

# Scalp Reconstruction in a Tertiary Care Hospital in Jharkhand, India

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## ABSTRACT

**Introduction:** Loss of scalp can be covered by various methods like skin grafting, local flaps, distant flaps, free flap or tissue transfer. Every method has some advantages and some disadvantages.

**Material and Methods:** Our study was conducted at Department of Surgery RIMS, Ranchi, Jharkhand, India from 6<sup>th</sup> June 2010 to 31<sup>st</sup> January 2017. Scalp reconstruction were performed on 16 patients who lost their scalp from electric burns 4 cases (25%), malignancy 4 cases (25%), road traffic accident and arteriovenous malformation 3 cases each (18.75%), and thermal burns 2 cases (12.25%).

**Results:** Skin grafting were done in most of the patient 5 cases (31.25%), followed by flap advancement in 4 cases (25%), transposition flap 3 cases (18.75%), flap advancement with skin grafting and rotation flap 2 cases (12.25%). Postoperative complication in our series includes alopecia in 7 cases (58.33%), dog ear and partial flap necrosis in 2 cases each (16.66%), and partial skin graft necrosis in 1 case (8.33%).

**Conclusion:** In cases of rotation flap there were no complication and the best outcome in terms of aesthetic acceptance and durability in comparison to other procedure.

**Keywords:** Scalp Reconstruction, Transposition Flap, Rotation Flap, Flap Advancement, Skin Grafting

## INTRODUCTION

It is very challenging to cover the scalp as it remains uncovered with clothing and scalp lacks laxity and primary closure of wounds more than 3-4 cm<sup>2</sup> is often not possible. Scalp has hairs so can be camouflaged by hairs easily. Most of the scalp is relatively inelastic, so repair by primary closure is difficult. These properties affect the surgeon's ability to reconstruct the defect of scalp. Knowledge of anatomy and variety of reconstructive options and individual need makes it more challenging.

## MATERIAL AND METHODS

In our prospective observational study conducted at Department of Surgery, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India from 6<sup>th</sup> June 2010 to 31<sup>st</sup> January 2017, after getting clearance from Departmental Ethical and Research Committee. An informed consent was taken from study subject. Scalp reconstruction was done in 16 patients, wounds of 9 cm<sup>2</sup> to 200 cm<sup>2</sup> were reconstructed with different surgical procedures. Free flap and tissue expansion were excluded from our study due to lack of logistic support. All the variables were noted in pre designed proforma, such as age, sex, procedure performed and postoperative complications. Culture and sensitivity of the wounds done for proper antibiotic coverage pre and post operatively for all the cases.

**Statistical analysis:** Our study was an observational study, so have used MS Excel format for compilation of data. Tables were made with the help of MS Excel. Mean and percentage were

used to interpret the data.

## RESULTS

Among 16 patients, 12 were males and 4 were females, most of the patients were in the age group of 11 to 40 years (Table-1), probably due to most active and independent age group. Size of the defects ranged from 9 cm<sup>2</sup> to 200 cm<sup>2</sup>. The causes of scalp defect were electric burn and malignancy 4 cases (25%) each, road traffic accident and arteriovenous malformation 3 cases (18.75%) each and thermal burns 2 cases (12.50%) (Table-2). Skin grafting was the most common procedure performed 5 cases (31.25%), flap advancement was the 2<sup>nd</sup> most common procedure performed, and 3<sup>rd</sup> in the frequency was transposition flap and 4<sup>th</sup> were rotation flap and flap advancement with skin grafting (Table-3). The postoperative complication seen in our series were alopecia in 10 cases (66.66%), dog ear and partial flap necrosis 2 cases each (13.33%) and partial skin graft necrosis in 1 case (6.66%) (Table-4). Alopecia was common in all the procedures except in flap advancement and rotation flap where no skin grafting was done (Table-5).

## DISCUSSION

Knowledge of anatomy of scalp is very important for the reconstruction of scalp, limited elasticity makes it difficult to cover medium to large size defect.<sup>1</sup> Although its rich blood supply makes flap cover either rotation or transposition a good option. As for the other defect, reconstructive ladder should be considered first.<sup>2</sup> All the procedure has some advantages and some disadvantages, by skin graft large defect can be covered but with exposed skull its roll becomes less favourable, and it has the disadvantage of alopecia also. Different flaps can be used to cover exposed skull. Transposition flap can cover large defect but need skin graft to cover donor site. Flap advancement and flap advancement with skin graft has the disadvantage of flap necrosis and alopecia in the skin grafted area. Rotation flap needs precise planning and surgical skill with long operating time, but has the best cosmesis and no alopecia. Tissue expansion is good option for scalp reconstruction<sup>3</sup> but cost of tissue expander, previously irradiated area, limitations in case of malignancy, burns, infection and time it takes for expanding the skin makes it a less used choice in country like ours. Free flap is also a very good choice but needs expertise in microvascular surgery,

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Age (years)	Number of cases	Percentage
0-10	2	12.50
11-20	4	25.00
21-30	5	31.25
31-40	2	12.50
41-50	1	6.25
51-60	1	6.25
61-70	1	6.25
Total	16	100

**Table-1:** Distribution of age

Cause of defect	Number of cases	Percentage
Road traffic accident	3	18.75
Electric burns	4	25.00
Thermal burns	2	12.50
Malignancy	4	25.00
A-V malformation	3	18.75
Total	16	100

**Table-2:** Distribution of the causes of the defect

Procedure	Number of cases	Percentage
Skin graft	5	31.25
Flap advancement with skin graft	2	12.50
Flap advancement	4	25.00
Transposition flap	3	18.75
Rotation flap	2	12.50
Total	16	100

**Table-3:** Distribution of procedure performed

Complications	Number of cases	Percentage
Dog ear	2	13.33
Alopacia	10	66.66
Partial skin graft necrosis	1	6.66
Partial flap necrosis	2	13.33
Total	15	100

**Table-4:** Complications of the procedure

Name of operation	Number of cases	Total number of complications	Percentage
Skin graft	5	5 AA + 1 GN = 6	40.00
Flap advancement with skin graft	2	2 AA = 2	13.33
Flap advancement	4	2 FN = 2	13.33
Transposition flap	3	3 AA + 2 DE = 5	33.33
Rotation flap	2	0	0.00
Total	16	15	100

AA = Alopacia; DE= Dog ear; GN = Partial skin graft necrosis; FN = Partial flap necrosis

**Table-5:** Procedure wise complications

various free flaps have been described for scalp reconstruction based on different vessels.<sup>4-7</sup>

## CONCLUSION

In conclusion it can be said that with skin graft and local flaps we can reconstruct almost all the defect, but has disadvantage of alopacia, rotation flap has the best result, free tissue transfer and tissue expansion has its limitation, because it requires special surgical skill and training.

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