

Case Series

Outcome of latissimus dorsi free flap in-case of large scalp defect a single center study

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ABSTRACT

Reconstruction of scalp and calvarial defects following trauma post burn and after tumor ablation frequently requires prosthetic cranioplasty and soft tissue coverage. Furthermore, patients often have advanced disease and receive perioperative radiotherapy following tumor ablation. We evaluated the outcome of scalp reconstruction in traumatic cases with a free Latissimus dorsi (LD) muscle flap in this setting. The aim of this study was to evaluate outcome of latissimus dorsi free flap in-case of large scalp defect. This prospective non-randomized study was conducted on 10 patients with scalp defects following trauma attended emergency unit and outpatient department of burn and plastic surgery, Dhaka medical college hospital (DMCH) in the period between July 2017 and June 2018. Durability of coverage, flap success, infection and overall satisfaction were studied. The age distribution of the study population shows highest number of patients (60%) were in middle (24-30 years) age group whereas lowest are in older group (30-50 years). The lowest age was 24 years and the highest age was 45 years. Highest number of patients (80%) were standard myocutaneous type of flap whereas lowest were in (20.0%) were partial latissimus muscle flap. Outcome of the reconstruction (80.0%) were excellent 10% partial flap necrosis occur and total flap loss in 1 (10%) patient. The reconstruction of scalp defects continues to be a challenge for the reconstructive surgeon, who must achieve a satisfactory functional and aesthetic outcome.

Keywords: Latissimus dorsi, Scalp, Soft tissue, Reconstruction

INTRODUCTION

Trauma and tumor resection are the most common causes of scalp defects. Infections, congenital lesions and necrosis after irradiation for neurological disorders are among the other causes. Because direct closure is usually not possible due to the lack of stiffness of the scalp, a split-thickness skin graft is a simple treatment in cases when the pericranium is intact. Local or free flaps are required for adequate coverage when the periosteum is denuded or when there is a skull defect. Various local

flaps based on the superficial temporal or occipital arteries and free flaps including bone are available for reconstruction.¹⁻¹⁶ Scalp defects were reconstructed with free flaps to evaluate the justification and efficacy of this treatment modality.

CASE SERIES

This case series study was conducted on 10 patients with scalp defects of different causes attended emergency unit and outpatient clinic of department of

burn and plastic surgery, DMCH in the period between July 2017 and June 2018. Durability of coverage, flap success, infection, pain and overall satisfaction were studied. Inclusion criteria were full thickness scalp loss with loss of pericranium or bone exposed following trauma and presence of adequate recipient vessel identified by hand held Doppler probe. Exclusion criteria were exposed dura or full thickness loss of bone, CSF leakage with potential injuries to the pedicel of both the donor and recipient site due to previous trauma or surgery, patients with significant major comorbid medical condition. In our series superficial temporal artery (7 cases), occipital artery (2 cases) and facial artery (1 cases) used as recipient vessels. No vein graft required for micro anastomosis. Other necessary investigations were done if clinically indicated and to prepare the patient for anesthesia. Statistical analysis of the results was obtained by using window-based computer software

devised with statistical packages for social sciences (SPSS-24).

Highest patients (60%) were in middle (20-30 years) age group whereas lowest were in older group (31-50 years). The lowest age was 24 years and the highest age was 45 years. Highest number of patients (80%) were standard myocutaneous type of flap whereas lowest were in (20.0%) and partial latissimus muscle flap. Wound infection occurred in 2 (10%) case, partial flap necrosis occurred in 1 (10%) cases. Eight (80%) cases healed without any complications. There were one case of total flap loss. In our study lowest wound size was 105 cm² and highest dimension was 286 cm². Lowest flap dimensions were 112 cm² and highest dimension were 308 cm², wound infection were managed by antibiotics and partial necrosis of flap managed by debridement and dressing. Donor site morbidity were minimum. Duration of hospital stay were not studied in this series.

