SCALP AS A DONOR SITE FOR SPLIT THICKNESS SKIN GRAFTS

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Background: Use of scalp as a donor site was reported for the first time in 1964. Since then, authors have described scalp as a donor site, which heals rapidly and re-growth of hair conceals the donor site. This study was aimed at evaluation of scalp as donor site by calculating the healing time, and frequency of post-operative complications. **Methods**: This was a descriptive study and was conducted at Plastic Surgery Department Jinnah Hospital, Lahore, from October, 2006 to December 2007. Thirty patients requiring split skin grafting for small to moderate sized defects (requiring up to 4 sheets) were included in this study. After taking informed consent skin graft were taken from the scalp using Zimmer Electric Dermatome. Donor site was covered with occlusive dressing. Donor site healing time and complications were recorded. Patients having scalp lesions were excluded from the study. **Results:** All the patients in this study achieved healing of the donor site. None of them required grafting. 26 (86.67%) patients achieved healing by 6th post-op day.3 (10.0%) patients achieved healing by 10th post-op day and the remaining 1 (3.33%) patients achieved healing by 20 days. Complications noted were folliculitis in 2 patients and scab formation in 1 patient. Alopecia, hair transplant to recipient site and hypertrophic scarring was not encountered in our study. Patients were discharged by 6th post operative day and complications were managed on outpatient basis. Overall patients' compliance and satisfaction was excellent. **Conclusion:** scalp is an excellent donor site for taking split skin graft. It has shown to be very useful in terms of quick healing, convenient post-op care and negligible complications. It should be given preference when donor site for taking skin graft is to be selected.

Key words: Split thickness skin graft, Scalp, Donor site.

INTRODUCTION

Split skin grafts are used in most of burns, reconstructive procedures and extensive wound management.[1] It remains the most workable option in many conditions.[2] Donor site morbidity is always a consideration in site selection. Many donor sites have been tried like thigh, buttocks, abdomen and scalp.[3] Donor site which heals rapidly, be less painful, leaves no scars, and has low complication rate should be the site of choice for the surgeon.[4]

Use of scalp as a donor site was reported for the first time in 1964.[5] Since then, authors[2] have described scalp as a donor site, which heals rapidly and re-growth of hair conceals the donor site. Potential complications are minor in adults.[7] In burn patients, exposed donor site, may aggravate the patient's condition. In such patients scalp appears as safe, reliable and truly hidden donor site.[3] It can also be useful in extensively burn patients where donor site is limited and especially in children.[8] Due to these reasons there is sometimes more pressing need to use scalp as donor site in children. The importance and usefulness of scalp donor site increases from the fact that it can be harvested multiple times with minimal morbidity. Some studies have quoted sequential harvesting from scalp up to ten times with mean interval of six days.[9] The characteristic of rapid wound healing and multiple harvest capacity make it an excellent donor site. No hypertrophic scars were seen in patients even with large number of repeat harvests. Bleeding which is the main immediate complication can be limited to 50 ml. by intra-dermal injection of epinephrine and epinephrine soaked gauze compression.[4]

Good colour match is desirable for facial grafting, where scalp is the donor site of choice. Its post operative pain is minimal and dressing is convenient for the patient.[10] Hair transfer to face is not a widely reported problem and is related to thick grafts and multiple harvests.[11]

Scalp grafts have fewer complications than from thigh grafts. Scalp epithelializes faster. The cost for dressing changes and staff required is less. Pain is minimal and there is no scarring or alopecia.[12] Harvesting a scalp graft can be more difficult.[13] Sub-galeal injection of fluid is recommended to stabilize the scalp.[8] Concrete scalp is a reported complication in some of the studies.[14,15] Most of them heal by removing dried granulation[14] and might be related to desiccation of the donor site wound.[15] To avoid this complication, occlusive dressing have been used with rapid healing and prevention of this complication.[15,16]

All the above mentioned qualities make it the most advantageous donor site. Aesthetic drawback of head shaving can be attenuated by proper counselling, detailed explanations of the procedure, and expected advantages.[17]

PATIENTS AND METHODS

This study was conducted in Plastic Surgery Department Jinnah Hospital, Lahore, from October,

2006 to December 2007. It was a descriptive study including thirty patients. All these patients required split thickness skin grafts of small to moderate size (up to 4 sheets of graft). Patients having scalp lesions or who refused to allow head shaving were excluded. Patients selected for the study were counselled regarding donor site preparation and post-operative care. Informed consent from the patients was taken before surgery. Head shave was done a day before surgery.

