RECONSTRUCTION OF SCALP DEFECTS: AN INSTITUTIONAL EXPERIENCESathyanarayana B. C¹, Somashekar Srinivas²**HOW TO CITE THIS ARTICLE:**

Sathyanarayana B. C, Somashekar Srinivas. "Reconstruction of Scalp Defects: An Institutional Experience". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 58, July 20; Page: 10156-10160, DOI: 10.14260/jemds/2015/1464

ABSTRACT: INTRODUCTION: scalp reconstruction comprises a diverse and complex set of defects. The unique properties of the human scalp affect the surgeon's ability to reconstruct defects in this area. Often repair must be performed with minimal disturbance to the eyelid, eyebrow, and hairline. **METHODOLOGY:** This study was conducted in dept. of plastic surgery & burns, bmc & RI from July 2011 to June 2013. 33 patients were included in the study. Data were collected about age, sex, etiology & reconstructive procedure done for each defect. Pts. were followed up for a maximum period of 2 yrs. Techniques used for reconstruction included skin grafts, Local flaps with or without ssg, tissue expansion and closure. **RESULTS:** of the 33 patients 23 were males & 10 were females. Age of patients ranged from 4–74 yrs. etiology of defects included were due to trauma-12, post neurosurgical procedure-8, post tumor excision-5, post animal attack-4, post electric burn-4. Defects were reconstructed with advancement flaps (4 pts), rotation flaps (7 pts), transposition flaps (12 pts), ssg (9 pts) & tissue expansion (1 pt) to correct alopecia in a female pt. minor graft loss and alopecia were the common complications noted in pts treated with transposition flap & ssg. **CONCLUSION:** Important tenets for successful management of scalp defects are adequate debridement, preservation of blood supply and durable coverage. Local scalp flaps remain the mainstay of reconstruction for mild to moderate defects and give superior aesthetic results than skin grafts. Free flaps are an alternative for reconstructing large or total scalp defects. **KEYWORDS:** Flaps, Reconstruction, Scalp defect.

INTRODUCTION: scalp reconstruction comprises a diverse and complex set of defects. The unique properties of the human scalp like rich vascular supply, the ability to withstand wounds of greater tension than other regions, and presence of hair challenges the surgeon's ability to reconstruct defects in this area. Multiple options exist and repair must be performed with minimal disturbance to surrounding structures, such as the eyelid, eyebrow, and hairline. Care must be taken to maintain symmetry between sides.⁽¹⁾ The purpose of this study is to evaluate the etiology and reconstructive procedures for scalp defects.

MATERIALS AND METHODS: This is a prospective study done in the department of plastic surgery and burns, Victoria hospital, BMC & RI. From July 2011 to June 2013. Total 33 patients were included in the study. In this study different reconstruction methods were selected depending on etiology, age and general health of the patient, the size and location of the defect, thickness of the defect, the presence or absence of periosteum, the quality of surrounding scalp tissue, the presence or absence of hair, location of the hairline, limiting co-morbidities of the patient, and the need for immediate or delayed reconstruction.

Data analysed included Age, Gender, Etiology and Location of scalp defects, Reconstructive procedures used and their outcome. Pts. were followed up for a maximum period of 2 yrs. Techniques

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used for reconstruction included skin grafts, Local flaps with or without ssg, burr hole with ssg, tissue expansion and closure.

RESULTS: of the 33 patients 23 were males & 10 were females. Age of patients ranged from 4–74 yrs. etiology of defects included were due to trauma-12, post neurosurgical procedure-8, post tumor excision-5, post animal attack-4, post electric burn-4 (Table 1). Location of the defect is given in table 2. Defects were reconstructed with advancement flaps (4 pts), rotation flaps (7 pts), transposition flaps (12 pts), ssg (9 pts) & tissue expansion (1 pt) to correct alopecia in a female pt. Minor graft loss and alopecia were the common complications noted in pts treated with transposition flap & ssg. No complications were noted in patients treated with rotation or advancement flaps.

