Clinical Case Report

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Massive idiopathic spontaneous hemothorax complicating anti-N-methyl-d-aspartate receptor encephalitis

A case report

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Abstract

Rationale: Spontaneous hemothorax is a subcategory of hemothorax which can be life threatening. The etiology of spontaneous hemothorax can be various, and in some rare cases the causes remained unknown. Hence, it is quite difficult to establish the diagnosis. Here, we report a case of spontaneous hemothorax in a young female patient who was recently diagnosed with anti-N-methyl-d-aspartate receptor encephalitis (anti-NMDAR encephalitis).

Patient concerns: A 20-year-old female was transferred to emergency department of our hospital from local hospital presented with insomnia, mood lability, tonic-clonic seizure, and decreased level of consciousness.

Diagnoses: The diagnosis of anti-NMDAR encephalitis was established by detection of cerebrospinal fluid (CSF) and serum antibodies to the NMDA receptor. During the hospital stay, the patient developed massive spontaneous hemothorax and was confirmed by closed-tube thoracostomy.

Interventions and outcomes: Video-assisted thoracotomy was performed to evacuate the blood clots and also to obtain pleural biopsy specimen for diagnostic evaluation. However, the reason of hemothorax remained idiopathic. The postoperative status of this patient was uneventful, and she was discharged on postoperative day 45 as her mental status improved markedly.

Lessons: In this case, the patient had both anti- NMDAR encephalitis and autoimmune thyroid disease. Based on it, we suspected that the patient subjected to severe autoimmune response and inflammatory reaction, which might explain the pathologic changes of parietal pleura and visceral pleura. We recommend the suspicion of spontaneous hemothorax should be considered when the patients with autoimmune diseases present with hemorrhage-related signs or symptoms.

Abbreviations: anti-NMDAR encephalitis = anti-N-methyl-d-aspartate receptor encephalitis, CSF = cerebrospinal Fluid, CT = computed tomography, IV = intravenous, MRI = magnetic resonance imaging, VATS = video-assisted thoracoscopic surgery.

Keywords: anti-NMDAR encephalitis, idiopathic, spontaneous hemothorax

1. Introduction

Spontaneous hemothorax is a subcategory of hemothorax which can be life threatening. The causes of spontaneous hemothorax vary, including tumor, hematological system diseases, exostoses, etc.[1–3] and in some rare cases the causes remained unknown. Hence, it is quite difficult to establish the diagnosis. Anti-N-methyl-d-aspartate receptor encephalitis (anti- NMDAR encephalitis) was formally described in 2007, and the possible mechanisms were reported to be paraneoplastic (usually ovarian teratoma) or related to previous infection which leads to development of autoantibodies.[4] Anti-NMDAR encephalitis may result in a series of mental disorders which may delay the diagnosis of spontaneous hemothorax. Here, we report a case of spontaneous hemothorax in a young female patient who was recently diagnosed with anti-NMDAR encephalitis.

2. Case history

A 20-year-old female was transferred to emergency department of our hospital from local hospital presented with fatigue, nausea, and upper respiratory symptoms, followed days later by insomnia, mood lability, tonic-clonic seizure, and decreased level of consciousness. Cerebrospinal fluid (CSF) examination was remarkable only for mild pleocytosis. All infectious studies were negative. Enhanced brain magnetic resonance imaging (MRI), chest and abdominal computed tomography (CT) were arranged and the results were negative. Additional studies included negative anti-neutrophil cytoplasmic antibodies, antinuclear antibodies, rheumatoid factors, normal level of IgE, complement C4, but complement C3 was 0.778 g/L. Antistreptolysin O antibodies were

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Written informed consent was obtained from the patient for publication of this case report and any accompanying figures.

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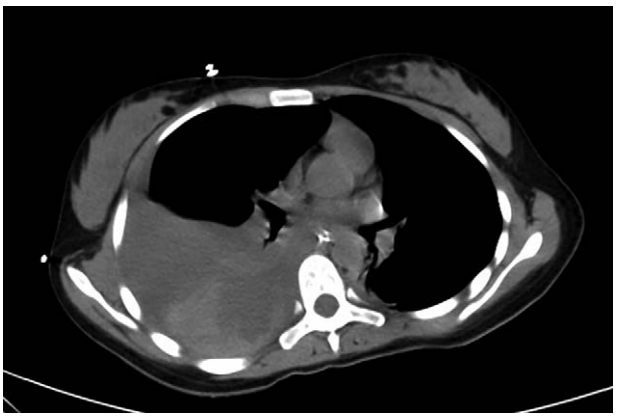

Figure 1. Chest CT revealed massive pleural effusion with blood clots in the right thorax. CT = computed tomography.

