IMPLANT FAILURE FOUR YEARS AFTER RESECTION AND RECONSTRUCTION OF A FEMUR FOR A CHONDROSARCOMA

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The authors describe an original reconstruction technique following resection for a chondrosarcoma of the femur. Although fatigue failure of the implant occurred four years later, they still think that this surgical procedure may be considered as a good treatment option in patients with a limited life expectancy.

Keywords : fractures ; implant failure ; revision prosthesis.
Mots-clés : défaillance d'implant ; prothèse de reprise.

HISTORY

An 86-year-old woman presented to another hospital in December 1990 with a pathological fracture of the shaft of the right femur. Pathological analysis revealed a differentiated chondrosarcoma. Treatment at that time included fixation with a Küntscher nail followed by local radiotherapy (60 Gray, 30 sessions). Because of persisting pain the patient was referred to our institution. Radiographs showed no healing of the fracture at the level of the persisting chondrosarcoma and a fracture of the femoral neck, probably resulting from the medullary nailing (fig. 1).

A second operation, performed in June 1991, consisted of a partial resection of the right femoral diaphysis, which resulted in a bone defect of 15 cm. Only the distal part of the femur (both condyles and approximately 10 cm of the diaphysis) remained. The rectus femoris muscle and the proximal part of the vastus lateralis muscle were spared.

Reconstruction was performed using a Wagner revision prosthesis and an angle blade plate. The bone defect was filled with methylmethacrylate

Fig. 1. — Persisting fracture at the level of the chondrosarcoma, fracture of the femoral neck.

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cement and covered with a Mersilène net to facilitate muscle attachment(fig. 2).

The tip of the Wagner revision prosthesis ended just proximal to the remaining part of the femur. To prevent migration of the prosthesis in the distal part of the femur a two-hole fragment tibia plate was inserted between the stem of the Wagner revision prosthesis and the angle blade plate.

For several years after the operation, the patient did quite well : she could walk with one crutch and she had full extension of the knee joint with flexion of 100°. The mobility of the hip joint was limited to 60° of flexion and 30° of abduction. She had no complaints of pain.

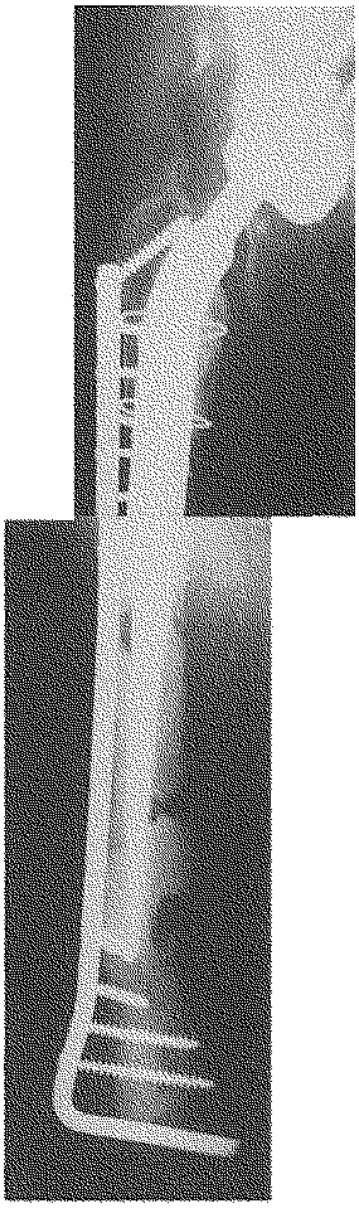

Fig. 2. — Long stem total hip prosthesis ending just before the distal femoral fragment. The angle blade plate was fixed with screws and three cerclage wires. The 15 cm bone defect was filled with cement and covered with a Mersilene mesh.

