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Primary Total Knee Arthroplasty Application for Osteoarthritis Developed 17 Years After Curretage–Cementation of Distal Femur Low-Grade Chondrosarcoma

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Abstract

Chondrosarcoma is the second most common primary malignant tumor of bone after osteosarcoma. Prognosis correlates with histological grade. Primary treatment is surgery and neoadjuvant therapies do not play an important role in the treatment algorithm. Surgical options include intralesional curettage and cementation with polymethylmethacrylate, and local resection, reconstruction with tumor resection prostheses. In some patients, degenerative changes in the adjacent joint surface may be seen in the post-treatment follow-up and reconstructive procedures may be needed in the future. Curettage and cementation may increase the risk of osteoarthritis when the procedure is done close to the joint surface. Our case includes knee reconstruction performed 17 years later in a patient who was treated with curettage and cementation for low-grade chondrosarcoma in distal femur. In this case, the cement extending from the femoral diaphysis to the distal end of femur interfered with the placement of alignment guide. However, standard primary knee replacement could be performed without the need for stem or augmentation. Significant clinical improvement was achieved in the follow up. In conclusion, total knee replacement is an effective method for knee osteoarthritis after curettage cementation and low-grade chondrosarcoma, despite some technical difficulties.

Keywords: Gonarthrosis, joint space, curettage, cementation, total knee arthroplasty, low grade chondrosarcoma

Introduction

Chondrosarcoma is the second most common primary malignant tumor of bone after osteosarcoma. Prognosis is related to histological grade.[1,] Low grade chondrosarcomas are detected in the age range of 40-70 years. While the primary treatment in chondrosarcoma is mainly surgery, radiotherapy and chemotherapy do not have an important role in the treatment.[3] Treatment options include intralesional curettage and cementation with polymethyl methacrylate, and local resection, reconstruction with tumor resection prostheses.[4,5] In some patients, degenerative changes can be seen on the adjacent joint surface during follow-up after treatment, and reconstructive interventions may be needed. In a case series of 53 patients, Van der Heijden et al stated that curettage and cementation may increase the risk of osteoarthritis when the procedure is done close to the joint surface.

In this article, we report a patient with a previous surgery of curettage and cementation for the distal femur chondrosarcoma, who developed knee osteoarthritis and required total knee arthroplasty in long-term follow-up.

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Case Presentation

A 43-year-old female patient applied to our clinic in 1999 due to a mass in the distal one-third diaphyseal region of the left femur. After the evaluations and biopsy, the patient was diagnosed with low grade chondrosarcoma. On radiological imaging, it was determined that the lesion started 4 cm proximal to the distal femur and ended 13 cm proximally. After curettage, the defect reached to 2.5 cm proximal of distal femur and the area was filled with cement. (Figure 1).

In addition, in the MRI examination, a lesion was detected in the distal diaphysis of the left femur, ending in the medulla 4 cm proximal to the knee joint, with relatively irregular contours, causing expansion in the cortex, but not causing periosteal reaction or destruction, and without any soft tissue component (Figures 2 and 3).

Seventeen years later, the patient suffered from pain secondary to degenerative osteoarthritis and decreased functional capacity in the same knee and admitted to our clinic. On physical examination, the patient had an incision in the anterolateral region of the femoral diaphysis starting from the middle and extending to the distal. There was a 10-degree varus deformity. Knee movements were between −5 extension and 90° flexion. Direct radiographs revealed a large volume of cementum occupying the femoral medulla up to the femoral epicondyles. The joint space was markedly narrowed. There was no evidence of tumor recurrence or cement loosening. Total knee reconstruction was recommended to the patient. Due to the good distal bone stock, it was decided to use a primary standard knee arthroplasty implant and primary total knee arthroplasty was performed. (Figure 4).

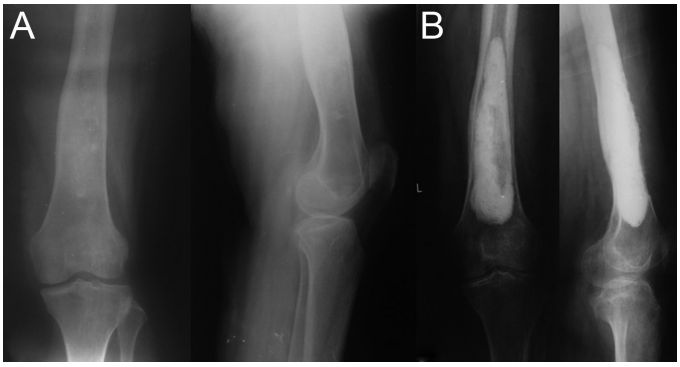

Figure 1. (A) Preoperative direct radiographs of the patient who presented with a mass in the distal left femur and was diagnosed with low grade chondrosarcoma in the pathological evaluation after biopsy. (B) Curettage—early postoperative direct radiographs of the cemented femur.

