Severe re-expansion pulmonary oedema requiring veno-venous extracorporeal membrane oxygenation treatment

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DESCRIPTION
A man in his 70s presented with a 1 week history of worsening exertional breathlessness. Oxygen saturation was 72% on air, respiratory rate was 20 breaths per minute and there were decreased lung sounds on the right. Chest X-ray revealed right-sided tension pneumothorax (figure 1A). A chest tube was urgently inserted and managed with a water seal. However, within 1 hour after insertion, an intractable cough developed and was followed by dyspnoea, and his oxygen saturation level deteriorated. The chest X-ray revealed massive re-expansion of the lung, signs of right-sided pulmonary oedema and right-sided subcutaneous emphysema (figure 1B). Re-expansion pulmonary oedema (REPE) was diagnosed, and non-invasive positive-pressure ventilation and intravenous furosemide and hydrocortisone therapy were begun. Chest CT performed on the following day demonstrated progression of the bilateral pulmonary oedema and mediastinal emphysema (figure 1C,D). Despite treatment, the patient’s respiratory function deteriorated, culminating in respiratory failure. The patient was transferred to another hospital for veno-venous extracorporeal membrane oxygenation (VV-ECMO) therapy. Although he was weaned off the VV-ECMO after 51 days, he died from septic shock and recurrence of right-sided pneumothorax.

REPE is one of the complications of chest drain insertion for tension pneumothorax. Its incidence ranges from 0.9% to 14.4% in patients with spontaneous pneumothorax undergoing drainage. The risk factors of REPE include longer duration and greater extent of lung collapse, young age and rapid lung expansion.1 2 One recent study reported an incidence of 21.6% in patients with a lung collapse duration longer than 4 days and severe lung collapse. The acute clinical course of REPE resembles that of negative pressure pulmonary oedema, another possible etiology of non-cardiogenic pulmonary oedema, which may also occasionally require VV-ECMO therapy.3 The recommended clinical management is supportive care consisting of non-invasive positive-pressure ventilation, as well as mechanical ventilation, if necessary. Coughing may be the initial symptom.2 Stopping drainage immediately may have been an option for suppressing the progression of oedema in the present patient. Diuretics are usually not indicated4 and might have exacerbated the respiratory failure in our patient.

Learning points
► Re-expansion pulmonary oedema is a rare but critical complication of chest drain insertion for tension pneumothorax.
► Its risk factors include a longer duration and greater extent of lung collapse, young age and rapid lung expansion.
► Early recognition of re-expansion pulmonary oedema and stopping drainage immediately is crucial for suppressing progression.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.
REFERENCES


