Case report - Cardiac general

Right ventricular penetration and cardiac tamponade as a late complication of Kirschner wire placement in the sternoclavicular joint

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Received 19 February 2005; received in revised form 28 March 2005; accepted 30 March 2005

Abstract

A 44-year-old woman was admitted to the emergency service with dyspnea, chest pain, and vomiting. Cardiac tamponade due to right ventricular penetration of a Kirschner wire was detected as a late complication of wire placement in the sternoclavicular joint. Clinicians should be aware of wire migration with cardiac penetration as a late complication of Kirschner wire placed in any part of the body.

Keywords: Kirschner wire; Penetration; Cardiac tamponade

1. Introduction

Kirschner wire is most often used to fix fractures and dislocations in orthopedic trauma cases. Migration of such wire is rare, but has been known to cause several complications [1–6]. We describe a case of cardiac tamponade caused by a piece of migrated Kirschner wire that was used for right sternoclavicular joint fixation.

2. Case report

A 44-year-old woman was admitted to the emergency service with dyspnea, chest pain, and vomiting. The problems had first appeared 2 weeks earlier, and had worsened in the 3 days prior to presentation. Physical examination revealed blood pressure 90/70 mmHg, pulse rate 118 beats/min, and respiration rate 28/min. A posteroanterior chest radiograph showed a linear metallic foreign body superimposed on the heart shadow, and an increased cardiothoracic ratio (Fig. 1a). The foreign body was estimated to be 9 cm long and 3 mm wide.

When questioned further, the patient said that, 6 months earlier, she had experienced sudden severe pain in her right shoulder while working at home. She had been diagnosed with right sternoclavicular joint dislocation, and had undergone Kirschner wire fixation at another health center. This operation was done 1 month before she presented to our hospital. A posteroanterior chest radiograph taken immediately after fixation of the dislocated joint had shown the Kirschner wire in proper location (Fig. 1b). However, follow-up film obtained 3 weeks after the orthopedic surgery (Fig. 1c) had shown progressive inferior migration of the wire. Removal of the wire was recommended to the patient who delayed the treatment until she had had progressive symptoms.

Thoracic computerized tomography at our hospital showed a linear foreign body in contact with the wall of the right ventricle (Fig. 1d). Echocardiography revealed pericardial effusion, and demonstrated the foreign body penetrating the pericardium and the right ventricle. Cardiac surgery was planned. The patient’s right femoral artery and vein were explored surgically at the beginning of the operation (prior to median sternotomy) to be ready for rapid cannulation in case sudden bleeding would occur during the procedure. After the chest was opened, the pericardium was incised and we detected adhesions that had formed due to hemopericardium. Half of the 9-cm long Kirschner wire was found to have penetrated the right ventricle, and the remainder was within the pericardial sac. After the wire was removed and the adhesions were released, the chest was closed in standard fashion. The patient made a full recovery and was discharged from hospital on the fifth postoperative day.

3. Discussion

The choice of treatment after closed reduction of sternoclavicular joint dislocation is generally conservative. If the dislocation cannot be reduced, surgical reduction and temporary internal fixation of the joint may be needed. Placement of pins across the sternoclavicular joint is another-
A posteroanterior chest X-ray taken on admission shows a linear metallic foreign object superimposed on the heart shadow. Note the increased cardiothoracic ratio. The chest film taken immediately after the orthopedic surgery (1 month prior to the work-up to our center) showed proper positioning of the Kirschner wire in the right sternoclavicular joint. A follow-up chest X-ray obtained 3 weeks after the fixation procedure shows the Kirschner wire caudal to its original position. Thoracic computed tomography during the work-up at our center showed the wire penetrating the pericardium and appearing to be in close contact with the right ventricle wall.

A treatment option which was performed for this patient. Previous reports have described several different complications that have occurred after Kirschner wire used in orthopedic surgery has shifted from its original location [2,3]. Short-distance migration into the chest may occur, such as when a wire placed in the sternum moves to the anterior mediastinum. Long-distance migration or embolization to the chest have also been reported [4,5]. In one case, Kirschner wire placed during hip surgery embolized to the right ventricle several years after the hip operation, and the wire piece had to be removed via open-heart surgery [6]. In another case, Kirschner wire used to fix a fracture of the left distal radius embolized to the right ventricle 4 years later, and had to be removed via thoracotomy under cardiopulmonary bypass [3]. Such foreign bodies can also be removed via the percutaneous transvenous route [7]. In our case the wire had originally been placed to the clavicle and sternum to fix the sternoclavicular joint. The wire had migrated so that its distal end had penetrated the heart. Before removing the wire, we explored the femoral artery and vein to get ready for cannulation in case emergency cardiopulmonary bypass was needed to manage massive bleeding during the sternotomy procedure. Fortunately, cardiopulmonary bypass was not needed, and we were able to remove the Kirschner wire via standard median sternotomy.

If a patient who has had Kirschner wire placed in any part of the body develops a cardiac complaint at any time, the possibility of wire migration should be considered and a thorough work-up should be done to investigate this.

References