

Scalp defects and their reconstruction in patients at Allama Iqbal Memorial Teaching Hospital, Sialkot

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Abstract

Background Scalp defect repair can be done in a number of ways depending on the depth, site and size of the defects.

Objective To study the various characteristics of patients presenting with scalp defects at Allama Iqbal Memorial Teaching Hospital, Sialkot and the reconstruction methods used in these patients.

Methods 14 Patients with scalp defects underwent reconstruction with local flaps, skin grafting and primary closure.

Results 10 men and 4 women participated in the study. Wound size varied from large (20-50cms), very large (50-100cm) and extremely large (>100cm). Defects were treated with primary closure, rotation flap, advancement flap and bipedicle flap. Most of the defects in men were traumatic in nature.

Conclusion Strong knowledge of the anatomy of the scalp is required for obtaining successful results.

Key words

Scalp defects, rotation flap, trauma.

Introduction

Scalp defects are not uncommon and caused mostly by trauma, oncologic excisions, electric burns etc. these defects differ in depth from superficial only to bone exposed wounds.^{1,2} The repair of scalp defects is not simple because of tough, fixed scalp layers. The reconstruction of such defects depends on their depth; location and size.³ There are a number of local tissue techniques to reconstruct, single or multiple flaps, and with or without skin grafting to close

the donor defects. Single flaps examples are rotation and transposition flap while triple flap by orticochea and pin wheel flaps are multiple flap technique.² The rotation flap is a smart choice to cover medium sized defects without creating the donor site defect.⁵ However, large sized defects cannot be reconstructed with rotation flaps and need transposition flap which will end up with a large donor site defect requiring skin grafts.⁷

Methods

During the period from August 2015 to August 2019, 14 Patients with scalp defects underwent reconstruction with local flaps, skin grafting and primary closure at Allama Iqbal Memorial

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Teaching hospital, Sialkot. The wound etiology varied: post traumatic wounds (n=11); Squamous cell carcinoma in XP patient (n=1), Neurofibroma (n=2), Electric burn (n=3), scalp avulsion due to fodder cutting machine injury (n=3). This is a retrospective analysis of patients operated for scalp and forehead defects. All defects were optimized before surgery and tumor free margins were confirmed before reconstruction.

The following parameters were studied: age, gender, diagnosis, location and size of the defect, reconstruction procedure employed, complications, and current status.

Results

We analyzed parameters such as age, sex, quality of surrounding tissue, and comorbidities. The mean age of the patients was 30.91years (ranging from 05 to 62 years). There were 10 men and 04 women (**Table 1**).

Table 1 Details of patient records.

Sr. no	Age/sex	Cause	Max diameter	Reconstruction method	result	complication
1	25y/F	Benign lesion on scalp...	4cm	Primary closure with scoring	satisfactory	No
2	30y/M	Posttraumatic wound with intact pericranium	6cm	Skin graft	satisfactory	alopecia
3	22/F	Ch. Scar on scalp	3.5 cm	Pin wheel flap	satisfactory	No
4	12/M	Trauma	6cm	Rotation flap	satisfactory	No
5	45/M	Trauma	11cm vertex	Orticochea 3 flap	dehiscence	Burr hole in outer table, secondary skin grafting
6	11/M	Neurofibroma scalp	7 cm	Rotation flap	satisfactory	No
7	5y/M	Post traumatic	5cm	Rotation flap	satisfactory	No
8	18/M	Excision biopsy of benign lesion	3cm	Pin wheel flap	satisfactory	No
9	55/F	Scalp avulsion by fodder cutting machine	Sub Total scalp	Skin grafting on pericranium	satisfactory	No
10	56/M	Trauma	Partial thickness	Split skin grafting	satisfactory	alopecia
11	11/M	Trauma	6cm	Rotation flap	satisfactory	No
12	19/F	Avulsion by fodder cutter	Total scalp except posterior mastoid area	Referred for microsurgical replantation		
13	62/M	SCC vertex (known case of xeroderma pigmentosum)	11cm	Transposition flap with skin grafting over donor area	satisfactory	Recurrence in flap at 2 years
14	32/M	Post electric burn	12cm	Transposition flap with skin graft over donor area	Dehiscence at graft flap junction & partial graft loss due to infection	



