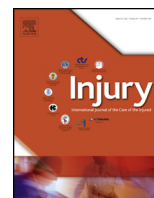




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Single stage reconstruction of post traumatic and post excisional composite perigenual defects using chimeric pedicled propelled osteomyocutaneous fibula flap

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ARTICLE INFO

Article history:

Accepted 26 April 2018

Keywords:

Composite perigenual defects (CPGDs)
Pedicled propelled fibula osteomyocutaneous flap
Chimeric fibula flap

ABSTRACT

Introduction: Composite perigenual defects (CPGDs) are exacting the expertise of the reconstructive surgeons. Segmental skeletal defects continue to be a challenge for both orthopedic and plastic surgeons. There are many techniques available for the reconstruction of segmental skeletal defects in the perigenual region. This study explores the outcomes of pedicled chimeric propelled osteomyocutaneous fibula flap reconstruction of post traumatic and post excisional composite perigenual defects (CPGDs)

Materials and methods: It was a retrospective study conducted from 2011 to 2016 including 16 patients (5 post excisional defects and 11 post traumatic defects). 14 males and 2 females were included. Ages of the patients were ranging from 24 to 46 years. All had their CPGDs reconstructed with chimeric pedicled propelled fibula osteomyocutaneous flap

Results: All 15 patients on an average of 26 months follow-up assumed pain free unrestrictive walking. Fracture of hardware and transferred fibula occurred in one case 2^{1/2} years following the surgery. Other patients had good functional recovery in an average of 26 months follow up. The average MSTS score of 15 patients was 23.9.

Conclusion: This anatomically construed procedure will be addendum to the armamentarium of reconstruction in both post excisional limb salvage milieu and secondary posttraumatic context for the perigenual composite defects. With high healing potential, infection culling capacity, high osteogenic potential and good supportive hardwares the pedicled osteomyocutaneous fibula flap may usher in better outcome in composite perigenual defects reconstruction.

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Introduction

Loss of knee joint with adjacent portion of articulating bones and overlying soft tissues result in “composite perigenual defects” (CPGD) that always exact the expertise of reconstructive surgeons. Knee is a common site for both neoplasms and severe injuries. The ultimate aim of reconstruction of post excisional and post traumatic CPGDs is to get stable functional lower limb which facilitates pain free walking and standing. The pedicled fibula flap in chimeric form not only provides stable arthrodesing skeletal continuity in the knee region but also provides the cover and stuffing for the voids of excision with cutaneous paddle and muscle respectively. Both post traumatic and post-excisional CPGDs are

limb threatening in nature [1,2]. Limb preservation surgery with knee arthrodesis has become the standard of care in both posttraumatic [3–13] and post excisional [14–19] CPGDs. Limb preservation surgery is standardized in the sarcoma reconstruction of lower limb. Similarly aggressive debridement and early reconstruction have become the standard of care in the surgical management of severe lower limb injuries.

Aim of the study

To evaluate the outcomes in the reconstruction of post traumatic and post excisional CPGDs using the chimeric pedicled propelled osteomyocutaneous fibula flap

Materials and methods (Tables 1 and 2)

It was a retrospective study conducted from 2011 to 2016 including 16 patients (5 post excisional defects and 11 post

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Table 1
Clinical details of the post-excisional CPGDs reconstruction.

No	Age/ sex	Origin site of perigenual tumor/ Pathology/EKST	Perigenual bone defect (cm)	Length of pedicled fibula component of chimeric flap (cm)	Adjuvant therapy	Oncological outcome	Consolidation osseous element of chimeric flap (months)	Complications	Follow up (months)/ MSTS score at the end of follow up
1	M/ 28	DEF/GCT/IB	11	16.5	Nil	NLRDT	11	Partial skin Graft loss at donor site ^b	36/22
2	F/36	PET/OS/IIB	10.5	16	PORT/ POCT	NLRDT	14	Mild collection at knee region ^b	26/25
3	M/ 40	DEF/OS/IIB	13	19	PORT/ POCT	NLRDT	15	Partial skin Graft loss at donor site ^b	26/24
4	M27	PET/SS/IIB	10	16	PORT/ POCT	NLRDT	16	Mild collection at knee region ^b	29/24
5	M/ 46	DEF/OS/IIB	12.5	19	PORT/ POCT	NLRDT		^a and infection and amputated	At 30 months

