

## Thirteen years of migration of Kirschner wires: A mediastinal foreign body

*Kirschner tellerinin 13 yıllık göçü: Mediastinal yabancı cisim*

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### ABSTRACT

Kirschner wires used for orthopedic fixation can rarely migrate over time. A 26-year-old male patient in whom two Kirschner wires were inserted 13 years ago for the stabilization of the right sternoclavicular joint dislocation and migrated into the anterior mediastinum and left hilum was admitted to our clinic. Incidentally detected Kirschner wires on chest radiography were removed by superior mini-sternotomy. In conclusion, since migration of Kirschner wires may cause serious complications, these patients should be followed closely and the wires should be removed once migration is detected.

**Keywords:** Foreign body migration, Kirschner wire, mediastinum, sternotomy.

It has been reported that Kirschner wires (K-wires) used in internal fixation are frequently migrated and these migrations are usually toward the mediastinum, lung, major vascular structures and cervical vertebra.<sup>[1]</sup> In case of a migrating K-wire, there is not any symptoms in some cases, whereas it can cause life-threatening complications.

In this article, we present a young adult patient in whom the K-wires used for fixation of the right sternoclavicular joint dislocation due to falling from a tree migrated to the anterior mediastinum and left hilum after 13 years.

### CASE REPORT

A 26-year-old male patient was referred to our outpatient clinic due to a foreign body which was detected in the mediastinum on his chest X-ray at the time of his admission to an external center for his back deformity. The patient had no additional complaints and his vital signs were stable. In his medical history,

### ÖZ

Ortopedide fiksasyon amaçlı kullanılan Kirschner telleri zaman içerisinde nadiren göç edebilir. Sağ sternoklaviküler eklem çıkığının stabilizasyonu için 13 yıl önce iki Kirschner teli takılan ve tellerin anterior mediasten ve sol hilyuma göç ettiği 26 yaşında erkek hasta kliniğimize başvurdu. Göğüs radyografisinde tesadüfen tespit edilen Kirschner telleri superior mini-sternotomi ile çıkarıldı. Sonuç olarak, Kirschner tellerinin göçü ciddi komplikasyonlara neden olabileceği için, bu hastalar yakından takip edilmeli ve göç tespit edilir edilmez teller çıkarılmalıdır.

**Anahtar sözcükler:** Yabancı cisim göçü, Kirschner teli, mediasten, sternotomi.

he was operated due to right sternoclavicular joint dislocation after falling from a tree 13 years ago and was not followed closely after the operation. Physical examination revealed scoliosis and left-dominant asymmetric pectus excavatum. Posteroanterior and lateral chest radiographs showed that two K-wires migrated to the anterior mediastinum and left hilum (Figure 1). Thoracic computed tomography (CT) showed that the one end of the wire was still in the sternoclavicular joint, while the other end was in the anterior neighborhood of the ascending aorta. The second wire was seen at the anterior part of ascending aorta, close proximity of main pulmonary artery and left pulmonary artery (Figure 2). Sufficient exploration for the removal of the wires was obtained by superior mini-sternotomy. It was observed that the K-wires did not adhere to any mediastinal structure. The K-wires were removed by careful dissection without vascular injury (Figure 3). The patient was discharged on postoperative Day 5 without any complications

