Available online at www.sciencedirect.com

ScienceDirect

EJSO 43 (2017) 416–422

EJSO the Journal of Cancer Surgery

www.ejso.com

Survival, failure modes and function of combined distal femur and proximal tibia reconstruction following tumor resection

F. Sevelda [a,*], W. Waldstein [a], J. Panotopoulos [a], C. Stihsen [a], A. Kaider [b], P.T. Funovics [a], R. Windhager [a]

[a] Department of Orthopaedics, Medical University of Vienna, Austria
[b] Center for Medical Statistics, Informatics and Intelligent Systems, Medical University of Vienna, Austria

Accepted 8 November 2016
Available online 23 November 2016

Abstract

Background: Tumor spread to the knee joint or skip metastasis to the adjacent bones of the knee require reconstruction with combined distal femur and proximal tibia replacements. The literature on implant survival and failure modes with this type of reconstruction is sparse. The goals of this study were to determine the implant survival, the different failure modes and the functional outcome of this megaendoprosthetic reconstruction.

Patients and methods: Thirty-nine patients with combined distal femur and proximal tibia reconstruction were retrospectively reviewed. Median follow-up was 8.8 years (quartiles 4.7–15.5 years). Twenty-one patients received combined distal femur and proximal tibia reconstruction as a primary mode of reconstruction, 18 patients as revision surgery after failed tumor prosthesis. For survival estimations, competing risk analyses were performed.

Results: The revision-free survival at five years was 42% (95% CI 22%–56%) and implant survival with exchange of the original implant was 54% (95% CI 35%–68%). Five-year revision-free survival for soft tissue failure was 72% (95% CI 52%–84%), for infection 67% (95% CI 48%–80%), for structural failure 82% (95% CI 63%–91%), for aseptic loosening and tumor progression 97% (95% CI 82%–99%), respectively. Patients with revision surgery had higher risk for infection ($p < 0.001$), structural failure ($p = 0.037$) and shorter revision-free- ($p = 0.025$) and implant-survival ($p = 0.006$). Limb survival at 20 years was 94%. Mean musculoskeletal Tumor Society score was 76%.

Conclusion: Despite high failure rates with short revision-free survivals, combined distal femur and proximal tibia reconstruction achieved longtime limb survival in the majority of patients with satisfying function.

© 2016 Elsevier Ltd, BASO ~ The Association for Cancer Surgery, and the European Society of Surgical Oncology. All rights reserved.

Keywords: Knee; Tumor resection; Combined distal femur proximal tibia reconstruction

Introduction

The most and second most common sites for primary malignant bone tumors are the distal femur and the proximal tibia.[1] Wide excision is the gold standard in primary malignant bone tumors.[2] In rare cases, infiltration to the joint cavity or skip metastasis to the adjacent tibial or femoral bone necessitates extraarticular resection of the knee including resection of the tibial tuberosity and parts of the extensor mechanism.[3]

First series on reconstructive surgery around the knee for tumor patients by autologous and homologous arthrodesis were published with satisfying results.[4,5] Particularly in

Abbreviations: CFTR, combined distal femur and proximal tibia replacement; ISOLS, International Society of Limb Salvage; KMFTR, Kotz Modular Femur and Tibia Reconstruction system; HMRS, Howmedica Modular Replacement System; GMRS, Global Modular Replacement System; LARS, Ligament Augmentation and Reconstruction System; MSTS, Musculoskeletal Tumor Society.

* Corresponding author. Department of Orthopaedics, Medical University of Vienna, Waehringer Guertel 18-20, A-1090 Vienna, Austria. Fax: +43 1 40400 40290.

E-mail addresses: florian.sevelda@meduniwien.ac.at (F. Sevelda), wenzel.waldstein-wartenberg@meduniwien.ac.at (W. Waldstein), joannis.panotopoulos@meduniwien.ac.at (J. Panotopoulos), christoph.stihsen@meduniwien.ac.at (C. Stihsen), alexandra.kaider@meduniwien.ac.at (A. Kaider), philipp.funovics@meduniwien.ac.at (P.T. Funovics), reinhard.windhager@meduniwien.ac.at (R. Windhager).

http://dx.doi.org/10.1016/j.ejso.2016.11.005
0748-7983/© 2016 Elsevier Ltd, BASO ~ The Association for Cancer Surgery, and the European Society of Surgical Oncology. All rights reserved.

proximal tibia reconstruction, Campanacci et al. argued for arthrodesis being the safest limb sparing option due to the sparse coverage of soft tissue and the difficulty to reattach the patella tendon.[4] Malawer et al. reported on endoprosthetic reconstructions of the proximal tibia in 1989 with additional use of a rotational medial gastrocnemius flap to cover the prosthesis and to reattach the remaining extension mechanism to the flap.[6] Since then there have been reports on prosthetic survival and functional outcome of proximal tibia endoprosthetic reconstruction indicating higher infection rates compared to other anatomic reconstruction sites around the knee.[7–9] The highest risk of early failure has been reported for combined distal femur and proximal tibia replacement (CFTR).[8] There are no studies in the literature exclusively reporting on the outcome of CFTR (Fig. 1).

