

## Removal of Kirschner Wire That Migrated from the Pelvic Bone into the Right Ventricle of the Heart

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A sixty-year-old man was admitted due to chest pain. He had a history of pelvic bone fracture fixation with Kirschner wire about 20 years earlier. On examination, we detected a Kirschner wire that had migrated into the right ventricle. Without cardiopulmonary bypass, we removed the migrating Kirschner wire via median sternotomy. The patient recovered without complications and was discharged on the 5th postoperative day.

Key words: 1. Kirschner pin  
2. Foreign body

### CASE REPORT

A sixty-year-old man was admitted to the emergency department with sharp, stabbing chest pain. The symptom had first appeared a month ago, and had aggravated in the 5 days prior to presentation. The patient's medical history showed that he had undergone a fixation operation using Kirschner wire for treatment of a right pelvic bone fracture from a traffic accident about twenty years prior. He was diagnosed with diabetes and had been taking oral hypoglycemic agents for the past ten years, and also had spine and knee surgery due to lumbar spinal stenosis and degenerative arthritis of the left knee.

During evaluation, his vital signs were stable and chest radiograph revealed a thin linear foreign body in thorax (Fig. 1A). Electrocardiography showed a normal sinus rhythm and laboratory tests including cardiac enzymes were in the normal range. Chest computerized tomography revealed a linear met-

allic foreign body from the pelvic bone that was penetrating the right ventricle of the heart with mild pericardial effusion (Fig. 1B). He was referred to our hospital for an emergency operation.

Echocardiography showed a foreign body penetrating at the apex of the right ventricle, and mild (Grade I) mitral, tricuspid regurgitation with normal valve morphology (Fig. 1C). One Kirschner wire had disappeared from the pelvis radiograph compared with the previous image (Fig. 1D, E).

The patient underwent emergency surgery under general anesthesia via median sternotomy. After pericardiotomy, there was no hemopericardium and about 1 cm of protruding Kirschner wire could be seen to the left of the distal left anterior descending coronary artery (Fig. 2A). Because the wire had a linear shape (Fig. 2B), without cardiopulmonary bypass or cardiectomy, we removed it after wrapping suture at myocardium with pledgeted 4-0 Prolene suture.