During surgery, cartilage damage was detected, which was more severe in medial joint space. There was no relationship between the cementum and the joint, but the intramedullary canal of the femur could not be opened sufficiently, and the intramedullary guide rod could not be placed. With the bone cutting block placed without the aid of the guide, the cuts were made by the sense of proportion and the components were placed.

The patient's clinical condition was good in the postoperative follow-up, and she had a range of motion between 0 and 110°. The wound site was clean and there was no discharge from the incision line. The patient, who was followed up without any problems during the hospitalization, was discharged with appropriate mobilization and exercises. No problem was observed in the 5-year long-term follow-up.

Discussion

Low-grade chondrosarcomas are detected between the ages of 40 and 70.[4] Our patient was 43 years old and did not have

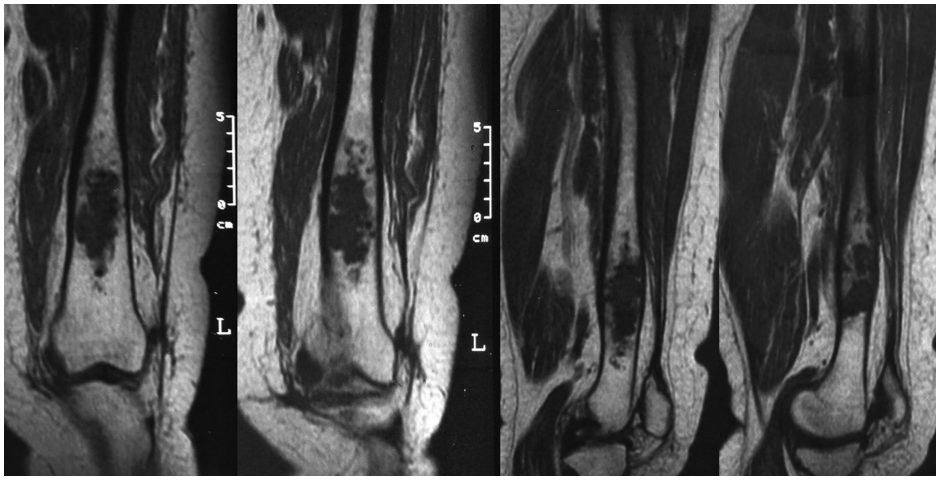

Figure 2. In the coronal and sagittal sections of MRI, there is a lesion in the left femur distal diaphysis, in the medulla, ending 4 cm proximal to the knee joint, with a relatively irregular contour, causing expansion in the cortex, but without periosteal reaction or destruction, and without any soft tissue component. Coronal and sagittal sections of MRI are shown in the figure.