The paucity of literature on implant survival and failure modes with this type of reconstruction has prompted this study to evaluate: the revision-free-, implant- and limb survival following CFTR, the type of failures according to the International Society of Limb Salvage (ISOLS) classification, the influence of synthetic augmentation devices for extensor mechanism reconstruction on the risk of infection and the functional outcome.

Patients and methods

Between 1984 and 2010, 39 patients received CFTR following bone and soft tissue tumor resection. Information for this retrospective cohort study was collected from a prospective database and from original medical records. Institutional review board approval was obtained before initiation of this study.

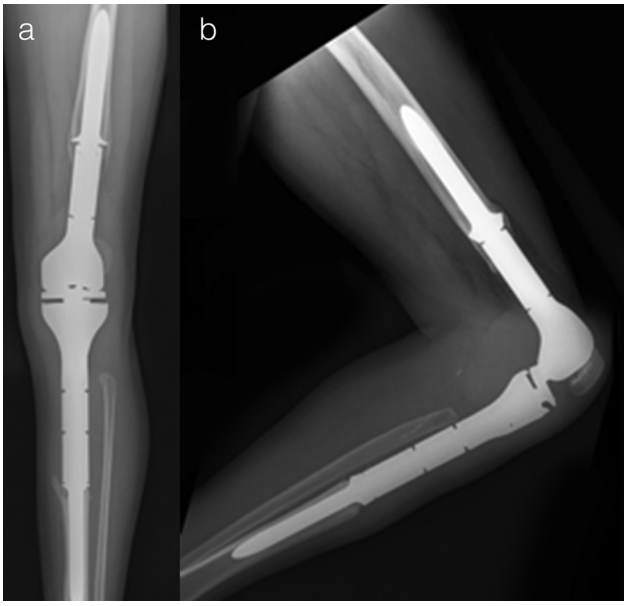

Figure 1. Anteroposterior (a) and lateral (b) radiograph of combined distal femur and proximal tibia reconstruction.

Overall median follow-up was 8.8 years (quartiles 4.7–15.5 years). Ten patients died, two of them within one year after surgery. The minimum follow-up of patients alive was one year.

Patients were split into two groups. Patients who received a CFTR directly after tumor resection formed the primary reconstruction group (n = 21). Patients with previous reconstructive surgery around the knee were assigned to the revision surgery group (n = 18) (Table 1). Indications for CFTR in the primary reconstruction group were skip metastasis in the adjacent bone in four patients and tumor spread into the knee joint in 17 patients. In the revision surgery group, indications were failure of previous proximal tibia reconstruction (n = 11) and failure of previous distal femur reconstruction (n = 7). CFTR in the revision surgery group, was performed a mean of ten years (range, 1–27 years) after initial surgical intervention.

All surgical procedures were performed by four experienced orthopedic surgeons. In the primary reconstruction group, depending on the site of biopsy an extended medial or lateral longitudinal incision was made including an elliptical excision of the biopsy tract to obtain wide resection margins.[2] In patients with tumor spread into the joint extra-articular resection was performed.[10] Patients without intra-articular tumor infiltration received an intraarticular

Table 1
Demographics, diagnosis and surgical parameters in combined distal femur and proximal tibia replacement.

Variable	Overall n = 39	Primary reconstruction n = 21 (54%)	Revision surgery n = 18 (46%)
Patient age [mean in year (range)]	32 (8–80)	28 (8–56)	37 (14–80)
Men/women [n]	23/16	16/5	7/11
Diagnosis [n (%)]			
Osteosarcoma	26 (67)	15 (71%)	11 (61%)
Ewing's sarcoma	2 (5%)	1 (5%)	1 (6%)
Chondrosarcoma	4 (10%)	1 (5%)	3 (17%)
Other sarcoma[a]	5 (13%)	2 (10%)	3 (17%)
Renal cell carcinoma metastasis	2 (5%)	2 (10%)	0
Chemotherapy [yes/no]	28/11	17/4	11/7
Radiotherapy [yes/no]	2/37	2/19	0/18
Surgical margins [w/m/i/roi]	30/1/2/6	19/1/1/0	11/0/1/6
Extra-/intra-articular Knee resection	18/21	17/4	1/17
Prostheses			
Fixed hinge/rotating hinge [n]	29/10	15/6	14/4
Cemented/uncemented [n]	3/36	0/21	3/15
Extensor reconstruction [n (%)]			
Synthetic augmentation (LARS)	16 (41%)	11 (52%)	5 (28%)
No synthetic augmentation	23 (59%)	10 (48%)	13 (72%)

w = wide; m = marginal; i = intralesional; roi = resection in other institution; LARS = ligament artificial reconstruction system.

[a] 1 malignant fibrous histiocytoma, 2 giant cell tumors, 2 soft-tissue sarcomas.

Download English Version:

https://daneshyari.com/en/article/5700892

Download Persian Version:

https://daneshyari.com/article/5700892

Daneshyari.com