Follow-up echocardiography was performed on the fourth

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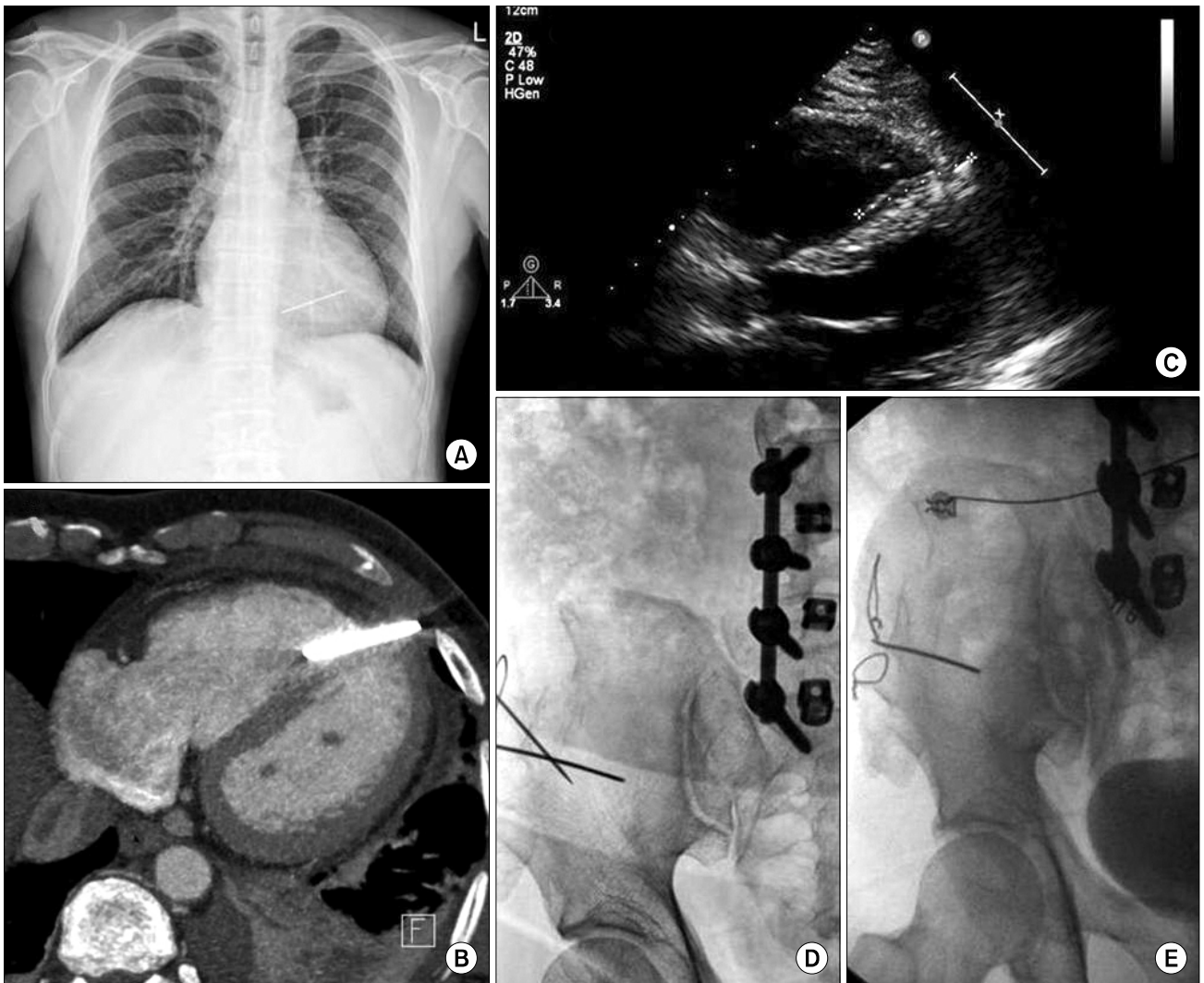
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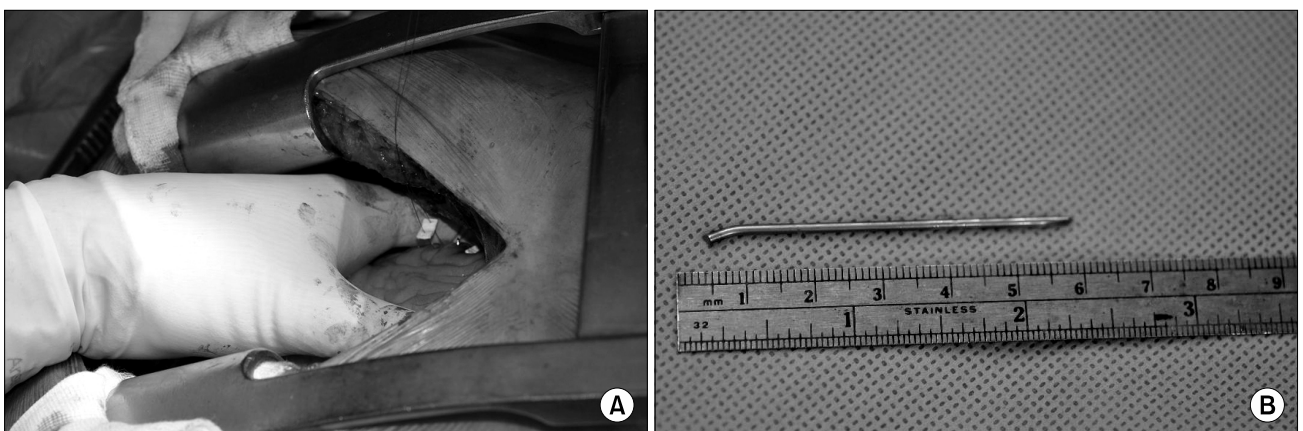
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**Fig. 1.** These chest radiograph (A), computed tomography (B), and echocardiograph (C) show an intracardiac foreign body penetrating the right ventricle. The pelvis radiograph (E) shows Kirschner wire disappearance compared with a previous examination (D).



**Fig. 2.** This figure shows the operation field (A) and removed Kirschner wire (B).

postoperative day. The patient had fully recovered without any complications and was discharged from the hospital on the fifth postoperative day.

## DISCUSSION

Fixation instruments are frequently used in fracture and dislocation of bones, but their migration is uncommon. Migration to the cardiovascular system is usually symptomatic [1], and can result in devastating complications [2,3]. In an extensive review of case reports of wire migration from the shoulder region, the authors found 49 cases of migration in 47 patients, including 17 cases in which a pin had migrated to a major vascular system such as the heart (4 cases), the subclavian artery (2), the ascending aorta (6), and the pulmonary artery (5). There were 8 deaths and 6 cases of pericardial tamponade [3].

The causes of migration are known to be the action of muscles, the capillary phenomenon, bone resorption, gravity, and the range of motion [4]. Especially in the lower extremities, migration to the cardiovascular system has rarely been reported. We found one report of migration of a wire used in patella fixation into the heart [5]. The greater activity mass on the upper extremities, the range of motion, and gravity are likely to affect the incidence of migration.

Also, the distance between the instrument and major vessels should be considered in cardiovascular complications. In this case, we believe that the Kirschner wire entered the vascular system penetrating into the external iliac vein and mi-

grated through the inferior vena cava to reach the right ventricle. A Doppler ultrasound or computed tomography can help to measure the distance, and more careful observation is necessary when the distance is close.

Because migration of a bone fixation device to the cardiovascular system can cause devastating complications, periodic radiographic follow up is necessary. If any migration were observed, surgeons would need to remove it. In addition, even if there is no migration, surgeons may consider removing a fixation device depending on a patient's age, activity level, and distance to major vessels.

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