Figure 1

The quality of the surrounding tissues was categorized as good and satisfactory (when part of it was had cicatrices or superficial burns). Accompanying comorbidities were considered, but were not regarded as contraindications. The final choice of the reconstructive method was determined about wound related parameters: size, location and depth of the defect. The indications for the application of local flaps were based on two factors: the patients' condition and wound parameters.

The defect size was classified into three groups as follows: large, 20 to 50 cm²; very large, 50 to 100 cm²; and extremely large, 100 cm². The location was regarded as peripheral (frontal, temporal, or occipital), central, or combined (more than one area). The depth of the wound was determined to be skin and galea loss; missing pericranium; or bone defect. The types of flaps used in this group were a single large



Figure 2

transposition flap, an advancement flap and a bipedicle flap.

One defect was treated by primary closure where the size of the defect was small, the rest of the defects need one or the other form of flaps. A single large transposition flap was used in 11 patients with a defect size of 20 to 120 cm² and a peripheral or combined (central and peripheral) location. The surrounding tissue was soft and pliable in 8 patients and satisfactory in 4 cases.

An advancement flap was used in 1 patient with a centrally located wound (40 cm²), skin and galea loss only, and elastic surrounding tissue.

A bipedicle flap was used in 1 case with defects located in three areas (frontalis, parietal, occipital) and a size of 391 cm². There was damage to the skin, galea, and pericranium, and the surrounding tissue was of good quality. All



Figure 3

the flaps were planned to be two to three times larger than the measurements of the defect in order to achieve wound coverage without tension. In the case of the bone defect, the calvarium was reconstructed with a prosthetic plate and then covered with a local flap.

The vascular pedicle was based on the right or left occipital artery in 8 of the patients, in 4 cases the superficial temporal and retroauricular arteries were included, and in one patient, the flap supply was provided by the left occipital, right supraorbital and supratrochlear arteries. The flaps were elevated by extensive undermining in the areolar tissues between the galea and the pericranium.

During dissection, care was taken to avoid injury to the periosteum of the calvaria. Whenever there was need of additional tissue gain and

mobility of the flap, we scored the galea at 1-cm intervals in the direction of the flap movement. The donor site was covered with a split-thickness skin graft in 12 of the cases, and in one patient the wound was closed primarily. Vacuum drains and compressive bandages were applied in all patients for 48 hours.

Two patients developed alopecia after the procedure, one patient developed wound dehiscence and partial loss of graft due to infection. No complications of the procedures were observed in the rest of the patients. All the patients were discharged within 7 days.

Discussion

The most common reason for scalp defects found in our study was trauma. This is consistent with various other studies. Traumatic scalp lesions were seen in all age groups leading to the conclusion that no age group is safe from injuries. Most of our patients were males which is also consistent with our cultural norms as males are the ones working outside homes as bread-earners and the cause of the defect was trauma in many cases.

Scalp defects require a detailed analysis of the defect and a complex approach as the repair requires skin from adjacent or distant hair bearing area for the surgery to give a meaningful result. The various options available are therefore local or distant flaps. Local flaps are always a better option as they are compliant with Gilles principle-“replace like with like”. However, when the defects are too large then free microvascularised flaps are the only option for scalp coverage. But, the long operative time and lack of resources for these flaps are the limitations. Hence, as far as possible, local tissues should be used for reconstruction of scalp.⁶ Rotation flaps are the ones which cover the defect and also leave minimal donor site

morbidity.⁶ In our study, we used different methods depending upon the types and size of defects.

Conclusion

To be able to perform a successful graft the performing doctor should have a strong knowledge of the anatomy of the area.

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