



ELSEVIER



Long-term outcome of free fibula osteocutaneous flap and massive allograft in the reconstruction of long bone defect[☆]

Ahmad Sukari Halim^{a,*}, Siew Cheng Chai^a,
Wan Faisham Wan Ismail^b, Wan Sulaiman Wan Azman^a,
Arman Zaharil Mat Saad^a, Zulmi Wan^b

^a Reconstructive Sciences Department, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan 16150, Malaysia

^b Orthopedics Oncology Unit, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan 16150, Malaysia

Received 2 March 2015; accepted 7 August 2015

KEYWORDS

Allograft;
Bone tumor;
Free fibula
osteocutaneous flap;
Limb salvage;
Segmental bone
reconstruction

Summary Reconstruction of massive bone defects in bone tumors with allografts has been shown to have significant complications including infection, delayed or nonunion of allograft, and allograft fracture. Resection compounded with soft tissue defects requires skin coverage. A composite osteocutaneous free fibula offers an optimal solution where the allografts can be augmented mechanically and achieve biological incorporation. Following resection, the cutaneous component of the free osteocutaneous fibula flaps covers the massive soft tissue defect.

In this retrospective study, the long-term outcome of 12 patients, who underwent single-stage limb reconstruction with massive allograft and free fibula osteocutaneous flaps instead of free fibula osteal flaps only, was evaluated. This study included 12 consecutive patients who had primary bone tumors and had follow-up for a minimum of 24 months.

The mean age at the time of surgery was 19.8 years. A total of eight patients had primary malignant bone tumors (five osteosarcomas, two chondrosarcomas and one synovial sarcoma), and four patients had benign bone tumors (two giant-cell tumors, one aneurysmal bone cyst, and one neurofibromatosis). The mean follow-up for the 12 patients was 63 months (range 24–124 months). Out of the 10 patients, nine underwent lower-limb reconstruction and ambulated with partial weight bearing and full weight bearing at an average of 4.2 months and 8.2 months, respectively.

[☆] Presentation at a meeting: This paper was presented at the 2nd Meeting of Asian Pacific Federation of Societies for Reconstructive Microsurgery 3rd–5th July 2014 in Buyeo, Korea.

* Corresponding author. Reconstructive Sciences Unit, School of Medical Sciences, Health Campus, Universiti Sains Malaysia, Jalan Raja Perempuan Zainab II, 16150 Kubang Kerian, Kelantan, Malaysia. Tel.: +609 7676000; fax: +609 7656434.

E-mail address: ashalim@usm.my (A.S. Halim).

In conclusion, augmentation of a massive allograft with free fibula osteocutaneous flap is an excellent alternative for reducing the long-term complication of massive allograft and concurrently addresses the soft tissue coverage.

© 2015 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.

Introduction

Limb-sparing surgery for patients with primary malignant sarcomas of the extremities has been well established. Osseous defects created by limb-salvage surgical procedures may be reconstructed by a variety of methods including segmental autograft, intercalary endoprosthesis, allografts, or a combination allograft and fibula composite. Various series have documented that reconstructions with allograft are associated with significant rate of complications.^{1–5} Isolated free vascularized fibula flaps offer well-integrated tissue and vascularity for reconstruction, but they demonstrate early mechanical weakness in lower-limb reconstruction and the risk of early fracture.

In this study, all cases were reconstructed with a combination of allografts and free fibula osteocutaneous flaps. Previous related studies^{6–9} emphasized limb reconstruction with massive allografts and free vascularized fibulas without cutaneous components. The combination reconstruction in our patients offered immediate early mechanical stability. In the long term, vascularized fibular grafts incorporated entire allografts and became complete biological vascularized units. Cutaneous components are beneficial for soft tissue reconstruction and facilitating postoperative monitoring. The cutaneous component also minimizes wound breakdown and reduces infection rate with the allograft.

Methodology

Between 1999 and 2012, 16 consecutive patients underwent either upper- or lower-limb reconstruction post tumor resection with massive allograft and free fibula osteocutaneous flap. This study included patients who were operated for primary bone tumors and followed up for a minimum of 24 months. Four cases were excluded: two of the patients needed early amputation within 12 months secondary to recurrence and histologically malignant change of tumor (final histology were telangiectatic osteosarcoma from aneurysmal bone cysts on biopsy) and two other patients underwent surgeries for secondary bone tumors (metastatic bone disease). The medical records for the remaining 12 patients were reviewed retrospectively with the ethical approval of the Human Research Ethic Committee (USM/JEPeM/15070252) for demographic information, diagnosis, operative technique, imaging study, and postoperative functional status.

According to tumor resection principles, a wide en bloc tumor resection was performed in all cases. All free vascularized fibula flaps were harvested along with skin

paddles as osteocutaneous flaps from the contralateral lower limb. To reconstruct the resected bone segment, the free vascularized fibula was inserted in the intramedullary position of the massive allograft-grooved medullary cavity (Figure 3a–d) or open-sandwiched alongside the allograft (Figure 4a–c) and stabilized with plate and screws. The cortical allografts were maintained at three-fourths of the diameter for the comfortable placement of the vascularized fibulas. Distal cancellous allografts were maintained to provide better union and stability. The entire reconstruction was stabilized with a long neutralizing plate in nine patients and an external fixator in three patients. Based on the availability of the recipient vessels and suitability of the vessel, recipient and donor vessels were anastomosed end to end, end to side, or in a flow-through configuration.

The skin paddle was monitored postoperatively to ensure the viability of all free fibula flaps. All the patients



Figure 1 (a) Computerized tomography angiogram (CTA) showed flowthrough configuration vessel in a flow-through flap. (b) Full weight wearing postoperative 6 months. (c-d) Five-year follow-up, x-ray and (CT) scan showed hypertrophy and incorporation of the allograft with the fibula.

Download English Version:

<https://daneshyari.com/en/article/4117493>

Download Persian Version:

<https://daneshyari.com/article/4117493>

[Daneshyari.com](https://daneshyari.com)