Minimally Invasive Treatment of Non–Steroid Induced Knee Osteonecrosis of the Lateral Femoral Condyle

Henry T. Goitz, MD

Although the treatment outcomes of hip osteonecrosis are described in the literature and their relative values debated, any discussion of knee osteonecrosis yields a relative paucity of information. As is true with hip osteonecrosis, the etiology of knee osteonecrosis is believed to be linked primarily to steroid use and localized to the medial femoral condyle. Although the regions of the tibial plateau and lateral femoral condyle have been described, they are rare.

This article presents a case of knee osteonecrosis of the lateral femoral condyle in a recovering alcoholic. The patient’s disabling pain was treated with decompression and an AlloMatrix bone putty (Wright Medical Technology, Inc, Arlington, Tenn) and bone marrow aspirate mixture via an arthroscopic and fluoroscopic-guided minimally invasive technique.

**CASE REPORT**

A 40-year-old woman with a 7-month history of left knee pain of insidious onset presented with lateral knee pain that gradually increased in intensity and affected her activities of daily living and sleep. She did not use steroids. The patient had a history of alcohol abuse, but did not use alcohol for the past 10 years. Family history was significant with an sister who was an alcoholic who underwent surgical treatment for knee osteonecrosis.

Physical examination showed a well-nourished woman of appropriate height and weight. Her left knee exhibited no gross effusion. There was full and symmetric range of motion and ligamentous stability. She exhibited lateral joint line pain with a negative McMurray sign.

Plain radiographs exhibit a well-circumscribed lesion (Figure 1) in the posterior aspect of the lateral femoral condyle. Magnetic resonance imaging (MRI) (Figure 2) confirmed avascular necrosis with the defect measuring 1 cm × 2 cm in size.

Due to the ongoing pain and chronic nature of the condition, the patient pursued surgical intervention for symptomatic relief. A muscle-strengthening program had not improved her symptomatology.

**SURGICAL PROCEDURE**

The patient underwent arthroscopic evaluation of the overlying articular surface of the lesion that proved to be intact as suggested by MRI. No gross intra-articular abnormality was identified. A direct lateral portal was made at the...
femoral condyle, just posterior to the lateral collateral ligament and superior to the joint line. The portal was directly visualized arthroscopically in the lateral gutter. A cannulated drill was placed through this lateral portal, penetrating the cortex at the lesion site with fluoroscopic assistance. A curette was introduced through this same portal to decompress the region of avascular necrosis in its entirety (Figure 3). In an attempt to stimulate new bone formation, 5 cc of AlloMatrix was mixed with 3 cc of bone marrow aspirate that had been obtained directly from the proximal tibia via needle aspiration. The mixture was injected into the defect through a syringe.

The patient follow-up was at 1 day and 2 weeks postoperative, then at monthly intervals. The patient noted almost immediate pain relief and she increased her activity with rehabilitative efforts. By 1 month postoperatively, the patient returned to her usual activity, still without pain. A 3-month postoperative computed tomography scan (Figure 4) evidenced filling of the defect to 8 mm, but was not as yet complete. At the most recent 6-month follow-up, the patient could perform her normal activities without the onset of pain.

**DISCUSSION**

This case illustrates the presentation of avascular necrosis in a non-steroid user in a rare site, the lateral femoral condyle of the knee. The minimally invasive treatment technique described yielded immediate pain relief and the onset of healing of the defect. While decompression is the presently accepted standard technique for relief of clinical complaints that mainly include pain, the stimulation of bony healing of the residual defect through bone graft substitutes with bone marrow aspirate may prevent potential complications such as local bony collapse and fracture. It has been previously shown that AlloMatrix bone putty in conjunction with bone marrow aspirate is a successful treatment regimen for space-occupying lesions and long bone nonunions.²

Young, active patients and older, less active patients with decreasing quality of bone integrity are at risk for conditions such as avascular necrosis, particularly with larger lesions. Novel surgical methods may decrease the rates of revision surgery.

This case is the first described treatment of lateral femoral condyle avascular necrosis using an injectable calcium sulfate–based bone putty in a non-steroid user. The described approach to treatment resulted in pain relief, a resumption of functional activity, and a stimulation of new bone formation. Similar methodology may be considered for the larger and more common lesion sites of avascular necrosis.

**REFERENCES**