Patients were operated in supine position with head end raised. Scalp was infiltrated with 1:100,000 adrenaline in normal saline (Figure-1). It stabilizes the scalp for graft harvest and secondly it minimizes bleeding. Zimmer Electric Dermatome was used for harvesting skin grafts (Figure-2). Graft thickness was set at 0.010 to 0.012 inch. After harvesting the graft, donor site was covered with adrenaline soaked gauze for five minutes. After removing the gauze and ensuring haemostasis, occlusive dressing was applied, and scalp was dressed with sterile gauze and crepe bandage to cover the donor site (Figure-3). Occlusive dressing is then opened on sixth post-op day and wound healing is observed. If there is complete epithelialization then donor site is left open and if healing is not complete then donor site is redressed with occlusive dressing.

Problem in healing of donor site is noted. All healing problems were successfully managed conservatively and no secondary surgical intervention was required. Healing was achieved by redressing the donor site.

RESULTS

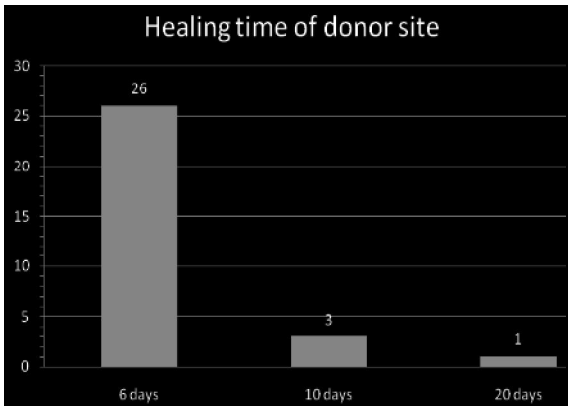
All the patients in this study achieved donor site healing without the requirement of donor site grafting (Figure-4). Twenty-six (86.67%) patients achieved healing by 6th post-op day. Three (10%) patients achieved healing by 10th post-op day and the remaining 1 (3.33%) patient achieved healing by 20 days (Figure-5). Mean healing time was 6.7 days. Complications noted were folliculitis in 2 patients and scab formation in 1 patient (Table-1, Graph-1). Alopecia, hair transplant to recipient site and hypertrophied scaring was not encountered in our study. Patients were discharged by 6th post op day and complications were managed on outpatient basis. Overall patient's morbidity occurring in two cases was 6.67%.

Early mobilization was easier with head bandage rather than thigh bandage. Duration of dressing was less then half of the conventional donor sites. No post-op hypertrophied scarring was encountered.

The hair grows quickly within two to three weeks and the donor site was concealed. At late follow up, there was normal hair growth pattern (Figure-6). Overall patient's compliance and satisfaction was excellent.

Table-1: Complications

Complications	No. of patients
Folliculitis	2
Scab formation	1
Micro alopecia/ Rarefaction of hair	1
Hypertrophic scarring	0
Alopecia	0
Hair transplant to recipient site	0



Graph-1: Graphical presentation of donor-site healing time (days)

DISCUSSION

Scalp as an excellent donor site is usually overlooked either due to lack of familiarity or fear of complications. Since the first description of its use by Crawford BS[5] it has been utilized by many surgeons.

Quick healing time is observed in our study with mean of 6.7 days. The grafts were harvested only once from the scalp and repeat harvests were not done from the same site. The healing time calculated in our study is consistent with other studies. Mimoun *et al.* have reported healing time of 6.8 days. Some authors have reported even earlier time of healing like 4.8 to 6.3 days by Barnett *et al.*[16] and 6±0.6 days by Barret *et al.* In our study we tried not to remove the dressing before sixth post-op day to ensure undisturbed re-epithelialization. So healing achieved earlier could not be documented. Kloti and Pochon[18] have found healing time in children of 12 to 14 days.