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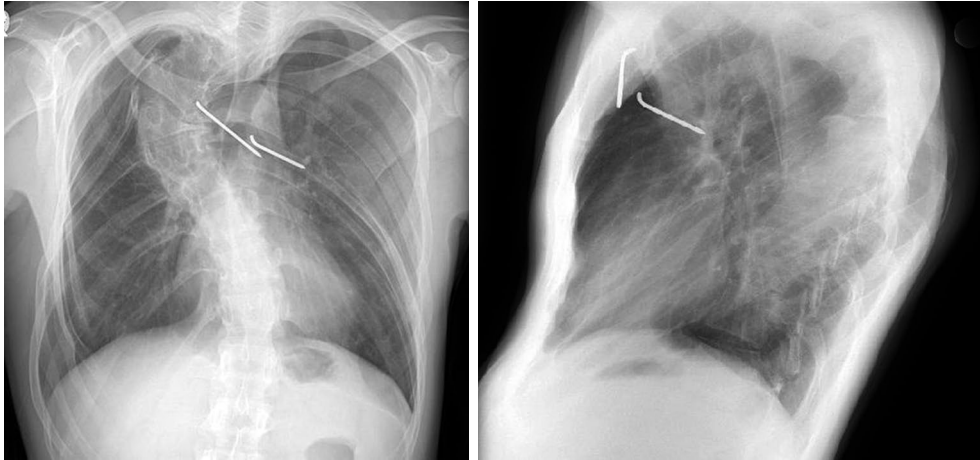
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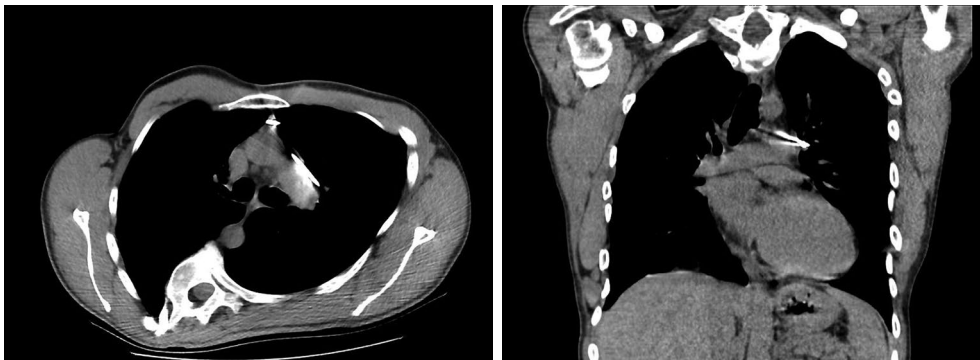
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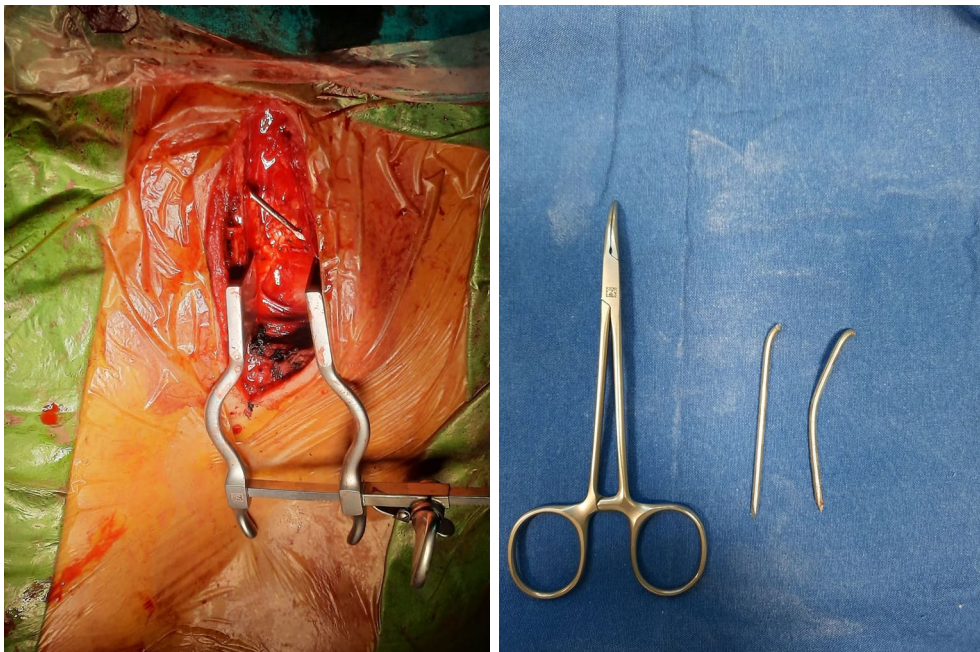
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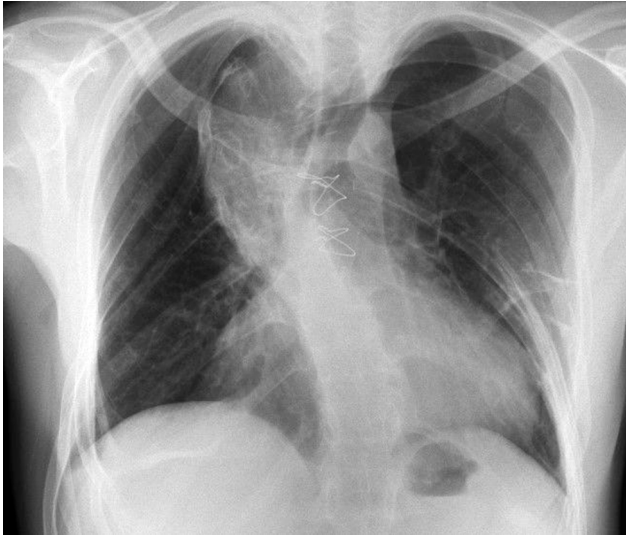
**Figure 1.** X-rays showing superior mediastinal placement of K-wires.



