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THE GALEAL PERICRANIAL FLAP FOR RECONSTRUCTION OF LATERAL FOREHEAD DEFECT.

Plastic Surgery

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ABSTRACT

The defects over the forehead are managed according to the size of the wound. The defects which are less than 3 cm could be closed 1,2.For larger defects where pericranium is intact, split thickness skin graft may cover the defect. Galeal and temporoparietal fascial flaps and free flap is used for medium or large size defects. A forty year male presented with injury to right side of forehead and temporal region of scalp. There was 10 × 6 cm of full thickness defect. The anteriorly based galeal-pericranial rotation flap is used to cover the defect and split thickness skin graft applied. The Schmitt 19 raised 5×5 cm galeal/periosteal flap which is rotated medially and inferiorly to cover the bony defect .Hussain 20while raising the galeal flap had kept the length and breadth ratio of the flap as 4:1. The galeal/paracranial flap could be a good option for forehead defects .

KEYWORDS

Forehead Defect; Galeal; Paracranial Flap, Forehead Defects, Scalp

INTRODUCTION

The defects over the forehead are managed according to the wound's size and the wound bed's status. The less than 3 cm defects could be closed primarily by undermining the remaining forehead or scalp [1,2]. For larger defects where the pericranium is intact, a split-thickness skin graft may adequately cover the defect. But it is cosmetically inferior to other methods because the colour match is poor, and the texture and thickness do not match the rest of the forehead .[1,3]Various types of pericranial flaps based on the supraorbital and supratrochlear arteries can be used to cover a wide area of exposed bone, sometimes in combination with local flaps and split-thickness grafts [4,5]. Galeal and temporoparietal fascial flaps have a wide arc of rotation, a good blood supply, and minimal donor site morbidity. They conform well to the underlying bone and are of the correct thickness for a good cosmetic result [1]. Damage to the hair follicles while raising the flap from the donor site can result in hair loss, and damage to the frontal branch of the facial nerve has been reported[1].Generally, lesions exposing bone greater than 50 cm^2 on the forehead and greater than 200 cm^2 on the scalp are candidates for free flap reconstruction with those lesions greater than 600 cm^2 requiring 2 flaps to cover the defect.[6]

Case Report

A forty-year-old male presented to our department of plastic surgery with a history of road traffic accident 5 days back when he sustained an injury to the right side of the forehead and temporal region of the scalp. There was 10 × 6 cm of full-thickness defect present 4 cm above the root of the right ear's helix and 2.5 cm above the right eyebrow (Figure 1). The wound bed was partially covered with unhealthy granulation tissue, and 3×2 cm of bone was exposed. The two longitudinal scars were present posterior to the wound. On palpation, the wound was slightly tender and bleeding on the touch.

As the wound involved the temporal region, we eliminated the possibility of coverage with a superficial temporal fascial flap. The patient was taken up for the surgery. After the proper debridement of the wound, 7×5 cm of the frontal bone was exposed (Figure 2). We extended a 10 cm incision from the anterosuperior margin of the wound. The skin flap is raised 10 ×10 cm at the subcutaneous level, taking care of the hair follicles. The anteriorly based galea-pericranial rotation flap is then raised by giving the incision along the base of the prior raised subcutaneous flap. The galeal-pericranial flap insetting is done at the margin of the exposed frontal bone region with the help of an absorbable suture (Figure 3). We resurfaced the flap with a split-thickness skin graft and bolster dressing. There was partial thickness loss of the distal galeal flap of 2×1 cm with 20 % skin graft loss. We debrided the necrosed part of the galea flap, and the periosteum beneath was found viable, which we later grafted with a split-thickness graft. The graft uptake was good. The patient is doing well at the 4-month follow-up (Figure 4). There is no hair loss at the donor site. The contour of the forehead is maintained, though the color match with the surrounding skin is not satisfactory due to the split thickness nature of the skin graft.