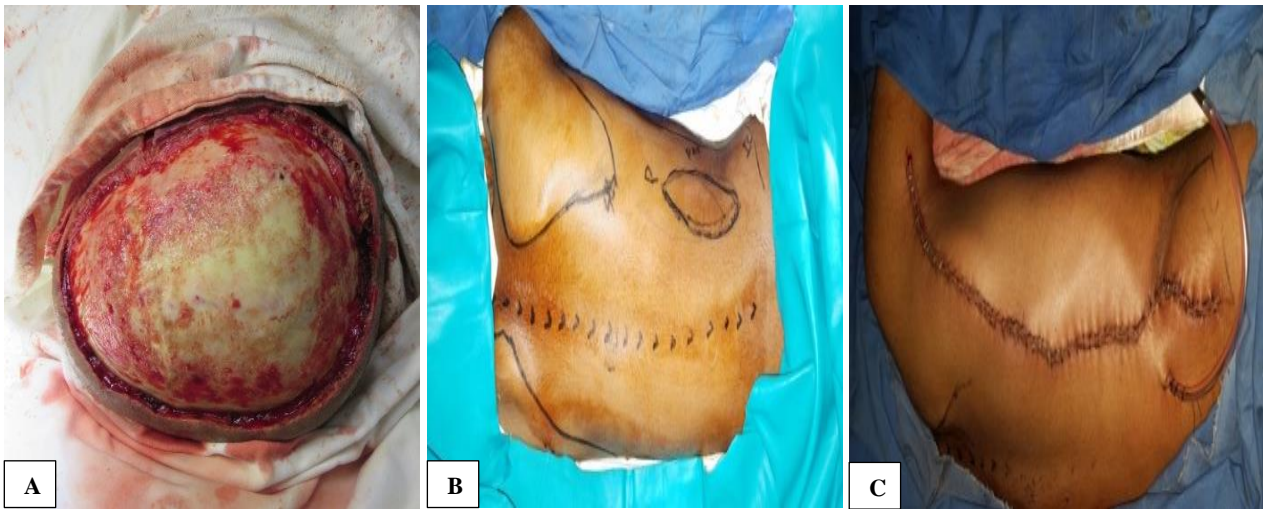


Figure 1: (A) Degloving wound over skull; (B) LD flap designing; (C) donor site closure.



Figure 2 (A and B): LD flap inset on 5th POD.

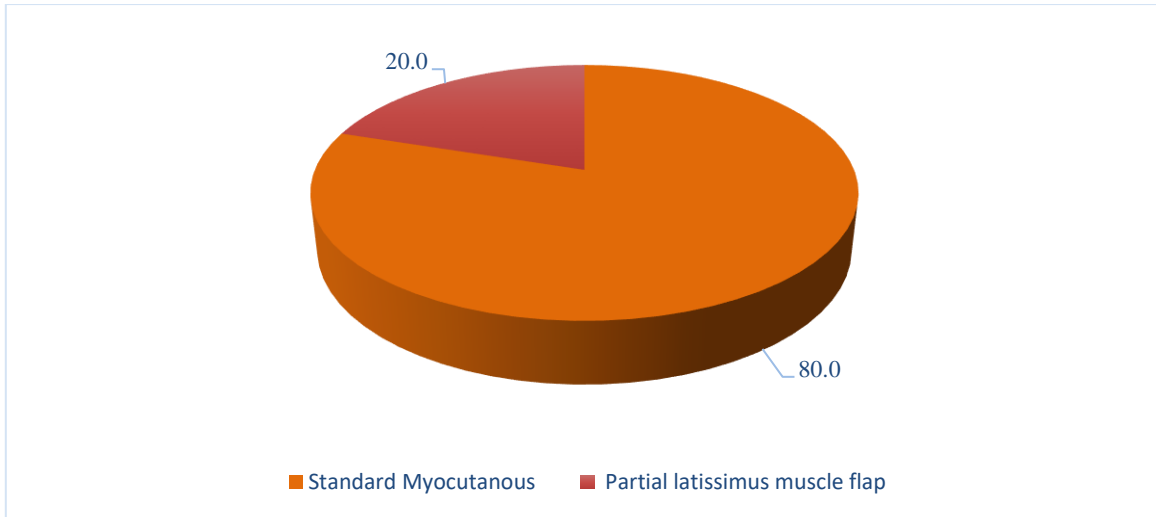


Figure 3: Distribution of patients according to type of flap (n=10).