**Figure 2.** Thoracic computed tomography images showing close proximity of K-wires to ascending aorta and left pulmonary artery.



**Figure 3.** Images of exploration of mediastinum with superior mini-sternotomy and removed K-wires on the table.



**Figure 4.** Posteroanterior chest X-ray on Day 5. Showing no K-wire.

(Figure 4). After two months of uneventful follow-up in the outpatient setting, follow-up was discontinued.

## DISCUSSION

Kirschner wire was first used by Martin Kirschner<sup>[2]</sup> in the stabilization of the knee in 1909. Until recently, K-wires were used in Ravitch procedures in thoracic surgery; however, currently, they are still used by orthopedists for distal phalanx stabilization. Migration of K-wires is most commonly observed after clavicle fracture operations, followed by sternoclavicular joint dislocations, acromioclavicular joint dislocations, proximal humerus fractures and shoulder dislocation. In this case, we observed that two K-wires placed for stabilization after sternoclavicular joint dislocation were migrated. However, his medical records did not reveal any control X-ray images in the postoperative period.

Review of the literature reveals that K-wires often migrate to the mediastinal structures, but can also migrate to the cervical and abdominal region.<sup>[3,4]</sup> We can speculate that the main determinant for the mortality of migrations is the region where the wire is migrated. In this case, both on preoperative radiological images and during intraoperative exploration, one end of the K-wire extended from the ascending aorta to the anterior of it, while the other end reached the sternoclavicular joint. The other wire was completely free in the mediastinum, anterior to the ascending aorta, adjacent to the main and left pulmonary arteries.

Although K-wires can migrate in the early period, migration after many years is also reported.<sup>[5,6]</sup> The main reasons for migration are muscular activities, high mobility of the shoulder, negative intrathoracic pressures associated with respiration, regional resorption of bone, gravitational force and insufficient measures taken to secure the fixating devices.<sup>[7]</sup> Since our patient did not have any follow-up from the application of K-wire to the day he was referred to our clinic, we did not have an opinion about when this migration was started. In addition, the presence of scoliosis may have accelerated the migration. However, the migration was detected at the first control performed after 13 years. We believe that close follow-up of the patient after K-wire application would enable the migration to be noticed earlier.

It is known that the wires can be removed by approaching with sternotomy, thoracotomy or video-assisted thoracic surgery, depending on the anatomical region where the wires are migrated and the accompanying complication.<sup>[8]</sup> However, despite this, it should be also noted that there may be migration-related deaths. In this case, complete exploration was achieved by performing superior mini-sternotomy and the wires were removed safely. There is no report in the literature regarding K-wires removed by superior mini-sternotomy. Therefore, we believe that this is the first case in which a K-wire was removed by superior mini-sternotomy. When the K-wire is inserted, one end of the wire is recommended to be bent and removed as soon as the treatment period is over.<sup>[7]</sup> However, bending the end of the wire does not guarantee the stability of the wires in the long term, as in this case.<sup>[1]</sup>

In conclusion, the use of Kirschner wires should be avoided as much as possible in clavicle and shoulder stabilization. Patients with Kirschner wires should be followed closely for the potential displacement of the wires. Also, wires should be removed as soon as possible to avoid possible complications. We believe that removal of Kirschner wires with superior mini-sternotomy is a minimally invasive approach in appropriate cases.

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**Data Sharing Statement:** The data that support the findings of this study are available from the corresponding author upon reasonable request.

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