233 IU/mL. Thyroid autoantibody tests revealed positive antithyroglobulin antibody, thyroid peroxidase antibody, and normal thyrotrophin receptor antibody. Anti-NMDAR encephalitis was suspected and confirmed by detection of CSF and serum antibodies to the NMDA receptor. Intravenous (IV) corticosteroid and IV immunoglobulin were started for treatment of anti-NMDAR encephalitis.

Three days later, the patient presented with melena. The fecal occult blood test was positive. The coagulation test only showed prolonged activated partial thromboplastin time of 44 seconds and complete blood count suggested that hemoglobin dropped from 112 to 87 g/L. More examinations were arranged to screen potential hemorrhage. On physical examination, she was pale. Dullness to percussion and reduced breathing sounds suggested pleural effusion of right chest. Chest and abdominal CT scan revealed massive right pleural effusion (Fig. 1). A closed-tube thoracostomy was performed and it confirmed hemothorax. As the vital signs were not stable despite she received aggressive fluid

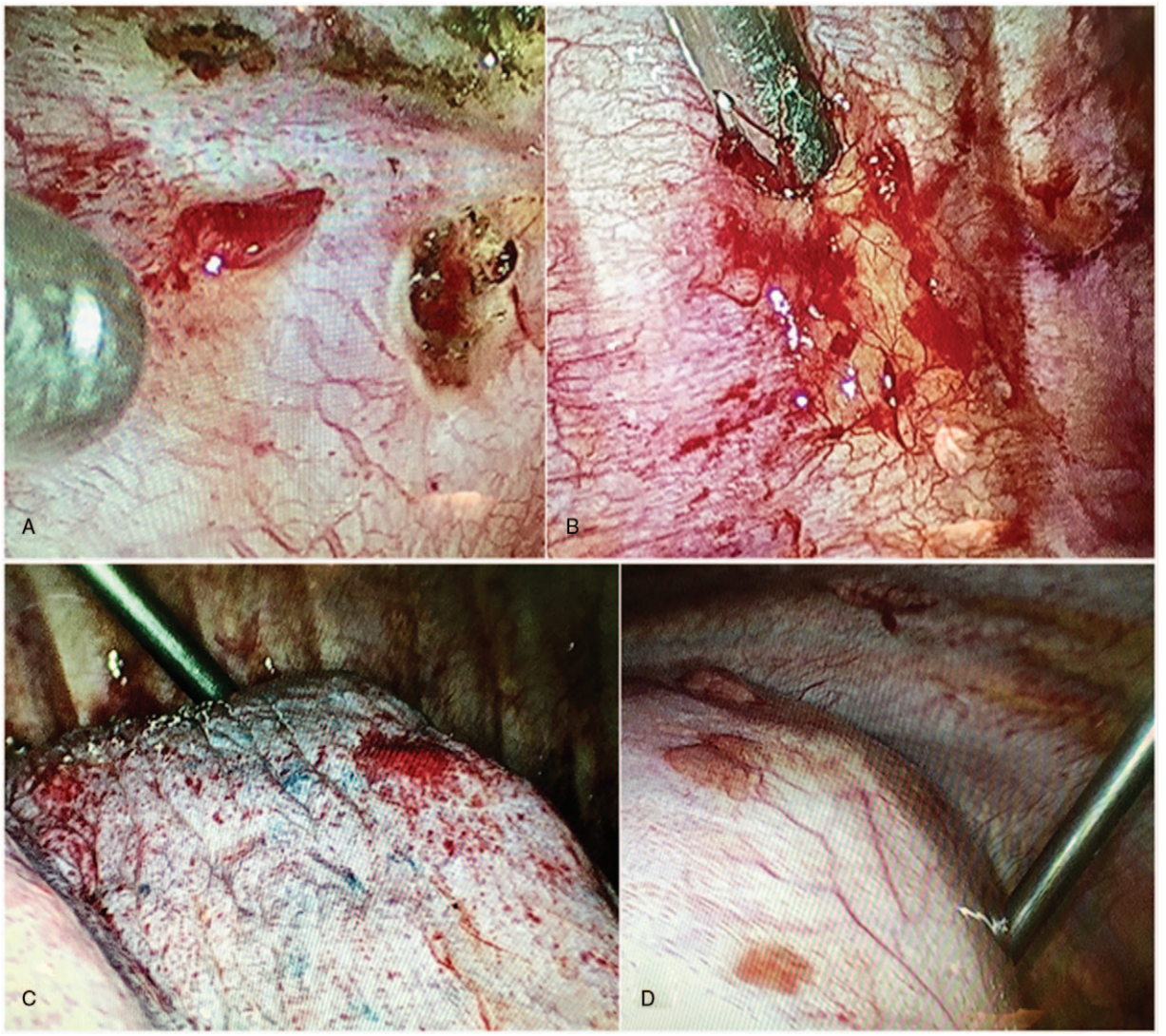

Figure 2. Video-assisted thoracotomy was performed to remove residual blood clots and take biopsies. A, Nodules and breaks were identified on parietal pleura. B, Blood was oozing from these lesions. C, Subpleural hemorrhage and small petechial hemorrhages involving the right lung. D, Nodules were identified on the diaphragm.

