CASE REPORT

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Locking knee after intra-articular migration of broken patella tension band wire: an extraordinary intra-articular migration via pseudarthrosis line

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Fixation of displaced patella fractures with tension band wiring is a commonly performed technique. Broken metal wires after such surgeries are not uncommon, however, intra-articular wire migration after failure of the tension band wires in the patella is uncommon and rarely described. In this study, we report a case of locking knee symptoms secondary to the migration of a broken patella wire into the knee joint through the pseudarthrosis line.

Key words: Broken wire; intra-articular; locked knee; migration; patella wire.

Tension band wiring of the patella is routinely performed for displaced patella fractures. Broken metal wires after such surgeries are not uncommon and can cause localized soft tissue irritation.[1-3] However, intra-articular wire migration after failure of the tension band wires in the patella is uncommon and rarely described.

In this case report, we present a case of a failed tension band wire construct with an interesting path of migration into the knee joint.

Case report

A 61-year-old Chinese man reported complaints of recent onset of right knee pain and locking symptoms. He had sustained a displaced comminuted fracture of his right patella following a fall 8 years ago. Tension band wiring was successfully performed and the patient was recovering well. However, he was lost to follow-up before the patella fracture had fully united. He was well for the past 8 years and returned to his job as a technician without any pain or functional disability. However, he started experiencing deep-seated pain within the right knee for the past 2 weeks, with intermittent locking symptoms due to severe pain. There was no recent history of any fall or trauma to the right knee. Clinical examination of the right knee revealed no patella or joint line tenderness. There was no effusion and the cruciate and collateral ligaments were intact. There was no extensor lag and knee extension power was normal. The range of motion of the knee was full at the point of clinical examination.

Radiographs of the right knee revealed a nonunion of the patella fracture with the metal wires broken at several places (Fig. 1). The superolateral segment of the broken tension band wire was found to have migrated into the medial compartment of the knee joint.

The patient underwent surgery for removal of the patella wires. An arthroscopic examination of the knee reviewed mild synovitis with pseudarthrosis at the superolateral aspect of the patella. There was no intervening fibrous tissue at this nonunion gap when viewed arthro-

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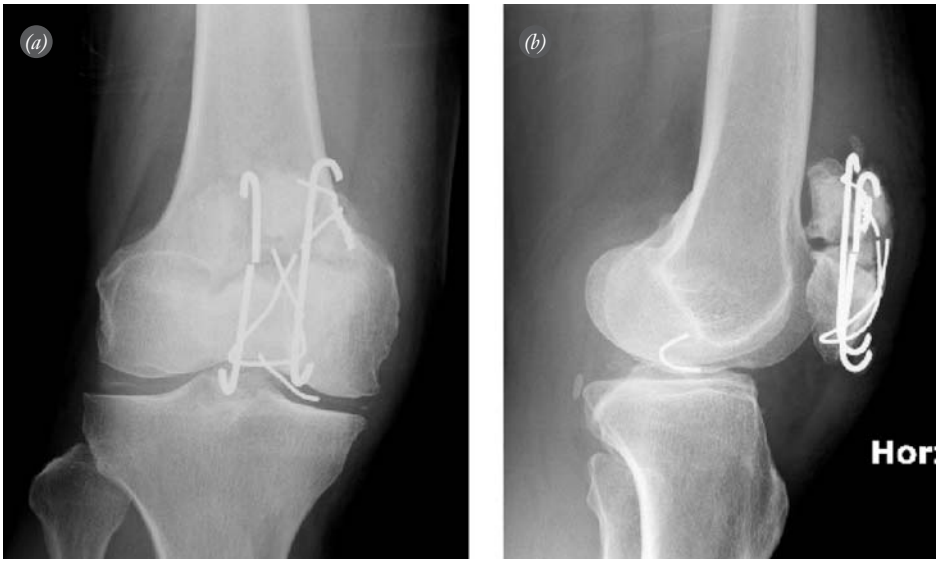

Fig. 1. **(a)** Anteroposterior and **(b)** lateral X-rays of the right knee showing nonunion of the patella and tension band wires broken at several places, with the superolateral fragment of the broken cerclage wire located in the medial compartment of the knee joint.

scopically. In fact, the fracture gap was mobile and narrowed with the knee in extension and widened maximally (4 to 5 mm) with the knee in about 45 degrees of flexion (Fig. 2). The migrated wire was found to have shifted to the posterolateral compartment of the knee joint (Fig. 3), requiring a separate incision at the posterolateral aspect of the knee for removal (Fig. 4). The rest of the broken wires were removed via a midline anterior knee incision along the old scar. The patella was stable after complete removal of the wires, indicating fibrous union of the rest of the non-united fragments. A decision was made not to perform a revision tension band wiring as the patient did not have any symptoms arising from the patella.

The patient was discharged the next morning and his wounds healed at 2 weeks. Complaints of knee pain and locking symptoms resolved completely following the surgery and the patient was able to resume work at 2 weeks. He remained asymptomatic at 6 months of follow-up and was given an open date appointment.

