Case Report

Arthroscopically Assisted Excision of Osteoid Osteoma Involving the Hip

Vladimir Khapchik M.D., Ph.D., Richard J. O’Donnell, M.D., and James M. Glick, M.D.

Abstract: Two cases of arthroscopically assisted excision of osteoid osteoma involving the femoral neck and acetabulum are presented. This technique allows for percutaneous excision of this benign bone lesion in those rare circumstances when it occurs in an intra-articular location. The approach enables direct visualization of the tumor as well as histologic confirmation. There was minimal morbidity, excellent relief of symptoms, and rapid functional restoration. Key Words: Osteoid osteoma—Hip arthroscopy.

Osteoid osteoma is a relatively common osteoblastic bone lesion, accounting for at least 10% of all benign bone tumors in most series. It occurs most often in the first 3 decades of life and can be found in both the axial and appendicular skeleton. While the proximal femur, including the femoral neck, is involved most frequently, acetabular tumors are comparatively rare.1,2 Minimally invasive percutaneous techniques for osteoid osteoma excision in difficult locations have been described, including computed tomography (CT)-guided approaches,3-14 as well as ablation using radiofrequency15-19 and lasers.5 Arthroscopically assisted removal of osteoid osteoma of the proximal tibia20 and talus21,22 has been reported. We present 2 cases of arthroscopic excision of osteoid osteoma of the hip.

CASE 1

An 18-year-old man developed hip discomfort while playing soccer. There was no history of injury. The pain was localized to the groin and lateral thigh. It was most noticeable at night; ibuprofen was required for pain relief. Plain radiographs revealed a small, eccentric, subperiosteal lesion along the medial femoral neck (Fig 1A). The presence of an osteoid osteoma nidus was confirmed by CT scan (Fig 1B).

Outpatient arthroscopically assisted excision of the lesion under general anesthesia was performed with the patient supine and the hip placed in the lateral frog position. With the aid of the image intensifier, the location of the tumor was marked on the skin with a metal label and marking pen. The femoral arterial pulse was palpated and marked. Three portals were made; 2 in line with the anterior superior iliac spine (1 superior and the other inferior to the lesion) and 1 in line with the lesion and placed over the palpable border of the adductors. Using the image intensifier, all instruments were positioned on the lesion; the arthroscope and an operating instrument were inserted through 1 of the lateral portals and an outflow cannula through the medial portal (Fig 1C). The tumor was located at the calcar area (Fig 1D). The nidus first underwent biopsy examination and then the tumor was com-
completely resected with motorized and electrosurgical instruments. Histologically, the lesion was consistent with an osteoid osteoma nidus (Fig 1E).

The patient’s night pain was relieved immediately. He was placed on restricted weight bearing for 6 weeks and was allowed to return to collegiate soccer after 3 months. He remains asymptomatic 2 years after surgery.

**CASE 2**

A 34-year-old man with a remote history of work-related injuries to the hip region presented with progressive hip pain and stiffness. On examination, he had limited hip motion, a flexion contracture, and a reproducible click with abduction. His anteroposterior hip radiograph showed acetabular sclerosis (Fig 2A).
There was increased uptake on the patient’s bone scan and an effusion was noted on the magnetic resonance scan. His CT scan revealed a nidus within the acetabular sclerosis (Fig 2B).

The patient underwent hip arthroscopy under general anesthesia as an outpatient. He was placed in the lateral decubitus position and traction was applied to the limb. The first 2 portals were placed anterior and posterior to the greater trochanter, while the third was directly anterior to the hip joint. An image intensifier was used to assist with passage of instruments toward the joint. The arthroscope and operating instrument were placed in the periosteal and operating portals and an outflow cannula in the anterior portal. A lesion was noted in the acetabular fossa (Fig 2C). A biopsy specimen was procured with a grasper and the lesion was completely removed with a motorized full-radius resector and an abrader. There were no other abnormalities in the hip joint. The diagnosis of an osteoid osteoma was confirmed on microscopic evaluation (Fig 2D).

The patient had no further night pain and he was allowed immediate weight bearing as tolerated. He returned to work 1 month after the procedure. At 18 months from the time of surgery, the patient was asymptomatic and has returned to full employment and recreational activities.

**DISCUSSION**

Osteoid osteoma is a benign neoplasm that consists of a well-demarcated central nidus surrounded by a distinct zone of reactive sclerosis representing a reversible change that gradually disappears after removal of the nidus. Symptomatic treatment with non-steroidal anti-inflammatory agents will sometimes result in spontaneous regression of the tumor, but a
wide range of operative interventions has been described. Localization of the osteoid osteoma nidus has been aided in the past by nuclear scanning, tetracycline fluorescence, and linear tomography but at the present time, precise CT-guided measurements are used most commonly. Although wide resection of the bone surrounding the nidus is sometimes still necessary, open procedures using the "burr-down" technique (consisting of aggressive intralesional excision) or radiographically directed percutaneous methods are now most commonly performed.

Osteoid osteomas located within the articular capsule are rare and often difficult to detect. Any joint may be involved, but the most vexing diagnostic problems involve the elbow, hip, and ankle joints. Associated symptoms are nonspecific and similar to other common joint disorders. Pain is usually less intense and response to nonsteroidal anti-inflammatory agents is less dramatic. These lesions are associated with an inflammatory response of the synovium that is edematous and thickened, with villous overgrowth. Synovial changes spontaneously subside after removal of the nidus. In rare instances, juxta-articular lesions may induce degenerative changes within the articular cartilage, promote proliferation of chondrocytes with angiogenesis, and promote migration of mesenchymal cells in the subchondral bone. These changes are occasionally responsible for the development of secondary osteoarthritis and, occasionally, excessive joint destruction.

Surgical treatment of hip joint osteoid osteoma has involved extensive, open approaches. Femoral neck lesions have been excised through the Smith-Petersen approach. Acetabular lesions have been exposed anteriorly, with or without dislocation of the femoral head, or with the Ludloff approach. Medial acetabular tumors have been reached via an extended iliofemoral approach with osteotomy of the anterior superior iliac spine and reflection of the iliacus muscle; lateral locations have been treated with detachment of the greater trochanter.

Recently, minimally invasive techniques have been described. Use of a CT scan for localization before limited open procedures with hand or power tools has been described. Ethanol injection under CT control has been used for an osteoid osteoma of the femoral neck. Increasing experience is being accumulated with percutaneous radiofrequency thermal coagulation, especially for lesions in difficult locations.

Prior reports have described arthroscopically assisted excision of chondroblastoma involving the femoral head and knee, as well as osteoid osteoma of the proximal tibia and tulus. We report for the first time the use of hip arthroscopy to treat intra-articular lesions involving the femoral neck and acetabulum.

Arthroscopy is especially well-suited for access to lesions in difficult, juxta-articular locations. CT-guided techniques are indirect, and neurovascular structures can be compromised. Moreover, such procedures cannot be used for intra-articular locations without destruction of the articular cartilage. Direct arthroscopic visualization allows safer, less destructive excision. Furthermore, this approach allows histologic confirmation of the process, which is not possible with radiologically guided ablative procedures.

Although great care must be taken to avoid inadvertent use of arthroscopy for treatment of extra-articular primary malignancies that simulate intra-articular pathology, we believe that arthroscopy can be extremely beneficial in assisting treatment of problematic juxta-articular osteoid osteoma lesions. This outpatient procedure can be performed with minimal morbidity and rapid functional recovery. In the event of incomplete excision and persistent symptoms, more aggressive ablative or even open procedures can always be used.

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