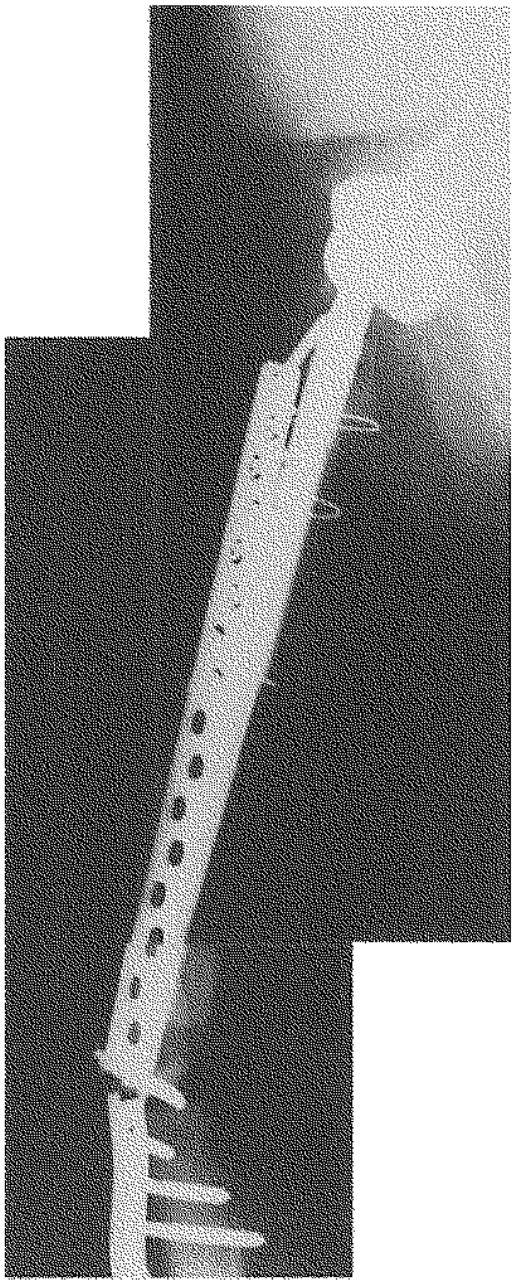

Fig. 3. — Fracture of the distal third of the angle blade plate and adjacent distal femur. The apex of the angle blade plate is positioned sideways and anterior. Broken spongiosa screw.

In June 1995 the 91-year-old patient fell and injured her right leg. Radiological examination revealed a stress fracture of the angle blade plate and a fracture of the adjacent femur, as well as a broken screw (fig. 3).

A third operation was performed. The broken 20-hole angle blade plate was replaced by a new one, and an 18-hole femur plate was placed over it. Around this structure, two Partridge bands were affixed. A third 6-hole femoral plate was placed anteriorly to increase stability (figs. 4, 5).

There were no significant complications. The patient was mobilized immediately, full weight bearing was allowed, and upon discharge (8 days postoperatively) she could walk with an ambulator. She was able to continue to live on her own, she was advised caution, and she underwent further intensive rehabilitation. Three weeks postoperatively, the patient had regained the function of her right leg comparable to function before the implant failure.

Nevertheless, we suggested permanent use of an ambulator or at least two crutches. At the last follow-up evaluation she still is independent and free from pain.

