Cartilaginous bone lesion of the proximal tibia treated with internal fixation and nanocrystalline hydroxyapatite bone grafting (NanoBone® Bone Graft)

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Preoperative

The patient was a 57-year-old female who presented with left knee pain of sudden onset. The patient was originally seen in this practice six years prior for a benign-appearing cartilage tumor of the left proximal tibia. Surveillance was recommended at that time but was not completed. She had no pain or symptoms until two weeks prior to follow up when she experienced soreness in the left knee without any specific injury or trauma. The pain was described as a constant, dull ache sufficient to restrict weight bearing activity and limit walking to about one-half mile. There was some improvement with administration of NSAID's.

Initial radiographs showed a probable enchondroma of the left proximal tibia. An MRI showed patellofemoral chondromalacia and joint effusion. Additional findings included a probable enchondroma that was stable in size when compared with prior imaging from the patient's last visit in 2013. However, there was increased calcification present. Based upon her imaging, history, and exam findings, it appeared her symptoms were more joint-based than a function of the bone lesion. She was treated with an intra-articular cortisone injection for therapeutic and diagnostic purposes, which she tolerated without complaint. She was to return in 2-3 weeks to see if she got relief of symptoms from this injection.

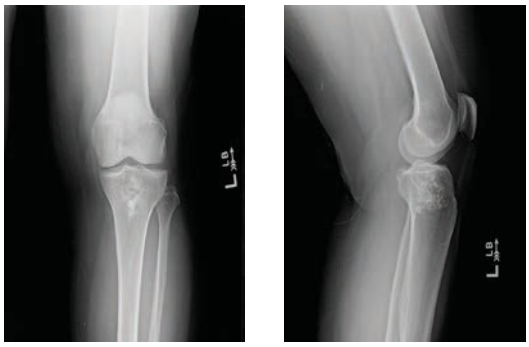

Fig. 1. Preoperative X-rays showing a probable enchondroma of the left proximal tibia

Follow-up Visit

Patient returned approximately three and a half months later with continued left proximal leg pain. She localized the pain to the proximal tibia area and described it as deep bone pain. She received no relief from the intra-articular cortisone injection administered at her last office visit. She had gotten intermittent pain relief with anti-inflammatories but had difficulty performing routine activities such as standing and walking. Review of her prior MRI and imaging studies showed a calcified intraosseous lesion of the proximal tibia consistent with a cartilaginous base neoplasm. There was nothing to suggest an aggressive tumor. Surgical resection of the tumor with prophylactic stabilization and bone grafting was recommended.

Surgical Procedure

The patient was taken to surgery and a tourniquet inflated on the left upper thigh. A lateral curvilinear incision was made spanning the knee joint and over the proximal tibia. The anterior muscle compartment was elevated laterally. A corticotomy was made over the proximal and lateral tibia, corresponding to the location of the lesion. The medullary space was entered and the cartilaginous tumor identified. The tumor was quite large, extending at least two-thirds of the diameter of the proximal tibia. An extensive curettage was performed using curettes and rongeurs. The entire specimen was sent to Pathology for analysis. The tumor cavity was further treated with a powered bur and irrigation. An argon beam laser was also used treat the tumor cavity in multiple cycles combined with curettage. An intraoperative x-ray was taken to confirm the extent of curettage. Copious irrigation was used and hemostasis ensured. The tourniquet was then deflated.

40ml of NanoBone SBX Putty was implanted, completely filling the defect. A six-hole pre-contoured proximal locking plate was used for prophylactic stabilization and secured to the bone provisionally with K-wires. AP and lateral X-rays confirmed appropriate placement. Bicortical non-locking screws were placed for compression as well as locking screws proximally in the subchondral bone for stabilization and prophylaxis against fracture. X-rays again confirmed implant placement in AP and lateral views. The incision was closed in layers and a sterile dressing was applied.

Postoperative Course

Two-weeks after surgery, the patient was recovering well as anticipated. Pathology had confirmed the diagnosis of enchondroma. Patient had minimal pain and was ambulating well with crutches, observing toe-touch weightbearing status. X-rays show stable positioning of hardware without signs of complications.

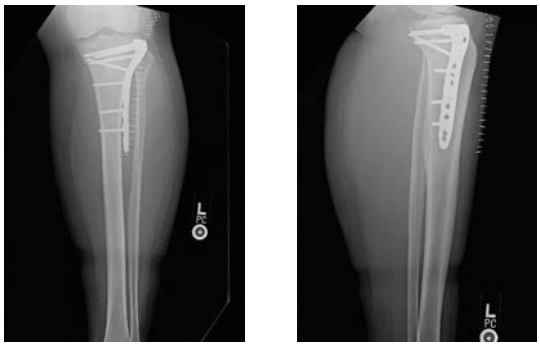

Fig. 2. 2-week X-rays demonstrating stable positioning of hardware

At three-months postoperative, the patient continued to make steady improvement in terms of function. She still had some residual pain and swelling at nighttime. She had completed physical therapy and demonstrated full motion and strength. There was no evidence of tumor recurrence. There was no evidence of fracture or joint collapse. The bone graft appeared to have completely remodeled.

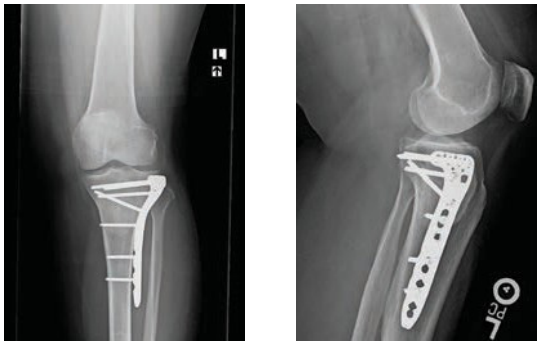

Fig. 3. 6-month X-rays demonstrating full NanoBone remodeling and no tumor recurrence

By six-months postoperative, she had returned to normal function without pain. X-rays demonstrated full bone graft remodeling without evidence of tumor recurrence.

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R013, Rev. 2, 03.21