated with antibiotics and aggressive hydration.
- His pneumonia resolved within a few days, however the patient started complaining of difficulty breathing and cough with a new oxygen requirement of 3L/min via nasal cannula.
- His chest imaging showed bilateral pleural effusions refractory to diuresis (Fig 1)
- The patient underwent right-sided thoracocentesis, with removal of 2.5L of transudative fluid
- He witnessed immediate improvement in his breathing, and the chest x-ray post-thoracocentesis showed significant reduction in the right pleural effusion. (Fig 2)
- Later that night, the patient developed dyspnea and hypoxia. On physical exam, he was tachypneic, tachycardic and his oxygen saturation was 67% on 3L/min via nasal cannula.
- Lung auscultation revealed new crackles on the right side extending to the apex, and remained unchanged on the left side.
- Repeated chest x-ray showed diffuse right-sided infiltrates, consistent with re-expansion pulmonary edema. (Fig 3)
- The patient was admitted to the intensive care unit and received BiPAP ventilation, as well as diuresis.
- Repeated imaging within five hours demonstrated significant reduction in the pulmonary edema, and the patient's clinical condition improved markedly. (Fig 4)
- He was transitioned to supplemental oxygen via nasal cannula at 2L/min within 24 hours.

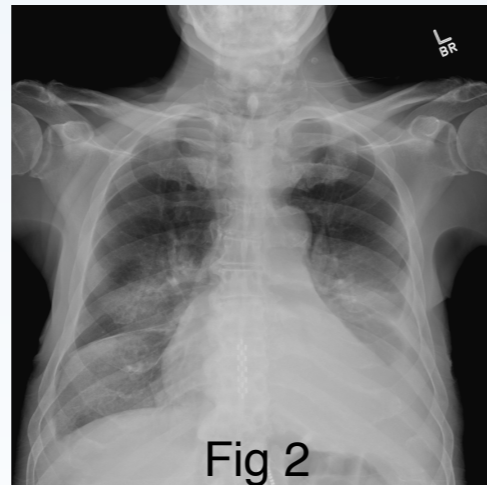
## Radiological Studies



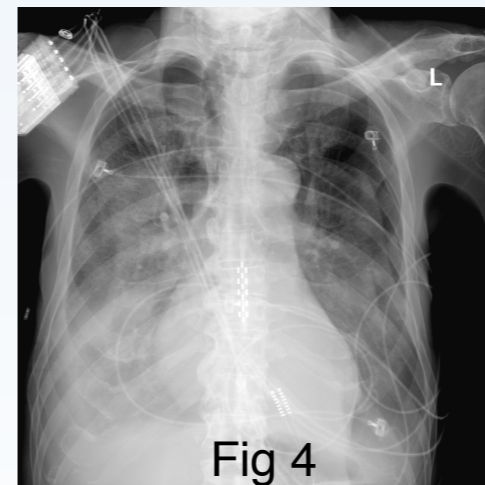
**Fig 1:** Pre-thoracocentesis X-ray showed bilateral pleural effusions with bibasilar infiltrates.



**Fig 3:** This X-ray was performed four hours after the previous study and showed complete opacification of the right hemithorax without any pneumothorax. It is consistent with Re-expansion pulmonary edema.



**Fig 2:** Post-procedure X-ray showed decreased right pleural effusion with patchy airspace disease on the right side without any definite pneumothorax. There is persistent moderate left pleural effusion.



**Fig 4:** This X-ray was performed six hours after the previous image and showed partial clearing of the edema of the right lung compared to the previous examination

## Discussion

- Re-expansion pulmonary edema (RPE) is a rare complication of therapeutic thoracocentesis.<sup>1,2,7</sup>
- The high mortality rate, reported up to 20%, presses the issue for finding adequate prevention and treatment.<sup>7</sup>
- Recent studies have shown a correlation between the amount of volume removed from the pleural cavity and the risk of developing RPE. In addition, the severity of the intra-pleural negative pressure is thought to contribute to the risk of developing RPE.<sup>1,3</sup>
- Patients usually present with productive cough, tachypnea, hypoxia, tachycardia, and hemodynamic instability within the first hour and up to twenty four hours after the procedure.<sup>8</sup>
- Chest imaging usually shows unilateral pulmonary congestion and edema at the site of the procedure, or contra-laterally in extremely rare cases.<sup>4,6</sup>
- Treatment for RPE is supportive, with oxygen supplementation and diuresis.<sup>5</sup>
- In our case, we found dramatic clinical and radiological changes after applying BiPAP and thereby increasing the intra-pleural pressure.
- Clinicians should be encouraged to place patients who develop RPE on BiPAP for six to twelve hours to prevent worsening of pulmonary edema.
- As presented in our case, this management modality had desirable outcomes in as little as five hours.

## Conclusion

BiPAP could be an effective way in treating patient with RPE by increasing the intra-pleural pressure. Further studies should be conducted to assess the effectiveness of BiPAP in decreasing the progression of RPE and mortality.

## References

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