



Functional Outcome of the Superior Lateral Genicular Artery Flap for Soft Tissue Reconstruction around Knee.

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Abstract

Introduction: Soft tissue defect is a difficult problem. The superior lateral genicular artery flap (SLGA flap) is a fascio-cutaneous flap based on the cutaneous perforators of the SLGA to reconstruct the damaged soft tissue around knee. **Aim of the study:** The aim of this study was to assess the functional outcome of the Superior Lateral Genicular Artery Flap for soft tissue reconstruction around knee. **Methods:** This prospective observational study was conducted in the Department of Plastic Surgery & Burn Unit, Dhaka Medical College and Hospital, Dhaka from July 2015 to June 2016. Due to time constraint and scarcity of patients 15 patients presented with defects around the knee were enrolled in this study using purposive sampling method. **Result:** In this study, maximum patients (66.7%) were male. Majority of respondents (46.7%) were between the age group of 36-45 years. Mean age was 39.53±13 years. In this series, RTA (26.7%) was the main aetiology of soft tissue defect. In the present series, the most common site of defect was popliteal fossa 7(46.7%). Majority of the patients gained full range of knee movement 13(86.7%). **Conclusion:** Majority of the patients gained full range of knee movement after Superior Lateral Genicular Artery Flap surgery of soft tissue reconstruction around knee.

Keywords: Functional Outcome, Superior Lateral Genicular Artery Flap and Soft Tissue Reconstruction.

INTRODUCTION

Knee is an important part of our body which is easily exposed to injuries due to accessibility and functionality. There are many options for soft tissue reconstruction around knee. Various flaps have been constructed to reconstruct the soft tissue of the knee, including fasciocutaneous, musculocutaneous, and free

flaps.^[1,2,3,4,5] Available surgical options associated with these flaps for knee reconstruction are local flaps for small defects, regional flaps: muscular, musculo-cutaneous or fasciocutaneous, distant flaps: pedicled or microsurgical transferred etc.^[6,7] These methods have some disadvantages, related to available flap size and limited pedicle length and, in case of free flaps, difficult and time-consuming

vascular anastomosis due to deep recipient vessels. The SLGA flap is useful and easy to harvest and leaves no functional loss of the lower extremity and no cosmetic problems. In 1990, Hayashi and Maruyama first reported the anatomy and clinical use of this fasciocutaneous flap.^[8] Spokevicius and Jankauskas described how the SLGA flap might be applied as an axial flap to cover defects in the popliteal region.^[9] Wiedner et al,^[10] performed a study on soft-tissue reconstruction in the knee area needs thin, pliable, and tough skin. The availability of local soft tissue, which would meet the requirements best, is limited. This study is a retrospective analysis of our clinical experience with the superior lateral genicular artery (SLGA) flap for soft tissue reconstruction around the knee and 6 SLGA flaps were elevated for reconstruction of defects around the knee. There was no flap loss in any of 6 patients. Three patients had partial tissue loss at the distal tip of the flap. Two of the 3 resulting wounds were effectively covered with split skin graft, the third one eventually healed with wound care. Primary donor site closure was possible in all cases. There were no late complications, either in the flap area or in the donor site region. Gupta et al,^[11] conducted a study including 19 patients of post-flame burn flexion contracture of the knee joint were

MATERIALS & METHODS

This was a prospective observational study was conducted in department of Plastic Surgery & Burn Unit, Dhaka Medical College and Hospital, Dhaka from July 2015 to June 2016. Due to time constraint and scarcity of patients 15 patients presented with defects around the knee were enrolled in this study using purposive sampling method. Findings of

operated. All 19 patients had flexion contracture of the knee joint with hypertrophic scarring and hypopigmentation. Superior lateral genicular artery performed in 3 cases. All flaps adequately covered the tissue defect over flex Ural aspect of knee joint. They were inset in a tension-free manner with maintenance of good contour, color and texture match. None of the cases needed splint age and all limbs were mobilized on 7th post-operative day. Sahasrabudhe et al,^[12] conducted a study to report experience of using distally based spilt vastus lateralis musculocutaneous flaps for soft-tissue defects around the knee joint a new technique. Seven out of eight flaps survived well without any flap loss. There are very few studies in Bangladesh about Superior Lateral Genicular Artery Flap for soft tissue reconstruction around knee. Thus, we conducted this study to assess the functional outcome of the Superior Lateral Genicular Artery Flap for soft tissue reconstruction around knee.

Objectives

To assess the functional outcome of the Superior Lateral Genicular Artery Flap for soft tissue reconstruction around knee.

observation and interview with the patient and attendants were recorded on prescribed data collection sheet (attached here) that were fulfilled by the investigator. After collection of data, all data were compiled in a master table first. Standard formulae were used and statistical analysis of the result was obtained by using window based computer software devised with Statistical package for Social Science (SPSS-22) and Microsoft Office Excel 2007.

Inclusion Criteria:

- Soft tissue defects around the knee
- Age group: any age group

Exclusion Criteria:

- Through and through defects around the knee
- Patients with poly trauma and life threatening condition
- Injuries in the area of pedicle.
- Patients with significant co-morbid medical conditions like uncontrolled DM etc.
- Patients unwilling to take part in the study

In the present series, maximum patients were male 10(66.7%), rest of the patients 5(33.3%) were female [Figure 1]. Male female ratio 2:1. Majority of respondents (46.7%) were between 36-45 years of age. Mean age was 39.53±13 years ranged between 18 to 65 years [Table1]. In this series, RTA (26.7%) was the main aetiology of soft tissue defect [Table2]. In the present series, the most common site of defect was popliteal fossa 7(46.7%) [Table3]. [Table10]: showed majority of the patients gained full range of knee movement 13(86.7%) [Table4]. Pre-operative state, inset of the flap and post-operative state of one patient is shown in [Figure 2 -5].