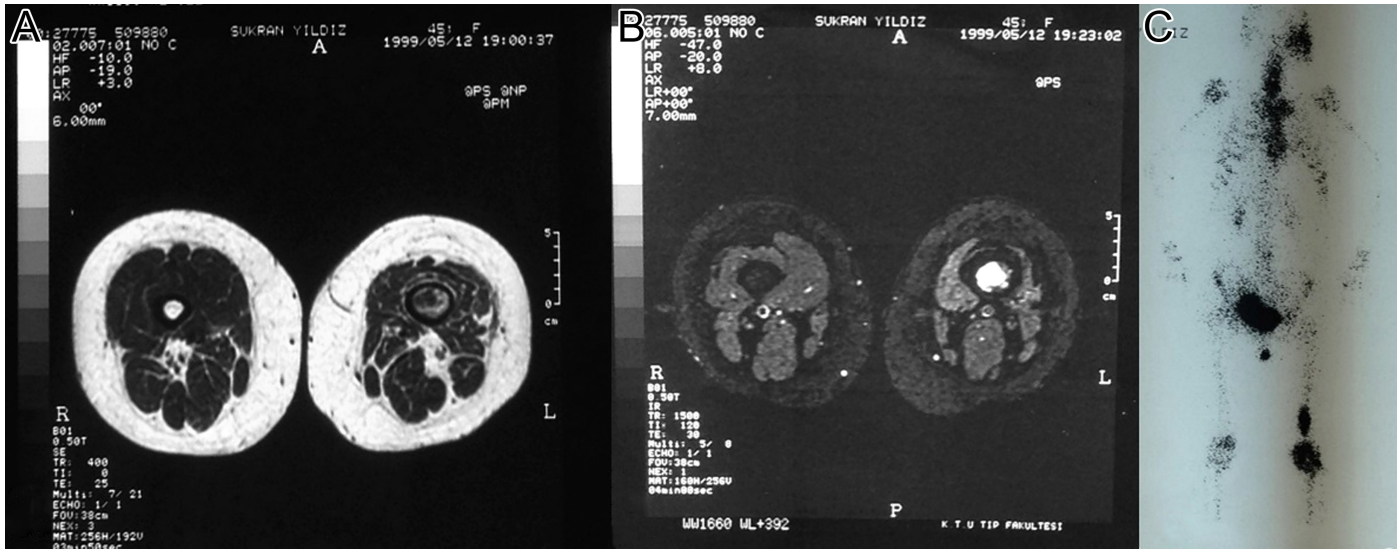

Figure 3. (A, B) Examples from MRI axial sections. (C) In the whole-body bone scintigraphy taken by intravenous administration of Tc99m MDP, an increase in activity was observed in the lower part of the left femur, which was not related to the knee joint.

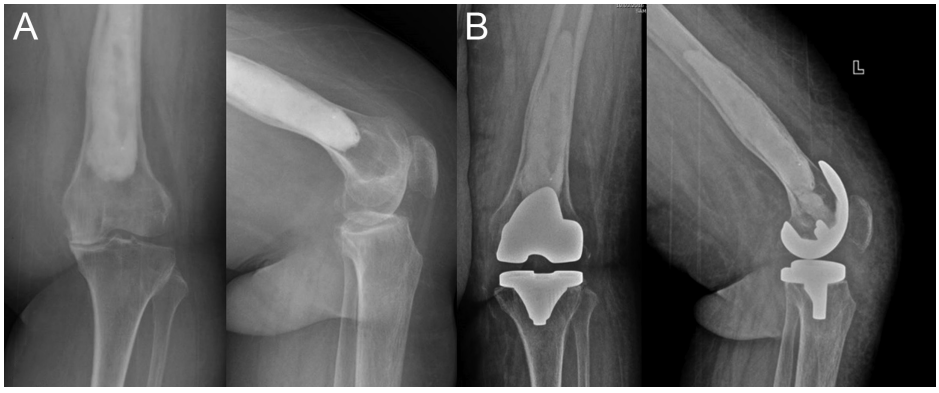

Figure 4. (A) Gonarthrosis findings in the radiographs of the patient 17 years later. (B) Postoperative fifth-year radiographs of the patient who underwent total knee arthroplasty.

any signs of gonarthrosis at her first referral. However, in case of simultaneous presentation of low-grade chondrosarcoma close to joint space and osteoarthritis, simultaneous performing of curettage and cementation and primary total knee arthroplasty can also be a choice of treatment, especially in elderly patients, which was also reported for the treatment of enchondromas close to joint surface.[8]

The timing between 2 definitive surgeries may vary and there is no evidence that shows a clear benefit when to perform. The second surgery in this case, the total knee arthroplasty should be performed when the patient has high stage gonarthrosis and symptoms which decrease the quality of life such as knee pain.

The most important factor affecting the prognosis in patients with chondrosarcoma is the grade of the tumor.[6,7] Contrary to other bone tumors, surgical margins, metastasis, mass size, chemotherapy response and patient age do not have significant prognostic value. Histological evaluation is especially important in cases where secondary intervention is possible. In lesions with close proximity to joint space, cement can affect the vitality of cartilage; thus, total knee arthroplasty can be applied in patients who developed knee osteoarthritis in the long-term follow-up case of osteoarthritis development.[8]

However, primary arthroplasty of such cases might be challenging due to long-standing cement structure interfering with the placement of alignment guides. Although challenging, primary knee arthroplasty can provide excellent clinical outcome in such cases, but, if possible, navigation or robotic systems should be used to eliminate the risk of malalignment problems.

Conclusion

Despite some technical difficulties, total knee arthroplasty is an effective method in knee osteoarthritis developed in long-term follow-up after curettage cementation of distal femur. The presence of distal cement may obstruct the positioning of intramedullary alignment guides, prompting consideration for alternative techniques like extramedullary guides, navigation systems, or robotic surgery.

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Declaration of Interests: The authors have no conflict of interest to declare.

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