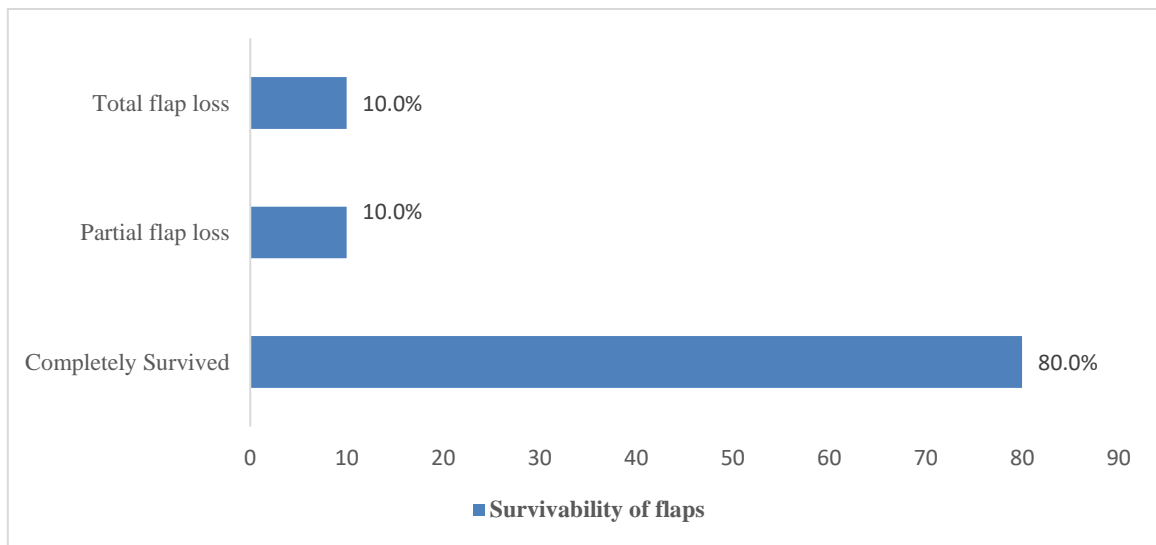


Figure 4: Distribution of patients by survivability of flaps (n=10).

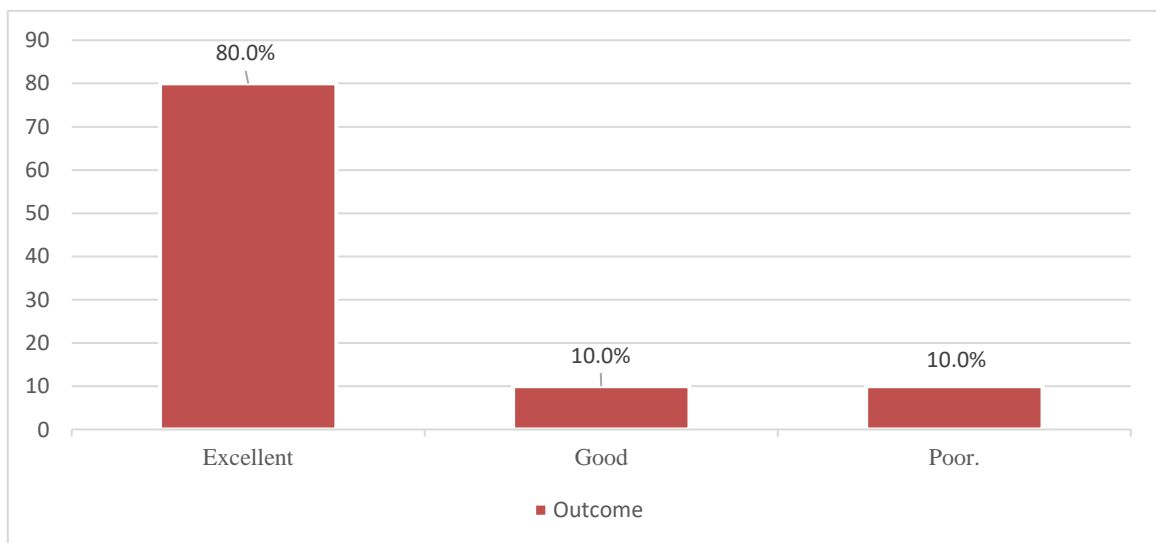


Figure 5: Outcome of reconstruction (n=10).

Table 1: Age distribution and demographic characteristics of the study (n= 10).

Characteristics	N	%
Age group (in years)		
24-30	6	60.0
31-40	2	20.0
41-45	2	20.0
Mean±SD	35.65±10.81	100.0
Range	24-45	
Sex distribution		
Male	2	20.0
Female	8	80.0
Education		
Primary	4	40.0
Secondary	4	40.0
Higher secondary	2	20.0
Occupation		
Labour/worker	6	60.0
Others	2	40.0

Table 2: Distribution of patient according to donor site morbidity (n=10).

