MIGRATION OF A KNOWLE’S PIN FROM THE NECK OF THE FEMUR TO THE KNEE JOINT

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This article presents a patient with migration of a Knowle’s pin from the neck of the femur to the knee joint in association with infection. This pattern of proximal to distal migration of a fixation pin in the femoral neck has not been described previously.

CASE REPORT

A 21-year-old man presented to the emergency department with an 8-month history of right knee pain that had recently worsened. He denied any trauma or swelling to the knee and was otherwise healthy.

His medical history was significant for treatment of bilateral stage 2 slipped upper femoral epiphyses at age 13. At that time, surgery had been performed on both hips to internally fix the epiphyses in situ, using two 10.7-cm Knowle’s pins on each side. The right hip wound had developed an infection, and cultures had grown Staphylococcus aureus (sensitive to methicillin only). The infection had resolved with 2 weeks of antibiotic therapy. He reported having no further problems until the current presentation.

On physical examination, the patient appeared healthy and had no fever. There was no swelling of his right knee, but tenderness was elicited superolateral to the patella. Knee range of motion was from full extension (without extension lag) to 120° of flexion, the limit of which caused pain superolateral to the patella. The right hip had limited flexion of 110° with fixed abduction and external rotation in flexion, but was not irritable.

Plain radiographs of the right hip, femur, and knee demonstrated a Knowle’s pin in the soft tissues of the distal right thigh superolateral to the patella (Figure 1). Another pin remained in place in the right femoral neck and was surrounded by a cone-shaped rim of sclerosis opening onto the lateral surface of the femur. There was also osteolysis at the lateral femoral cortex bordered by a sclerotic rim (Figure 2). The capital epiphysis had fused with the femoral neck in a varus and retroverted position.

He underwent surgery using general anesthesia and a tourniquet. An incision was made over the location of the Knowle’s pin. Dissection revealed the pin had perforated the suprapatellar pouch and was bathed in turbid fluid. The pin was removed, a fibrous track excised, and the knee thoroughly debrided with normal saline. A drain was inserted, and the wound was closed in layers.

Cultures of the fluid grew S. aureus (sensitive to methicillin only). Histology of the excised track showed fibrous scar associated with acute inflammatory tissue that contained siderophages. Antibiotic treatment was administered for 2 weeks, and the wound healed uneventfully.

DISCUSSION

There are many reports of orthopedic implant migration in the literature. Perhaps the most bizarre reports involve devices used around the shoulder, particularly smooth Kirschner wires. Lodgment of such devices has occurred in the cervical neural canal, the trachea, mediastinum, heart, lung, and peritoneum.1 Perforations of the aorta and pulmonary artery by Kirschner wires have been fatal.1

In the hip, movement of threaded devices used to stabilize femoral neck fractures has been well-documented. In such cases, movement is generally distal to proximal, and many different devices have traversed the hip joint to penetrate the pelvis. Examples include a Knowle’s pin,2 a Kirschner wire free within the peritoneal cavity,3 and the screw of a sliding hip-screw and plate.4,5 There have been reports of Olmed screws causing vascular laceration within the pelvis, which was variably fatal or required vascular bypass grafting.6,7 The absence of an expanded-head on the Olmed screw appears to make it vulnerable to proximal migration. A Smith-Peterson nail has been reported to perforate the rectum.8

Numerous other similar reports generally are associated with fracture non-union or osteopenic bone. It is presumed that relative motion of bone fragments or altered bone material properties leads to migration of the fixation device. The reported time from original surgery to presentation of the complication varies from weeks to years.

Only a few cases of proximal to distal migration of implants in the thigh as occurred in our patient have been described. There is one report of a small compression screw from a sliding screw and plate device causing a discharging sinus just above the knee, with a track communicating with the hip plate proximally.9

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Figure 1: AP (A) and lateral (B) radiographs of the distal right femur and knee showing the Knowle’s pin superolateral to the patella.

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the presentation of the migrated pin 8 years later. On each occasion, cultures grew the same organism with the same antibiotic sensitivity.

Two features are seen on the radiographs that are consistent with localized, chronic osteomyelitis. These are a cone of osteosclerosis around the pin that remained in the neck of femur and an area of circumscribed osteolysis at the lateral femoral cortex. It is possible that an indolent infection led to softening of the bone around the pin, sufficient for it to become loose and migrate.

The most direct course for the migration of the Knowle's pin in our patient was deep to the fascia lata. It would have had to burrow through the vastus lateralis muscle to penetrate the suprapatellar pouch of the knee. As Mazet stated, “There are no rules governing the behavior of foreign bodies in the tissues.” The patient described here fits this collective experience.

REFERENCES


EDITORIAL DISCUSSION

ORTHOPEDICS: Why wasn't the Knowle's pin removed, and why wasn't the chronic sepsis on the right hip washed out after the migrated pin was moved?

Stanford & Kohan: There was no evidence of deep infection at the time of the original surgery; all clinical evidence of infection resolved with antibiotic treatment. The patient did not return for follow-up, but presumably was asymptomatic until presentation with the migrated pin 8 years later. Thus, there was no indication to remove the pin following the original treatment.

When the patient presented with the migrated pin, he had no hip symptoms. In the absence of clinical symptoms, we did not favor intervention in the proximal femur or hip joint. We surmise that the cause of pin loosening was infection. If this were the case, the spontaneous discharge of the pin and creation of a drainage track in the bone would be satisfactory resolution of chronic sepsis. In addition, plain radiographs did not indicate a bony sequestrum.