

Successful Treatment of a Patient with Penetrating Injury of the Esophagus and Brachiocephalic Artery Due to Migration of Kirschner Wires

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Pins and wires offer the simplest and most effective tools for managing bone fractures and dislocations. Migration of these devices within the chest is rare, but can cause serious problems. The spontaneous migration of Kirschner wires from the right clavicle to the mediastinum resulted in penetrating injury of the esophagus and pseudo-aneurysm of the brachiocephalic artery in an 84-year-old patient. Two Kirschner wires were removed via a vertical incision on the right shoulder without thoracotomy and the brachiocephalic artery was replaced with a Dacron graft. (Ann Thorac Cardiovasc Surg 2005; 11: 313–5)

Key words: esophageal injury, penetrating injury, Kirschner wire, migration

Introduction

Orthopedic fixation wires are regularly utilized for the management of bone fractures. Intrathoracic migration of orthopedic fixation wires occurs infrequently, but can have dire consequences.¹⁾ The present report describes a patient with migration of Kirschner wires, causing penetrating injury of the esophagus and pseudo-aneurysm of the brachiocephalic artery.

Case Report

An 84-year-old man presented to a local hospital with hematemesis. Upper-gastrointestinal endoscopy was performed and a metallic foreign body was observed in the lumen of the esophagus. The patient was transferred to our hospital for treatment.

The patient reported a medical history of fracture of the right clavicle following a fall in early two years. Internal fixation was performed, with placement of two

Kirschner wires.

Cardiac, pulmonary and abdominal examinations were unremarkable. Chest radiography identified two metallic foreign bodies in the right thorax and mediastinum (Fig. 1). Neither pneumo- nor hemothorax was evident. Retrospective examination of chest radiographs obtained 18 months prior to presentation showed no migration of the wires. Upper-gastrointestinal endoscopy revealed a metallic foreign body piercing the thoracic esophagus. The tip of the foreign body was poking into the opposite side of the esophageal wall (Fig. 2). Chest computed tomography revealed pseudo-aneurysm of the brachiocephalic artery (Fig. 3). The end of one pin was located in the 2nd intercostal space, while the end of the other was in the 3rd intercostal space. Removal of both wires without thoracotomy was thus considered feasible, and surgery was planned for repair of the brachiocephalic artery in consideration of the age of the patient. The patient was intubated under general anesthesia in the supine position, and the two wires were removed using an incision in the right shoulder, without need for thoracotomy. Radiographic imaging during the operation was employed to monitor the locations of the pins, which were easily identified and removed without the development of pneumo- or hemothorax. Operation time was 135 minutes and blood loss was 200 ml. A 28-F chest tube was inserted as a precautionary measure. No air leak or bleed-

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Fig. 1. Chest radiography identified two migrated Kirschner wires in the right thorax and mediastinum.



Fig. 2. Upper-gastrointestinal endoscopy revealed a Kirschner wire piercing the thoracic esophagus.

ing from the chest tube was identified postoperatively and the tube was removed on the second postoperative day. On 5 days postoperatively, barium swallow was performed to confirm healing of the esophageal injury, and oral intake was recommenced. Ten days after the first operation, the brachiocephalic artery was replaced by a Dacron graft through a midsternotomy approach. Operation time was 190 minutes. Blood loss was approximately 1,000 ml and blood transfusion was necessary during the operation. A 28-F drainage tube was inserted to the mediastinum and the tube was removed on the second postoperative day. The patient had no complication and was discharged from hospital 18 days after the first operation.

Discussion

Migration of pins within the chest after orthopedic surgery represents a rare but known complication. Lyons and Rockwood reviewed 37 reports (49 cases) regarding pins and similar devices used in operations on the shoulder that had migrated to the lung and mediastinum, including eight deaths attributable to migration.¹⁾ All deaths were associated with catastrophic cardiovascular event and cardiac tamponade. Serious, non-fatal complications include pericardial tamponade, arrhythmia, pericarditis, pseudo-aneurysm, aortopulmonary fistula, pneumothorax,

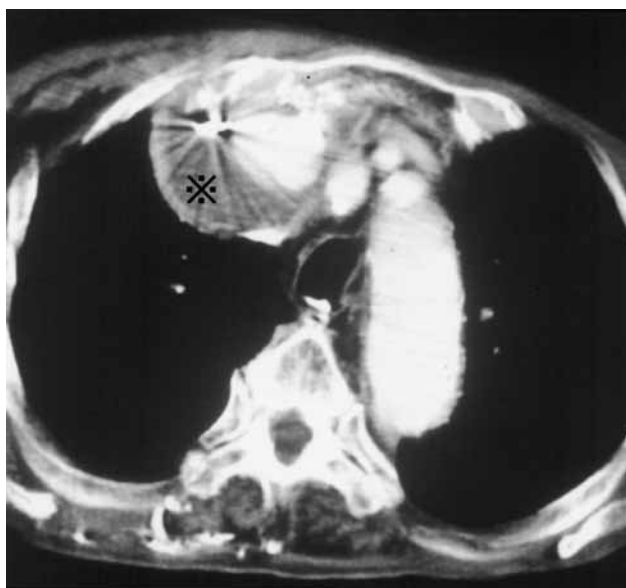


Fig. 3. Chest computed tomography revealed pseudo-aneurysm () of the brachiocephalic artery.

hemoptysis, subclavian steal syndrome, hemianopia, hemiplegia, paraplegia, radicular pain, dysphagia and splenic hematoma.¹⁻³⁾

As described, the migration of a Kirschner wire to the lung or heart does not represent a novel event, but a migrating pin penetrating the esophagus, with subsequent hematemesis, has not been reported previously. Hema-

temesis in this case was most likely due to irritation of the esophageal wall by the wire penetrating the esophageal wall.

Thoracotomy and sternotomy have often been used to remove migrated wires.⁴⁾ Sternotomy may be considered more appropriate in the presence of injury to the heart or great vessels. Recently, thoracoscopic approaches have also been reported.⁵⁾ In our patient, the ends of the pins were located in the intercostal spaces, so removal was successfully achieved without recourse to thoracotomy. However, midsternotomy was required for repair of the brachiocephalic artery. Pseudoaneurysm of the brachiocephalic artery is relatively rare. Causes of the disease typically involve trauma and iatrogenic events. In most cases, pseudoaneurysm of the brachiocephalic artery have been replaced by a prosthetic graft.^{6,7)}

Although our patient underwent successful removal of wires and recovered uneventfully, the migration of Kirschner wires can cause fatal complications. Clinicians caring for patients with orthopedic wires in place should be aware of wire migration as a potential complication.

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