Etiology	Number
Trauma	12
Post neurosurgery procedure	8
Post tumour excision	5
Post animal attack	4
Post electric burn	4

Table 1: Etiology of Scalp Defects

Location of defect	Number
Frontal	10
Parietal	2
Vertex	8
Temporal	6
occipital	7

Table 2: Site of scalp defects

DISCUSSION: There are many options for repairing scalp defects. Healing by second intention can be used for small superficial defects of the scalp. Primary closure is another simple option for closing small defects with or without galeal scoring.⁽²⁾

Free skin grafts reconstruction requires an intact pericranium to supply vascularization to the graft. Careful hemostasis of the receptor bed is necessary to improve graft take. In our study 9 patients were reconstructed using skin grafts for large superficial defects in the absence of a pericranium, and if grafting is the only repair option, perforations in the external cortical layer of the skull allow the formation of granulation tissue that would improve the prognosis of the second-step free skin graft. Patient shown in Fig. 4 was treated with burr holes over the outer cortex of skull followed by ssg in 2 stage.⁽³⁾

Local scalp flaps fulfil the basic surgical principal of replacing like with like tissue using simple surgical techniques. These flaps provide tissue with similar colour and texture as of the recipient site. They also prevent or reduce extent of alopecia following reconstruction. In our study 12 patients were treated with transposition flaps, 7 pts with rotation flaps, 4 pts with advancement flaps. Minor graft loss and alopecia were the most common complications noted in patients treated with transposition flaps.

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Few important principles should be applied when using local scalp flaps for reconstruction, the edges of the wound must be carefully trimmed avoiding injury to hair follicles, excessive tension should be avoided in the flap extremities, since localized ischemia with involution of the hair follicles could result in alopecia. Prior local anesthetic infiltration with epinephrine reduces bleeding at the wound edges, and facilitates dissection of the loose areolar plane.⁽⁴⁾ Electrocauterization is to be avoided, in order to reduce thermal damage to the hair follicles. “dog ears” is the most common complication of local flaps but these dog ears should not be resected at same surgical procedure which results in reduced vascularity and increased tension in the flap.

The anteroposterior midline of the scalp is a zone where the vascular territories of both sides of the cranium converge, forming a physiological barrier. It is advisable not to surpass this zone too much when preparing the flap, particularly in the region of the nape of the neck, where skin circulation is less pronounced than at scalp level. In the immediate postoperative period it is advisable to apply slight pressure to the flap, in order to avoid hematoma formation. Excessive pressure is to be avoided, however, since ischemia secondary to compression of the vascular pedicles may result.⁽⁵⁾

Free flaps have many advantages like providing large well vascularised tissue for reconstruction of large composite defects of skull and scalp in single stage, but facility for free flap reconstruction is not available in majority of centers and They have disadvantages like prolonged surgical time, the possibility of total flap loss, morbidity in the donor zone, and the absence of hair on the donor skin.⁽¹⁾

CONCLUSION: Important tenets for successful management of scalp defects are adequate debridement, preservation of blood supply and durable coverage. Local scalp flaps remain the mainstay of reconstruction for mild to moderate defects and give superior aesthetic results than skin grafts. Free flaps are an alternative for reconstructing large or total scalp defects.

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Fig. 1: Bilateral advancement flap for frontal scalp defect

Fig. 2: Transposition flap for occipital defect

Fig. 3: Rotation scalp flap for frontal defect

Fig. 4: Burr holes followed by ssg in scalp defect following animal attack (Bear)

Fig. 5: SSG after excision of scalp vascular malformation

AUTHORS:

1. Sathyanarayana B. C.
2. Somashekar Srinivas

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Surgery, Victoria Hospital, BMC & RI, Bangalore.
2. Post Graduate, Department of Plastic Surgery & Burns, Victoria Hospital, BMC & RI, Bangalore.

FINANCIAL OR OTHER

COMPETING INTERESTS: None

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Somashekar Srinivas,
Post Graduate,
Department of Plastic Surgery & Burns,
Victoria Hospital, BMC & RI, Bangalore.
E-mail: skms1981@gmail.com

Date of Submission: 12/06/2015.

Date of Peer Review: 13/06/2015.

Date of Acceptance: 09/07/2015.

Date of Publishing: 20/07/2015.