CPGDs – Composite Peri Genual Defect; M – Male; F – Female; DEF – Distal End Femur; PET – Proximal End Tibia; PORT – Post Operative Radio Therapy; POCT – Post Operative Chemo Therapy; NLRDT – No Loco Regional Distant tumor; MSTS score – Musculo Skeletal Tumor Society score; GCT – Giant Cell Tumor; SS – Synovio Sarcoma; OS – Osteo Sarcoma; EKST – EnneKing Staging of Tumor.

^a Fracture.

^b All are minor complications managed conservatively.

traumatic defects). 14 males and 2 females were included. Ages of the patients were ranging from 24 to 46 years .

Inclusion criteria

1. Patients with post traumatic and post excisional CPGDs with good local, regional and systemic conditions that favored the reconstruction with chimeric fibula pedicled flap were included.
2. After thorough analysis of factors governing amputation and limb salvage, patients were chosen for limb salvage procedure [21–24]. One should not underestimate the good results obtained in the limb threatening CPGDs with above knee amputation and prostheses (modern above knee joints incorporated) rehabilitation. Nevertheless amputation imposes both

devastating mental strain in the amputees and colossal increase in the walking metabolic equivalents [20]. They were all taken up for the surgery after written informed consent.

3. All delayed primary and secondary posttraumatic CPGDs with bacteriological wound balance (when the wound shows epithelializing edges with flat stable granulation) were included.

Exclusion criteria

1. Patients with diabetes mellitus, no suitable donor area in the ipsilateral side (extensive injury or excision), bleeding diathesis, poor general condition, other comorbid illnesses, associated vessel repair and high nerve injuries were excluded.

Table 2
Details of 11cases of post traumatic CPGDs cases.

Case number/ sex and age	Dimension (cm) of the bony defect in the post traumatic CPGDs	Length of fibula in the pedicled chimeric Osteo myo cutaneous fibula flap (includes the portion within the intramedullary tunnel)(cm)	Complications ^b	Final consolidation –time for healthy bony union (months)/MSTS score at the end of follow up
6.M/28	12	18.5	Mild Collection at the knee region	12/23
7.M/24	14	19.5	Nil	14/24
8. M/36	13.5	18.5	Superficial epidermolysis of skin component of chimeric flap	12/22
9. M/32	11	16	Nil	13/24
10. F/30	11.5	17.5	Nil	14/22
11.M/42	13	19	Nil	12/25
12.M/46	12	18	Nil	14/22
13.M40	14	19	Nil	16/26
14.M/45	13	19	Partial loss of donor site skin graft	18/26
15.M/31 ^a	9.5	13.5(double strut)	Partial loss of skin graft loss	11/25
16.M/26	10	16	Nil	14/25

PECPGD – Post Excisional Composite Peri Genual Defect; PTCPGD – Post Traumatic Composite Peri Genual Defect; MSTS score – Musculo Skeletal Tumor Society score; GCT – Giant cell tumor; PT – Proximal Tibia; DET – Distal End Femur.

Average skeletal defect at the knee region was 11.91 cm.

Overall (both Post excisional and post traumatic CPGDs group) average period for consolidation is 14.2 months.

All other cases single pedicled vascularised fibular strut was used.

Average follow-up period for post traumatic CPGDs cases were 24 months.

^a One avascular bony strut was used by the side of vascularised fibular strut.

^b All the complications encountered are minor and are managed conservatively.

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