

Bone-Tendon-Bone Allograft Reconstruction for Peri-patella Sarcoma Cases

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Abstract (477 words)

Background:

Nowadays, thanks to great advances in imaging technology, surgical techniques, and adjuvant therapies such as chemotherapy and radiotherapy, approximately 90% of extremity sarcomas can be successfully treated with limb-salvage surgeries. However, reconstruction after wide resection for sarcomas involving the patellar tendon can be challenging, with difficulty in obtaining satisfactory functional results even if the tumor is rather small. There have been several single cases using autologous grafts published for patellar tendon reconstruction after sarcoma wide resection, but bone-tendon-bone allograft reconstruction has never been reported.

Questions/Purposes:

This is a case series of peri-patella sarcomas treated similarly at a single institution, highlighting a new surgical technique for sarcomas involving the patellar tendon. The aims of this study are to report our experience and suggest a new reconstruction option for these sarcomas, including post-operative management.

Patients and Methods:

Four peri-patella sarcoma cases that underwent surgery between 2009 and 2014 were included. Patients were all male aged 26–72 years, with follow-up periods of 12–63 months. Histological diagnoses were synovial sarcoma (two cases), clear cell sarcoma and Ewing's sarcoma (one case each). Two of the four cases received unplanned excision somewhere else with inadequate margin before referral to our institution. All the four cases received pre-operative radiotherapy of 50.4Gy/28Fr. The details of surgery, radiographic examination, and clinical outcomes of each case were reviewed and summarized.

Results:

Surgery

Five to ten weeks after the completion of pre-operative radiotherapy, surgery was performed. Following wide resection including the whole patellar tendon with its insertions to the patella and tibia, bone-tendon-bone allograft was fixed to the residual patella and proximal tibia with screws and wire(s), and then covered with anterior lateral thigh flap. Nearly the whole original patellar-femoral joint surface of the patella was preserved (**Figure 1**).

Post-operative management

Post-operatively, the operated knee was kept straight in knee splint for at least six weeks, and then range-of-motion (ROM) exercise was gradually started. Full weight bearing was tolerated immediately after

surgery. Aside from one case with trauma-related tibial fracture three months post-operatively, no complication was observed. Bone union of both allograft-to-residual-bone junctions was completed within one year after surgery in all the cases (**Figure 2**).

Clinical results

At the latest clinical follow-up, all the patients could walk unsupported without pain and had no difficulties in daily life. Satisfactory knee function was retained with knee extension of -10° to 0° , knee flexion of 100° to full, and quadriceps manual muscle test of 5/5 for all the cases. MSTS scores were 30/30 in three cases but 28/30 in one case. Oncological status at the latest clinical review was continuous-disease free in all the four cases.

Conclusions:

This case series is the first to use patellar tendon allograft for reconstruction following tumor resection but preserve joint surface and promise satisfactory clinical outcomes. Allograft reconstruction with vascularized flap can be a viable reconstruction option for peri-patella sarcomas.

Figure 1. Intra-operative photos (a: specimen, b: operative field after tumor resection, c: operative field after screws and wire fixation) of the first case. *P* patella, *F* femur, *T* tibia

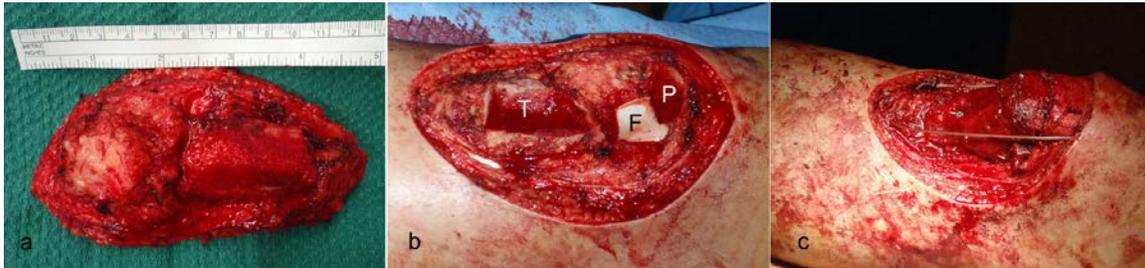


Figure 2. Radiographs of the first case 1 year after surgery (a: AP view, b: lateral view). Both of the junctions were united