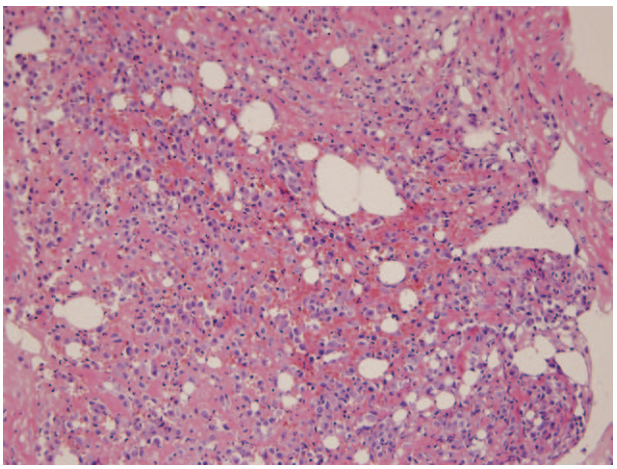

Figure 3. Biopsies were taken from these pleura nodules and histopathologic examination revealed acute inflammatory reaction of pleural surface. (HE ×200).

replacement. We performed video-assisted thoracotomy using 3-port access. Residual clotted blood was removed using a sucker. There was no adhesions nor obvious bleeding point. However, we could identify multiple nodules and breaks on parietal pleura, and blood was oozing from these lesions. Examination of the lung revealed subpleural hemorrhage and small petechial hemorrhages involving the right lung (Fig. 2). We used coagulation hook to stop bleeding and take biopsy of parietal pleura. Histopathologic examination revealed acute inflammatory reaction of pleural surface with fibrinoid exudate and small foci composed of proliferating mesothelial cells (Fig. 3).

The patient recovered well and the chest tube was withdrawn on postoperative day 6. She continued the treatment on anti-NMDAR encephalitis. She was discharged on postoperative day 45 as her mental status improved markedly and no longer display motor or behavioral abnormality.

3. Discussion

Spontaneous hemothorax is a subcategory of hemothorax which can be life threatening. There are varieties of rare clinical entities that can result in the accumulation of blood in the pleural space. Hence, it is quite difficult to establish the diagnosis. Especially, in our case, disorder of mental status in the patients made it challenging to discover hemothorax. Therefore, physical examination as well as adequate radiology examination is of importance to screen potential hemorrhage. In most cases of spontaneous hemothorax, patients underwent tube thoracostomy placement followed by exploratory thoracotomy or video-assisted thoracoscopic surgery (VATS). VATS is preferred because it is a minimally invasive procedure, helps to visualize small lesions and perform biopsy and more feasible for the management of clotted hemothorax.[5]

Another factor causing the delayed diagnosis of hemothorax was that the patient was diagnosed with anti- NMDAR encephalitis. The diagnosis is established when NMDAR antibodies are detected in patient's serum or CSF. When she was transferred to our hospital, her mental status was not stable with decreased level of consciousness and difficulty to follow commands. She received immunotherapy as definitive treatment and sodium valproate to control epilepsy. But when we reviewed the literature, we found that there was no researcher reporting spontaneous hemothorax complicating with anti- NMDAR encephalitis nor relating to the treatment against this disease. Moreover, gastrointestinal hemorrhage was suspected when hemoglobin started dropping and the fecal occult blood test was positive, as IV corticosteroid was given, which also made it difficult and confusing for us to make accurate diagnosis.

Very few cases of spontaneous hemothorax are accompanied with autoimmune diseases. Dorothy reported a case with systemic lupus erythematosus,[6] Hind reported a case with Wegener vasculitis[7] and Ahmet reported a case complicating rheumatoid lung disease.[8] It remains unknown in some patients even after an exploratory thoracotomy or an autopsy to identify a definite etiology.[9–13] Although the etiology of our case remains unclear, given that the patient had both anti-NMDAR encephalitis and autoimmune thyroid disease, we suspected that the patient was affected by autoimmune response and inflammatory reaction, which might explain the pathologic changes of parietal pleura and visceral pleura. We recommend the suspicion of spontaneous hemothorax should be considered when the patients with autoimmune diseases present with hemorrhage-related signs or symptoms. For the management of spontaneous hemothorax in this situation, VATS is preferred for taking biopsy and for the management of clotted hemothorax.

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Author contributions

Xin Wang and Yutian Lai drafted the manuscript. Pengfei Li and Kun Zhou participated in the collection of the radiologic and pathologic data. Guowei Che designed the research and participated in final revision of the manuscript. All authors read and approved the final manuscript.
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