

Case Report

Arthroscopic Retrieval of an Unusual Foreign Body of the Knee

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Abstract: We report an unusual use of the arthroscope in the case of a man who accidentally shot himself through his left thigh, the bullet ending up in the ipsilateral knee joint. After radiographic diagnosis, the bullet was successfully removed through a standard arthroscopic procedure. The patient had a quick and complete recovery. Review of the literature and the 4 steps of successful management of gunshot wounds are included. **Key Words:** Penetrating injuries—Gunshot wound—Foreign body—Arthroscopic debridement.

The removal of loose bodies from a joint is one of the most readily accomplished arthroscopic procedures. This case illustrates the successful use of the arthroscope to remove an unusual foreign body from the knee. One of the most appreciated features of arthroscopic surgery is its minimal invasiveness, which is particularly emphasized by removal of loose bodies or foreign bodies from joints. In most cases, it is a question of chondral or osteochondral loose bodies, whereas retrieval of foreign bodies is much more rare. This case involved the successful arthroscopic removal of a very unusual foreign body from the knee: a firearm bullet.

CASE REPORT

A 70-year-old man who was cleaning a pistol sustained an accidental self-inflicted gunshot wound to his left thigh. He did not pay much attention to what had happened, cleaned the wound, and returned to his activities. Several hours after, he felt mild discomfort

in his left knee and went to a physiotherapist for pain relief. The physiotherapist persuaded him to report to our Emergency Department where clinical examination revealed an entrance wound at the anteromedial aspect of the distal third of the thigh. A moderate knee effusion was present and flexion was limited at 100° because of pain. Radiographs disclosed a foreign body in the anterior compartment of the knee at level of the intercondylar eminence (Fig 1).

Tetanus prophylaxis was administered and, after 2 hours, knee arthroscopy was performed through 3 standard portals (superomedial, anterolateral, and anteromedial). The examination revealed the presence of a metallic bullet in the anterior compartment of the joint. The bullet was embedded in the synovium covering the fat pad, between the origin of the anterior cruciate ligament and the medial femoral condyle (Fig 2). It was removed with a grasping forceps through the anteromedial portal. The bullet was a copper-jacketed 6.5-mm caliber and showed slight deformation at its posterior aspect.

The joint was then carefully inspected in order to determine the site of entrance of the bullet, which was located at the medial suprapatellar pouch, and to exclude the presence of pieces of clothes, skin, or hair. The articular cavity was then generously irrigated and the portals were sutured. The entrance wound was debrided and the skin margins excised. Antibiotic prophylaxis with a first-generation cephalosporin was administered for 7 days. No complications were

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FIGURE 1. Anteroposterior and oblique radiographs of the left knee showing the bullet in the intercondylar notch.

observed. One month postoperatively, the patient showed a complete recovery and has remained symptom free.

DISCUSSION

Penetrating knee injuries are relatively rare. With the exclusion of common penetrating wounds (i.e., after an accidental fall), the remaining injuries are sustained by missiles shot by machinery for civilian use (e.g., power-gun nails or staples) or by weapons.¹



FIGURE 2. Arthroscopic appearance of the bullet. On the right is the lateral femoral condyle.

Usually the bullet passes across the joint but, in some circumstances, it may complete its trajectory into the articular cavity, thus becoming a real, although unusual, foreign body.

Articular gunshot injuries are a serious and not infrequent lesion.^{2,3} They may lead to infection,⁴ chondral damage,² and, when the bullet is retained, lead toxicity.^{5,6} According to Hurst et al.⁷ the 4 steps of successful treatment of gunshot wounds include diagnosis, proper debridement technique and surgical care, immobilization, and restoration of function.

Diagnosis may be suspect because the presence of an intra-articular foreign body may be overlooked. Low-velocity gunshots are in fact designed to disable the victim and often do not cause very serious damage. In the case we describe, the diagnosis was easily obtained with radiographs, but if the patient had not presented quickly to the Emergency Department, the presence of the bullet could have been unrecognized for an undetermined time. Our patient actually had only mild functional impairment.

Without a proper diagnosis, the retention of the bullet involves the theoretical risks of infection⁴ and systemic lead toxicity^{5,6} and the real threat of mechanical damage caused by an intra-articular loose body.^{2,8} In fact, reports have shown that bullet-induced lead poisoning is a clinical rarity and that the rate of infection after low-velocity gunshot wounds is low. Perhaps the risk of infection may increase when the bullet introduces pieces of clothing, skin, and hair into

the joint but, at the moment, this remains uncertain.³ Nevertheless, a careful inspection of clothing for fabric defects is recommended.

Thus, the most compelling indication for surgical retrieval of an intra-articular bullet is to remove a mechanical cause of arthritis. In fact, hyaline cartilage is very prone to irreversible mechanical and inflammatory damage⁸ When, after bullet removal, joint effusion persists, contamination of the articular space must be considered. In this case, irrigation and debridement of the joint have shown to be effective.³ In the reported case, the degree of joint damage was very low and no contamination was observed.

We do not believe that prolonged immobilization is necessary when arthroscopic treatment of a low-velocity gunshot wound has been performed. In our case, a very short period of immobilization was adopted. Complete functional recovery was accomplished after a rapid rehabilitation, confirming the minimal invasiveness of the arthroscopic procedure.

Arthroscopy confirmed to be very effective for intra-articular bullet removal and subsequent joint de-

bridement. It allowed an accurate visualization both of the bullet and the synovial entrance hole, and also easy retrieval of the foreign body, thus avoiding a larger open procedure.

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