RESULT

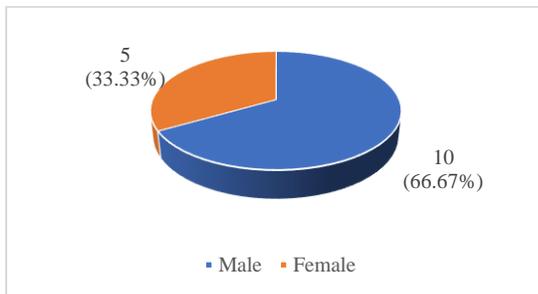


Figure 1: Gender distribution of the study people. (n=15)

Table-1: Age distribution of the study people. (n=15)

Age (in year)	Number of patients	Percentage (%)
≤ 25	2	13.33
26-35	3	20.00
36-45	7	46.67
46-55	2	13.33
≥56	1	6.67
Total	15	100.00
Mean±SD	39.53±13.1	
Range	(18-65)	

Table-2: Aetiology of soft tissue defect (n=15)

Aetiology of soft tissue defect	Number of patients	Percentage (%)
After bursectomy	1	6.67
After prepetellar bursa excision	1	6.67
After release of postburn scar contracture in popliteal fossa	2	13.33
Electric burn	2	13.33
Excision of fibrous histocytoma	1	6.67
Excision of murjolin's ulcer with postburn scar contracture	2	13.33
Machinery injury	2	13.33
RTA	4	26.67
Total	15	100.00

Table-3: Site involved (n=15)

Site	Number of patients	Percentage (%)
Front of knee joint	2	13.33
Lateral side of the knee	3	20.00
Popliteal fossa	7	46.67
Prepatellar region	3	20.00
Total	15	100.00



Figure 3: Inset of the flap.

Table-4: Functional outcome of knee joints (n=15)

Range movements of	Number of patients	Percentage (%)
Full range of movement	13	86.67
5-10° restricted	2	13.33
Total	15	100.00



Figure 4: After inset of the flap.

Case-2:



Figure 2: Identification of SLGA by Doppler and applying of tourniquet and marking of the operative area.



Figure 5: 5th postoperative day.

DISCUSSION

The present study aims to see the outcome of superior lateral genicular artery flap for soft tissue around the knee. In present study among 15 cases, age of the patients in this series ranged from 18 to 65 years. Majority patients 7 (46.7%) were age 36-45. yrs. Mean age was 39.53 ± 13.1 years. Maximum patients were male 10(66.7%), rest of the patients 5(33.3%) were female. Male female ratio 2:1. Male patients were predominant in this study. Al-Moktader et al.^[13] conducted a study included ten patients were men and five patients were women with age range 13 to 55 and mean age 39.3 ± 14.42 years, which correlate well with present study. RTA (26.7%) was the main aetiology of soft tissue defect in this study. Masoodi Z et al,^[14] also observed Road Traffic Accidents as the most cause of leg defects reconstructed with this flap. Reported road traffic accident was the most common etiology of the soft tissue defects (68.8%).^[15] In the present series, the most common site was popliteal fossa 7(46.7%). Al Moktader et al,^[13] reported involved site (40%) was popliteal fossa. Findings of this study are consistent with that study. In this study functional outcome of knee joints was measured by goniometer. In this study 13 patients had full range of movement of knee joints, 5-10 degree

restricted in 2 patients. In the study of Sahasrabudhe et al,^[12] out of eight patient, six patients achieved full functional range of motion by 3 months. One patient had a 10° limitation of knee extension. One patient had foot drop due to primary injury and walks with a limping gait. Preoperative Doppler examination is mandatory, in this study Doppler examination was done before a tourniquet was applied. Wiedner et al,^[10] reported the flap was elevated under tourniquet control without exsanguinations, so, that the pedicle would be clearly visible. This was also done in present study. In this study the tourniquet was released with the flap in its native position and the flap is allowed to perfuse for 10 to 15 minutes. The flap was then rotated into the defect and anchored loosely to the edges of the defect. The sutures were removed after 2 weeks and patients were allowed to resume normal activities. It was similar to the other studies. In conclusion, the lateral genicular artery flap has been shown to be effective to recover lateral and superior defects of the knee. There are of rotation, however, was limited for the medial and inferior regions of the knee. In these cases, the gastrocnemius muscle flap is a more appropriate choice to treat such defects. A disadvantage of the lateral genicular artery flap, as compared to dissection of the gastrocnemius muscle flap, is the need for a more accurate surgical technique, especially if intramuscular dissection is needed. Under these circumstances, the use of optical magnification is recommended to ensure greater safety.

Limitations of the study

Sample size was not sufficiently enough to make a firm conclusion. It was a single center study. Duration and follow up period were



short. Selected co-morbid patients were excluded from this study. Preoperative functional outcome could not be assessed.

CONCLUSION

Majority of the patients gained full range of knee movement after Superior Lateral Genicular Artery Flap surgery of soft tissue reconstruction around knee. The successful knee reconstruction requires the appropriate selection of the various available methods, a careful preoperative planning, a meticulous surgical technique and a close postoperative

monitoring. Perforator flaps represent a reliable and elegant option for the reconstruction of the soft tissue defects of the lower limb, due to the limited donor site morbidity, to the relatively rapid dissection and flap elevation, and to the reliable skin territory. The lateral genicular artery flap represents a useful procedure for reconstruction of anterior, antero-lateral knee defects and popliteal defect, as this cutaneous flap brings pliable, supple and flexible cutaneous tissue, similar to the original skin, without bulk or irregularities. Large sample size should be taken and follow up period should be long.

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