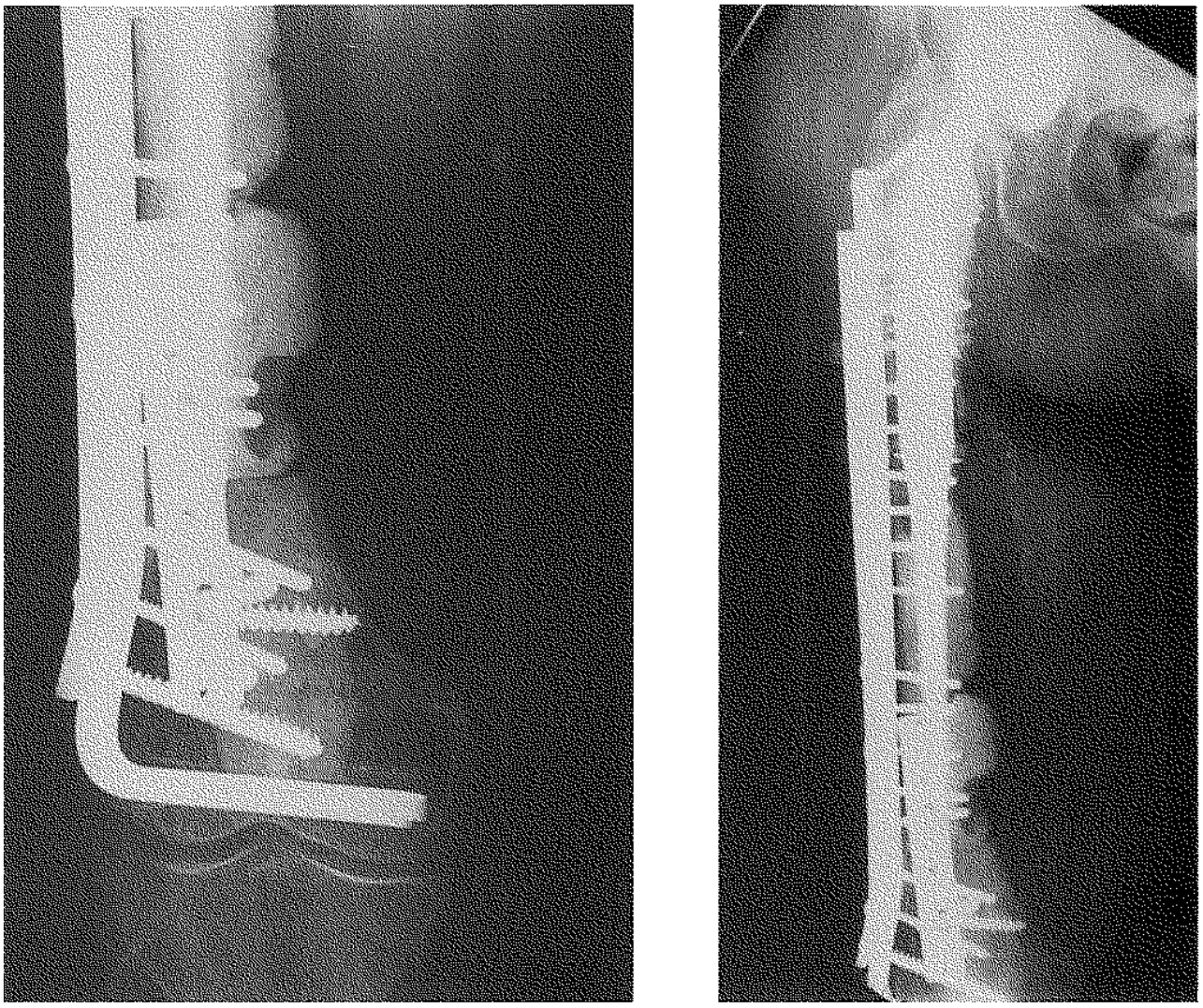

Fig. 4 and 5. — Two angle blade plates fixed with several screws and 2 Partridge bands. A 6-hole femur plate was affixed for stability.

DISCUSSION

The incidence of pathological fractures of long bones due to primary malignant bone tumors and metastases will continue to rise due to the increase in life expectancy of cancer patients (1, 2). It has been shown that, of all primary malignant bone tumors, chondrosarcoma has the best prognosis. Curative resection of the tumor is sometimes possible (1, 3). The surgical treatment (7, 14) depends on the location and extent of the lesion and includes (special) endoprostheses (4, 5), endomedullary fixation (2, 6) and a double plate osteosynthesis (2, 7).

If the tumor is located at the level of the femoral shaft, the surgical procedure might include complete removal of the affected bone tissue and reconstruction by a total femur prosthesis. Due to the age of our patient, this option was not selected in this case. The tumor could be removed sufficiently while sparing the proximal and distal femoral segments. To bridge the resulting gap, we initially opted for a Wagner prosthesis (longest type) in combination with an angle blade plate osteosynthesis. The bone defect was filled with methyl-methacrylate to allow immediate weight bearing (8, 9). This option was preferred to a reconstruction using an allograft, again because of the age of our patient. The result of this procedure was quite satisfactory; for a period of 4 years our elderly patient lived independently. At that time we could not imagine the patient would live long enough to experience a fatigue fracture of her implant.

At the most recent surgery (June 1995) the same strategy was followed, this time, however, a triple osteosynthesis was performed with Partridge bands. The immediate result again was highly satisfactory. Nevertheless, such complex salvage procedures must be avoided when treating young patients after curative resection as implant failure is bound to occur over time. In such cases, we suggest using a massive allograft or rather a total femur prosthesis.

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SAMENVATTING

P. L. O. BROOS, T. A. DRIXLER, T. VOGTEN, I. DE WEVER. Implantaat fraktuur, vier jaar na resectie-reconstructie van het femur wegens chondrosarcoma.

De auteurs beschrijven een originele methode om een femur te reconstrueren na uitgebreide resectie omwille van een chondrosarcoma. Alhoewel na vier jaar het implantaat brak door metaal moeheid menen zij toch dat deze behandelingsmethode de voorkeur geniet bij patiënten met een beperkte levensverwachting.

RÉSUMÉ

P. L. O. BROOS, T. A. DRIXLER, T. VOGTEN, I. DE WEVER. Défaillance d'implant, après résection et reconstruction de l'extrémité supérieure du fémur pour chondrosarcome.

Les auteurs rapportent une technique originale de reconstruction du fémur après résection d'un chondrosarcome. Malgré la survenue d'une fracture de fatigue de l'implant après quatre ans, les auteurs sont convaincus que la technique est à conseiller pour traiter les patients ayant une espérance de vie limitée.