Hemothorax in an Uncontrolled Anticoagulated Patient: Fight or Flight?

— A Case Report —

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Hemothorax in a patient on anticoagulant therapy for atrial fibrillation after blunt trauma is not an uncommon event. However, massive hemothorax in such a patient with an extremely uncontrolled and high international normalized ratio (INR) may pose a serious dilemma. We report a case of a patient under anticoagulant therapy for atrial fibrillation who underwent an emergent thoracotomy for massive hemothorax with an INR of 9.57.

Key Words: anticoagulation, emergency thoracotomy, hemothorax.

Massive hemothorax in a patient on oral anticoagulant therapy for atrial fibrillation after blunt trauma is not a rare entity, but in a patient with an extremely high international normalized ratio (INR) may prove to be challenging. Unnecessary delay of an emergent operation is fatal and prompt action should be weighed on an individual basis. To the best of our knowledge, there are few detailed reports of an emergent thoracotomy procedure in a patient under anticoagulative therapy presenting with high INR.

CASE REPORT

A 52 year old male patient had visited our emergency department 1 hour and 30 minutes after blunt trauma to his chest due to a slip down incident after hiking. The patient had been taking warfarin and aspirin for five years after an episode of cerebral infarction caused by thromboembolus in atrial fibrillation. The patient had sustained three multiple rib fractures in his left chest wall and a fractured right scapula. He had a small amount of hemothorax that eventually required a closed thoracostomy tube insertion. His injury severity score was evaluated at 4 for his chest and 12 in total for temporary loss in consciousness, scapula fracture, and a cervical cord

lesion.¹⁾ His initial hemoglobin level was at 14.3 g/dl, which dropped to 9.2 g/dl three hours later. His initial prothrombin time was 62.3 seconds, 9%, and INR at 9.57. He had been taking warfarin at daily doses of 4.5 mg. A computer tomogram of his chest revealed small amount of hemopneumothorax (Fig. 1). A follow up chest x-ray revealed haziness requiring insertion of a chest tube. The initial drain was bloody and massive (1,300 cc). Despite infusion of vitamin K1 at 10 mg intravenously and infusion of 5 pints of fresh frozen plasma, bleeding continued at greater than 200 cc/hour for 5 consecutive hours with greater than 300 cc in the last hour. After a total of 8 pints of pack cell blood was given (4 pints at the emergency room and 4 pints at the intensive care unit), deci-

Fig. 1. The computerized tomographic scan of his chest, showing multiple rib fractures and an initial small amount of hemopneumothorax.

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sion for an emergent exploratory thoracotomy was made.

Double lumen intubation was performed under general anesthesia and the patient was placed in a left down lateral decubitus position. A moderate sized thoracotomy incision was done over his 5th intercostal space. After hematoma evacuation, a small sized pseudo-sequestered artery from his apicoposterior segment of his left upper lobe supplied from the dome of his left pleural cavity was ruptured and arterial bleeding was seen. Ligation of the artery from his lung was done and bleeding from his dome was controlled by electrocautery. Lung laceration was also noted and was sutured with continuous polypropylene sutures and covered with collagen fleece (Tachocomb). A total of 4 pints of packed cell blood was given during the operation without serious hemodynamic instability. A chest tube was inserted and routine closure performed.

Bleeding after the operation was minimal, no further transfusion of any sort was necessary. His chest tube was removed on his postoperative 9th day and due to central canal and left lateral recess stenosis of his cervical spine between his 4th and 5th level and between his 5th and 6th level, a second operation was performed on his postoperative 11th day after transfer to the department of neurosurgery. Antiplatelet drugs were given immediately postoperatively and warfarin restarted at the postoperative 27th day (after neurosurgery) and the patient was discharged on his postoperative 46th day. His INR has been readjusted to the vicinity of 2.0.

DISCUSSION

Any operative procedure in a patient with uncontrolled anticoagulation, whether the procedure be small or large, would give the surgeon second thoughts about the emergent situation at hand. The annual risks of bleeding in patients on warfarin are up to 1% for fatal episodes, 6.5% for major episodes, and 21.8% for minor bleeding.²⁾ There are four ways to reverse the anticoagulation effects arising from warfarin intake: (1) discontinue warfarin, (2) administration of vitamin K, (3) infusion of fresh frozen plasma (FFP), and (4) infusion of clotting factor concentrates.²⁾ It generally takes at least 3 to 5 days to completely reverse the effects of warfarin by simple discontinuation. Oral vitamin K preparations do not produce any significant correction within 4 hours and is not helpful in patients with life-threatening bleeding. Correction provided by intravenous vitamin K occurs within 6 to 8 hours.²⁾ In life-threatening bleeding, this may be too late. At the recommended FFP

dose for at 15 ml/kg, especially in patients with an INR > 4.5, warfarin reversal would embarrassingly fail. The only effective reversal of anticoagulation is with prothrombin complex concentrates (at 25 u/kg), which correct the coagulopathy within 5 to 10 minutes.²⁾ Unfortunately, in our case prothrombin complex concentrates were not available. Even if it was available, we are not sure it would have precluded the operation.

The indications for emergency thoracotomy for hemothorax after tube insertion are initial drainage of more than 1500 mL (>20 mL/kg) or hourly output of >200 mL/hr (>2 mL/kg/hr) for 2 to 4 hours.³⁾ Our patient clearly required emergent thoracotomy. The operative findings of our patient presented an aberrant blood supply to the lung. The aberrant vessel was most likely caused by pulmonary tuberculosis, noted in his previous medical history. The patient had a history of pulmonary tuberculosis 40 years ago and had been treated with anti-tuberculous medication for 1 year. The bleeding of which was probably caused after laceration of his lung from rib fractures, leading to traumatic pneumothorax and eventual rupture of the aberrant artery. We imagine that this bleeding may have been controlled conservatively in a patient without bleeding tendency.

Because there are a growing number of patients under anticoagulation and many whom may have trauma, such cases involve important decision making for doctors in emergency medicine, trauma, and/or surgery. Although there are several cases of spontaneous hemothorax complicating anticoagulation therapy, to the best of our knowledge there are few detailed reports of hemothorax after blunt trauma in a patient under anticoagulation therapy.⁴⁾ Reversal of the effects of anticoagulation is difficult in an emergent situation and the fact that clotting factor concentrates may be unobtainable can only complicate the situation. The decision for surgical intervention is not an easy one and must be done on an individual basis.

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