Graft harvesting from scalp is technically more demanding as compared to other sites like thigh[13]. Dermatome is required for taking equal thickness graft[8], as taking split graft by Humby's knife is difficult and there is tendency for unequal thickness graft.

Bleeding is more from the scalp then other sites as reported uniformly by other authors.[7, 17] But in our study we have found excessive bleeding is not a major problem. We have used subgaleal injection of adrenaline, adrenaline soaked gauzes compression and rapid application of occlusive dressing to control the bleeding. Blood loss was around 50 to 100 ml in our series and this is comparable to Chang *et al.*[4]

Figure-1: Sub-galeal infiltration with adrenaline.

Figure-4: Post-op result showing complete healing.

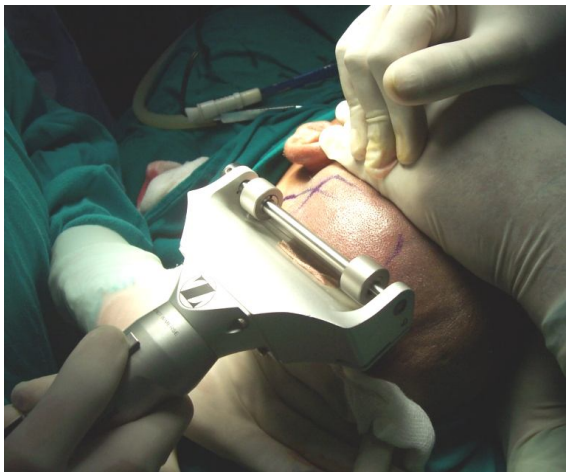


Figure-2: Harvesting split skin graft using Dermatome

Figure-5: Folliculitis involving small area of donor site

Figure-3: Donor site covered immediately with occlusive dressing.

Figure-6: Six months follow-up showing imperceptible donor site.

Better colour match of graft for face and neck area is another advantage of scalp skin grafts.[10] We have found scalp as the best option for facial grafts due to excellent colour match. In scalp, post operative discomfort is less, dressing is easy and duration of dressing is relatively short.[12,13]

Taking split thickness graft from scalp is also advantageous in extreme of ages. In children which are very active and difficult to be confined to bed, scalp donor site is very suitable as problems of dressing slips and loosening is avoided. In elderly patients where early mobilization is needed scalp dressing does not hinder the patients' mobilization.[12] We have also observed this distinct advantage of scalp in our study.

Hair transfer to face and other recipient area is a known complication of scalp grafts.[8] This complication is attributed to thick split grafts. In our study because of thin grafts, no such case was seen. According to Funican *et al*[10] the hair bulb is 2.51 to 2.72 mm deep in scalp, if we keep the thickness of split grafts between 0.010 to 0.012 inch, the chances of hair transplant are negligible.

Alopecia is the most dreaded long-term complication of scalp donor site. Reported incidence in different studies ranges from 0–9%.[6,9,11,13] We have not seen any large area of alopecia, but have noticed alopecia < 0.5 Cm^2 in one of our patient. This patient has developed small area of Folliculitis which healed but resulted in micro alopecia as reported by other studies.[4,17] This micro alopecia was concealed by hair re-growth.

Scar hypertrophy is rare in scalp.[4,8,13] which is its major advantage and makes it a preferable donor site. Only one case has been reported of scalp scar hypertrophy in literature.[18] we did not come across any case in our study.

Two of our patients developed Folliculitis. We were fortunate enough that it involved only part of donor site and healed by antiseptic treatment and dressings. Folliculitis is one complication which is encountered almost uniformly by all authors working on scalp split grafts.[4,8,14,17] Staphylococcus is found in majority of cases.[17] Its pathophysiology is not yet clear. It is attributed to incorrect epithelialization caused by overgranulation.[14] In severe cases surgical debridement and skin grafting is required.[9]

CONCLUSION

Scalp is an excellent site for taking split skin graft. It has shown to be a very useful in terms of quick healing and convenient post-op care. In face and neck it is the site of choice with its better colour match and convenience of dressing. It should be given preference when donor site for taking limited skin graft is to be selected. In terms of donor site complications it has proved to be least morbid. Scalp should always be considered as the best option whenever concealed donor site is the aim.

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