

Original Research

A clinical study of various methods of reconstruction of scalp defects and its outcomes

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ABSTRACT

Background: Assessment of various methods of reconstruction of scalp defects and its outcomes.

Materials & methods: A total of 50 patients were enrolled. Complete demographic and clinical details of all the patients was obtained. A Performa was made and detailed medical history of all the patients was recorded. Only those patients were enrolled who were scheduled to undergo scalp reconstruction. Reconstruction methods were classified according to the etiology of the defect and were compared for each etiology. All the results were recorded and analysed using SPSS software.

Results: Wound aetiology was recorded as defect related factors. Malignant resection was the cause in 56 percent of the cases. Direct closure was done in 48 percent of the patients while skin graft was done in 24 percent of the patients. Local flap was done in 16 percent of the patients. Regional flap was done in 4 percent of the patients.

Conclusion: Certain factors are likely to influence the selection of reconstructive technique like the size and location of the defect in the scalp, whether the pericranium is intact to take up skin grafts, and quality of the adjacent scalp tissue.

Key words: calp, Defect, Outcome

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INTRODUCTION

Scalp defects may occur following trauma, radiotherapy, oncologic resection, and recurrent surgeries. The hair-bearing scalp has a dual role, which consists of protecting the calvarium and contributing to esthetic appearance. While the "reconstructive ladder" approach may be used to close small and medium-sized scalp defects, it is not the case for larger ones involving the calvarium or with a radiation therapy history. Primary closure may be sufficient to close a small defect. A larger one with a suitable wound bed may be closed with a skin graft but will result in alopecia and a depressed appearance. As they permit replacing like with like, local flaps are usually a more suitable option to reconstruct medium-sized and even large defects since the orbitochea flap has been described.¹⁻³ Tissue expanders are another

option to reconstruct scalp up to 50% with similar tissue. Meanwhile, the need for an intact calvarium and the two-staged approach limit tissue expanders' application in malignancy cases. It is also well known that increased complication rates are associated with expansion of irradiated tissue.⁴⁻⁶ Scalp reconstruction after oncologic resection and radiation therapy remains a challenge in head and neck reconstruction owing to the specific vascularization patterns of the scalp and the poor elasticity of the soft tissues. Primary closure, second intention healing, tissue expanders, skin grafts, and local and regional flaps are the classic methods for the reconstruction of defects that are not very extensive.^{7,8} Hence; the present study was conducted for assessing various methods of reconstruction of scalp defects and its outcomes.

MATERIALS & METHODS

The present study was conducted for assessing various methods of reconstruction of scalp defects and its outcomes. A total of 50 patients were enrolled. Complete demographic and clinical details of all the patients was obtained. A Performa was made and detailed medical history of all the patients was recorded. Only those patients were enrolled who were scheduled to undergo scalp reconstruction. Reconstruction methods were classified according to the etiology of the defect and were compared for each etiology. All the results were recorded and analysed using SPSS software.

Table 1: Causes

Causes	Number	Percentage
Malignant resection	28	56
Post-traumatic soft tissue defect	10	20
Burn scalding	12	24

Table 2: Reconstructive procedures

Reconstructive procedures	Number	Percentage
Direct closure	24	48
Skin graft	12	24
Local flap only	8	16
Local flap + Skin graft	4	8
Reginal flap	2	4

DISCUSSION

Scalp reconstruction is an “ordinary challenge” for the daily activity of the plastic surgeon and the skin surgeon. Due to high sun exposure and increased mean survival rates, the scalp is an anatomic region where skin cancers grow easily. Primary malignant tumors of the scalp are most frequently epithelial in origin; however, tumors from adnexal and connective tissue elements also occur. Also, as first shield of the cranial bone, in domestic accidents it could be exposed in trauma more often comparing the real encephalic trauma. Burns, pressure sores, or malformation diseases occur quite often and give more easily destruction of the soft tissue cover than the cranial bone. The scalp being the superior border of the body, is many a times exposed to insults from the environment. As the scalp usually lacks clothing coverage, it is more commonly susceptible to burns and other trauma that cause extensive disfigurement and scarring. It is also the site for a variety of benign and malignant neoplasms, due to prolonged sun exposure. The factors influencing decision making in the repair of scalp defects are their size, depth and location. Another vital factor in deciding the management is the nature of the defect. In case of a tumour excision the bone may be removed sometimes requiring a complex reconstructive technique. The type of flap needed to cover the defect is also influenced by the integrity of the surrounding scalp tissue.⁷⁻¹⁰ Hence; the present study was conducted for assessing various methods of reconstruction of scalp defects and its outcomes.

RESULTS

Out of 50 patients, 60 percent were females while the remaining 40 percent were males. Mean age of the patients was 33.2 years. Wound aetiology was recorded as defect related factors. Malignant resection was the cause in 56 percent of the cases. Direct closure was done in 48 percent of the patients while skin graft was done in 24 percent of the patients. Local flap was done in 16 percent of the patients. Reginal flap was done in 4 percent of the patients.

Out of 50 patients, 60 percent were females while the remaining 40 percent were males. Mean age of the patients was 33.2 years. Wound aetiology was recorded as defect related factors. Malignant resection was the cause in 56 percent of the cases. Innocenti, Aet al reported 10-years experiences in microsurgical reconstruction of major scalp defects, comparing outcomes, evaluating complications. The average age was 55.1 years ranging from 6 to 87 years. The mean follow-up was 16.7 months ranging from 12 to 24 months. The size of the lesions ranged from 9x10 to 16x20cm. The average hospital stay was 20 days ranging from 8 to 43 days. Mean operative times was 5.3 h ranging from 5 to 6.45 h. Free flaps included 8 Latissimus Dorsi flaps (LD) and 2 anterolateral thigh flaps (ALT). The superficial temporal vessels were used as recipient vessels in 9 cases while the superior Thyroid artery was used in remaining case. For large or complex lesions, the use of free flaps is mandatory. Nowadays LD and ALT flaps are among the most common reconstructive choices for scalp defects reconstructions. Older age does not contraindicate the operation procedure nevertheless in younger patients the size of vessels is proportionately larger and pristine. Microvascular free tissue transfer is the mainstay of scalp defects coverage.¹⁰

Direct closure was done in 48 percent of the patients while skin graft was done in 24 percent of the patients. Local flap was done in 16 percent of the patients. Reginal flap was done in 4 percent of the patients. Jang, H. Uet al examined patients who underwent scalp reconstruction within the last 10

years. The study evaluated several factors that surgeons use to select a given reconstruction method such as etiology, defect location, size, depth, and complications. An algorithmic approach was then suggested based on an analysis of these factors. Ninety-four patients were selected in total and 98 cases, including revision surgery, were performed for scalp reconstruction. Scalp reconstruction was performed by primary closure (36.73%), skin graft (27.55%), local flap (17.34%), pedicled regional flap (15.30%), and free flap (3.06%). The ratio of primary closure to more complex procedure on loose scalps (51.11%) was significantly higher than on tight scalps (24.52%) ($p = 0.011$). The choice of scalp reconstruction method was affected significantly by the defect size ($R = 0.479$, $p < 0.001$) and depth ($p < 0.001$). There were five major complications which were three cases of flap necrosis and two cases of skin necrosis. Hematoma was the most common of the 29 minor complications reported, followed by skin necrosis. There are multiple factors affecting the choice of scalp reconstruction method.¹¹

CONCLUSION

Certain factors are likely to influence the selection of reconstructive technique like the size and location of the defect in the scalp, whether the pericranium is intact to take up skin grafts, and quality of the adjacent scalp tissue.

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