Nature of complications	N	%
No morbidity	6	60.0
Wound dehiscence	2	20.0
Wound infection	2	20.0
Total	10	100.0

DISCUSSION

Skin, subcutaneous tissue, galea aponeurosis, loose areolar tissue and pericranium are the five anatomical layers of the scalp, which can be remembered to use the mnemonic scalp.¹⁷ The frontalis and occipitalis muscles were separated by the galea, which extended laterally as the temporoparietal fascia. The thickness (3-8 mm), inelasticity due to the galea and pericranium and hair-bearing quality were all characteristics of scalp tissue. While the scalp's thickness made it a good candidate for split-thickness skin grafting, the latter two qualities complicated primary closure and make reconstruction look unattractive.

Scalp abnormalities can occur as a result of burns, trauma, prolonged postsurgical infection or scarring or tumor resection and can impact any number of scalp layers. Due to the requirement for considerable excision, which may include the calvarium, the risk of disease recurrence and radiation-induced tissue necrosis, scalp neoplasms pose significant reconstructive problems.¹⁸ Reconstructive options vary on the basis of the location and size of the defect and careful preoperative characterization of the wound was essential for successful reconstruction.^{17,19} Partial-thickness wounds can heal by secondary intention and may benefit from split thickness skin grafting if there was intact pericranium or fascia to

serve as a vascularized wound bed, particularly if the defect was large or in a highly visible area.

For full-thickness wounds, primary closure was sufficient for small defects (25 cm²) may require multiple or larger rotation flaps, tissue expansion or free tissue transfer (FTT). FTT allowed for a single-stage reconstruction and was also favored in cases involving infected calvarium or irradiated tissue.¹⁸ Free tissue transfer-based scalp reconstruction with an omental flap was first described by McLean et al in 1972 and had since been accomplished with the LD muscle flap, anterolateral thigh flap, radial forearm flap, rectus abdominus muscle flap, scapular flap and serratus muscle flap.²⁰ Because of the huge size of the LD muscle and the possibility for broad coverage, the LD muscle flap was one of the most preferred flaps for scalp reconstruction. The flap can be used in conjunction with a skin graft to create an artificial outcome, and it had a long and durable vascular pedicle. Anastomoses with superficial temporal or occipital and facial vessels were recommended.¹⁸

In this study all patients were post-traumatic full thickness defect of scalp with bone exposed. Wound defect was minimum 120 cm² and maximum 308 cm² in size. In traumatic patient usually recipient vessels for micro anastomosis was intact than other causes of scalp defect. In case of exposed bone, muscle flap was best choice due to good blood circulation and antibiotic can reach that area to combat infection. In our study highest number of partial in 20-30 years group as because they were potential workers and had a chance an expose trauma. Surprisingly female were predominant in this study because in our country garments worker were mostly females. Lowest flap dimensions were 112 cm² and highest were 308 cm².

In this study, superficial temporal artery (n=7), occipital artery (n=2), facial artery (n=1) used as recipient artery. Out of 10 cases, 7 patients had excellent recovery in terms of flap survival, flap adhesion and had no infection. In two cases wound infection occurs, out of these 1 case had partial necrosis of flap which had treated with debridement and antibiotic according to culture and sensitivity. Total flap loss occurred in one case due to postoperative venous thrombosis started on 2nd POD and on 4th postoperative day re-exploration done but failed. Skin graft was done to manage the wound temporarily.

One of the most well-known complications of the LD flap was donor site seroma, with a reported rate of formation ranging from 9% to 80% depending on the dissection and fixation technique.⁶ Regardless of the reconstructive material, simultaneous calvarial and scalp reconstruction had been shown to be feasible without a significant increase in complications.^{18,20,21}

The present series was conducted in a very short period due to time constraints and funding limitations. The small sample size was also a limitation of the present study.

CONCLUSION

LD free muscle flaps are useful with high versatility for a range of defects and complex reconstructive problem. It contains maximum tissue components and can be tailored to fulfill the recipient site requirement. Flap is easy to dissect, anatomical variation is rare, long pedicle length which allow to anastomose with suitable recipient artery and finally donor morbidity is negligible. For larger and complicated scenario, chimeric flap can be used but must always be made prudently, as the surgical procedures are technically sophisticated and represent the complex end of the reconstructive ladder. Nevertheless, if the defects involve multiple regions of important functional areas, LD-serratus anterior chimeric flap may be an alternative.

Recommendations

This study can serve as a pilot to a much larger research involving multiple centers that can provide a nationwide picture, validate regression models proposed in this study for future use and emphasize points to ensure better management and adherence.

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Ethical approval: Not required

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