Current Problem Case

Prosthetic Replacement of the Knee in the Treatment of Infected and Recurring Giant Cell Tumor of the Distal Femur

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Summary. Giant cell bone tumors represent a specific problem in surgery. While excocleation of the tumor and insertion of the bone transplant (with the potential development of local recurrence or even malignant alterations) were the former procedures of treatment, today it is recognized that block resection of the tumor and replacement of the defect with a special endoprosthesis gives better and longer lasting results and complete functional restitution of the joint. The case report of a 25-year-old patient with recurring giant cell tumor of the distal femur is presented. Due to the failure of surgical treatment and repeated recurrence with infection, 15 cm of the distal femur was resected and a knee endoprosthesis was inserted. Two years after surgery, functional findings of the knee are excellent and there are no signs of infection.


Giant cell tumors represent a very interesting problem in the pathology of bone tumors, especially from the standpoint of therapy. Although the tumor is usually benign and only a small percentage possess malignant properties, the clinical course of this tumor often resembles that of a malignant growth. Namely, its course is usually long lasting and asymptomatic, it causes extensive osteolytic destruction of bony tissue and it recurs after surgery in 50% of the patients (Schajowicz et al. 1972). For this reason, some authors call it a “semimalignant” (Zollinger 1944) or “potentially malignant” (Hellner 1958) tumor.

Giant cell bone tumors are today primarily a surgical problem (Marcove 1981) and complications develop when the attempt is made to totally remove the tumor and fill the defect with a replacement (Watsh 1980) which maintains the function of the joint and the entire extremity.

The contemporary procedure of removing a tumor by block resection leaves a large bone defect which was originally repaired with certain Putti-Juvar types of arthrodeses and then later with a massive homotransplant (Volkov 1970; Parrish 1973). Time revealed, however, that long-term immobilization, cartilage degeneration of the replaced joint bone and frequent fractures of the transplant after loading were the most basic problems of the massive homotransplant.

Campanacci and Costa (1979) believe that after resection of the distal femur, mobility can be maintained in only a few selected cases and therefore they perform a modified version of the Putti-Juvar-Merlé d’Aubigne arthrodesis, inserting intramedullarly the Küntscher nail and a massive autogenic bone transplant.

As endoprosthesis for joints have improved, especially for the hip and knee, we have a better chance of replacing the bone defect remaining after block resec-
We believe that it is particularly interesting to describe in detail the approach we took for treating a recurring giant cell tumor of the distal femur. Besides extensive destruction of the distal femur, there was pronounced, long-term infection and fistulation in the area of the surgical scar. World literature has only a few reports on the block resection of giant cell tumors with infection and prosthetic replacement.

**Figure 1.** In 1978, extensive osteolysis of the metaepiphysis portion of femur, with marked septa within tumor and infraction of corticalis

**Figure 2.** In 1980 second recurrence with expansion of distal femur and fossa intercondyliaris, and extensive destruction of the anterior corticalis of femur

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**Case Report**


Disturbances began in 1978 when he felt pain after long walks in the military service. X-rays revealed comprehensive bone resorption which involved the entire distal metaepiphysis of the femur (Fig. 1).

July 2, 1978. The tumor mass was biopsied and cytological and histopathological reports confirmed a giant cell bone tumor.

July 23, 1978. The tumor was excised, and an autotransplant from the os ilium and tibial bone was inserted.

December 1979. X-rays revealed local recurrence and resorption of the bone transplant.

February 19, 1980. The tumor was excised, a bone transplant from the os ilium inserted again, and the patella was built in. The entire patella was not only built to fill in the large bony cavity, but also to serve as a support for the very thin articulating area of the distal femur.

April, 1980. Secretion drained from the lateral portion of the postoperative scar and small parts of the bony transplant and purulent secretion exuded from the fistula. Bacteriological findings confirmed Staphylococcus albus. The fistulous canal was excised several times but secretion continued.

Due to the duration of secretion, the creation of the fistula and progressive bone destruction (Fig. 2), block resection of the tumor was indicated and a special knee endoprosthesis was inserted. Implantation of the endoprosthesis in an infiltrated area was a risk we consciously took since all other surgical procedures were exhausted, and amputation remained as the ultimate solution if surgery failed again.

Preoperative clinical findings revealed swelling of the entire distal portion of the upper leg and knee, no pain upon palpation and normal temperature. Knee movement was limited and flexion was only 45° upon extension. Scars were visible.

On the lateral side of the scar area, a fistulous opening secreted a bloody, purulent fluid under pressure, and fresh granulation appeared on the margins.

On the distal left femur, angiography revealed pathological vascularization, such as irregularly twisted arteries and stasis of the contrast medium in the late phase with irregular clusters which indicated a neoplastic process. The medial and lateral upper genicular arteries were displaced and the main pathological vascularization developed partly from this and partly from the medial genual artery. The pathological vascularization included a limited area of the distal third of the femur diaphysis towards the distal epiphysis but did not go beyond the knee joint itself.

All hematological and biochemical laboratory findings were normal except sedimentation (SE 20/47) which was accelerated.