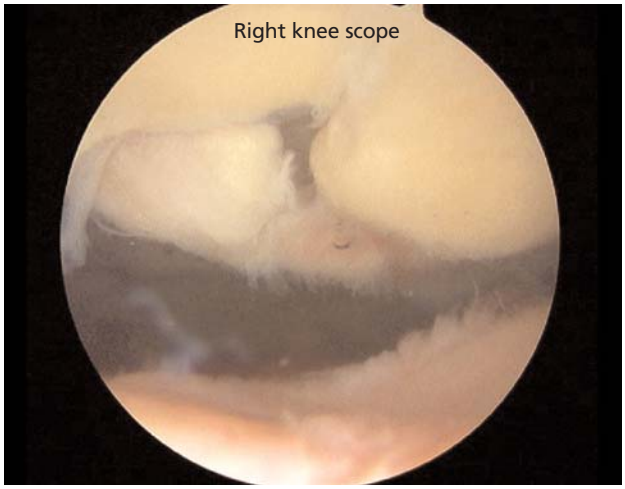

Fig. 2. An arthroscopic picture of the patient's right knee showing the pseudarthrosis line without intervening fibrous tissue at the superolateral aspect of the patella at 45 degrees of knee flexion. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

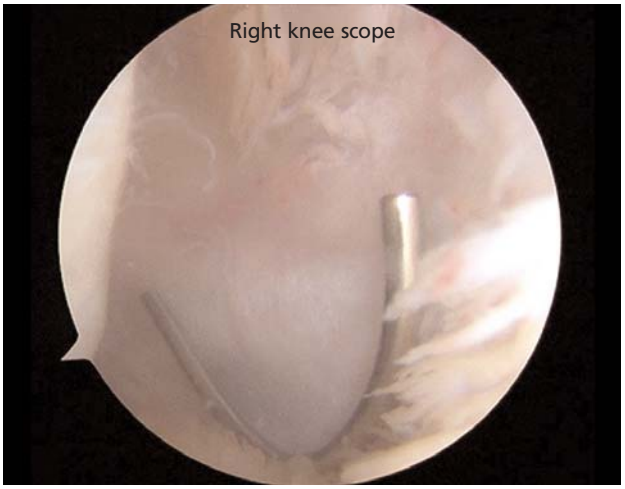

Fig. 3. An arthroscopic picture of the broken cerclage wire found lying in the posterolateral recess of the patient's right knee joint. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

Fig. 4. A small posterolateral knee incision was made to facilitate removal of the intra-articular wire under arthroscopic guidance. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

Discussion

Theoretical routes of metal hardware migration include paths along myofascial planes and even into the circulation. Several authors have described the migration of metal hardware after orthopedic procedures, most commonly from the upper and lower limbs.[1-9] Catastrophic complications can result from wire migration into critical structures, such as pericardial tamponade from wire migration to the heart.[4,5]

Specific to patella wires, only one case of intra-articular migration of a patella wire has been documented in the literature.[2] Choi et al. reported 2 cases of extra-articular patella wire migration to the popliteal fossa.[1] Biddau et al. reported a rare case of patella cerclage wire migration into the heart presumably via the blood circulation.[3] To our best knowledge, this is the first documented case of patella wire migration intra-articularly via a pseudarthrosis line. In the absence of this fracture gap, it would be difficult, although not impossible, for the wire to find a route intra-articularly as this would require the wire to pierce through a significant amount of soft tissues, such as the thick retinaculum, before entering the knee joint. In most cases of nonunion, fibrous tissue fills the pseudarthrosis line, providing a strong barrier to entry. In this rare report, a dynamic gap without fibrous tissue has opened up an unexpected portal for the broken wire's entry into the knee joint.

It has been suggested that activity level and age may be factors predictive of implant failure and possible migration.[1,3] Proper surgical technique with symmetrical twisting of the tension band wire and correct choice of fixation should be enforced to ensure bony union and reduce hardware fatigue.[10-12]

We should be mindful of the deleterious effects of intra-articular migration of hardware. These potentially include pain, locking symptoms, higher risks of infection and early degenerative wear. In this patient, acute pain and occasional locking symptoms surfaced 8 years after surgery and prompted the patient to seek medical attention. The intra-articular wire was mobile in the joint and produced locking knee symptoms intermittently.

We recommend that all patients receiving bone fixation with wires should be counseled on the risks of hardware failure and possible migration, with the option of elective hardware removal discussed. In addition, when wire breakage is detected radiologically, especially in the presence of nonunion, the patient should be strongly advised to have the wires removed as soon as possible.

In conclusion, construct failure after tension band wiring of a patella fracture is common but intra-articular migration of hardware is rare and has not been previously documented to occur via pseudarthrosis line. In view of the potential deleterious consequences of wire migration, especially intra-articularly, we recommend that all patients with broken periarticular wires be advised to have them removed.

Conflicts of Interest: No conflicts declared.

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