DISCUSSION:-

The forehead defects are managed according to the size of the defect. Minor defects can be closed primarily after mobilizing the adjoining skin flaps. The medium-sized defects with intact pericranium can be covered with skin grafts. The tissue expander can be utilized to expand the normal adjoining skin.[7] The pericranial, galeal flap and temporoparietal fascial flap are also employed to cover these defects [8,9]. The free flaps are a better option for the more significant size defects.[10,11]

The time required to cover the bare bone with granulation tissue is 2 weeks for every centimetre of bone width[12]. Thus, covering medium- or large-size bone defects usually takes a very long time. The Schmitt [13] had adopted the idea of galea/pericranial flaps for medium-size defects. He raised the flap by giving a 7 cm curvilinear incision at the superomedial aspect of the defect, extending only through the skin at the subcutaneous level, leaving the underlying galea exposed. He raised a 5×5 cm galeal/pericranial flap, which is rotated medially and inferiorly to cover the bony surface of the scalp defect. Hussain et al. [14] while raising the galea flap, had kept the length and breadth ratio of the flap as 4:1. We followed the same technique by Schmitt et al. [13], 7×6 cm of the galea/pericranial flap was raised, which was based anteriorly and the length/breadth ratio of the flap was 1:1; rotated medially to cover the exposed bone. The size and incision of the flap vary according to the location and the size of the defect, Hui-Hsiu Chang [15] harvested 4×4.5 cm of galeal/pericranial flap by an incision along the frontal skin crease above the brow to reconstruct the medial canthus and upper lid reconstruction. Halpern[16] created the galea hinge flap to cover the exposed outer table, where he lightly scored along the partial thickness plane of the galea, which was large enough to cover all or a portion of the exposed periosteal defect. The scoring of the galeal/ pericranial flap was not done in our case, as the flap size was adequate to cover the defect.

The Schmitt used the split and full-thickness skin graft over the galeal/pericranial flap. Hussain and colleagues discouraged the use of full-thickness skin grafts. Conversely, Halpern illustrated that galea flaps alone could provide sufficient perfusion for a full-thickness graft on the scalp. Nonetheless, we used a split-thickness graft over this flap, and the graft uptake was satisfactory, but the colour match with the surrounding forehead skin was not good; the graft appeared darker than the rest of the skin.

The forehead galeal /pericranial flap has also been used to reconstruct medial canthus 17, subtotal and total upper lid reconstruction after tumour excision, and periorbital fasciitis [18-19]. We chose the galeal flap for the lateral forehead defect because as the size of the defect increased to 7cm, it became difficult for us to advance the medial forehead flap; secondary, we avoided using the hairy scalp in that region as a crane principle, which would require another procedure to return it.

Although there was partial thickness necrosis of the flap, in our case, the pericranial part of the flap was intact. We debrided the necrosed part and, later on, re-grafted it. In the series of 8 patients by Terranova et al.[5], one of his patients had developed flap necrosis.

Our patient has been on regular follow–up for 4 months, which is relatively less compared to another study like in Terranova et al[5] study where the patient was followed for 2 years (range 6-26 months).

The galeal/pericranial flap could be a good option for medium-sized forehead defects where the injury involves the temporal region.

Conflict of interest:- None
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The patient has given informed consent for the use of clinical images.
All appropriate institutional guidelines have been followed.
Institutional Review Board approval is not applicable.

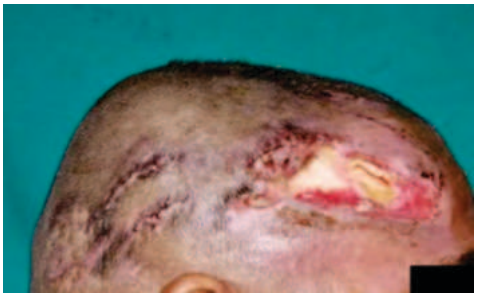

Figure 1 :Pre-operative picture

Figure 2:- Intra-operative picture after debridement

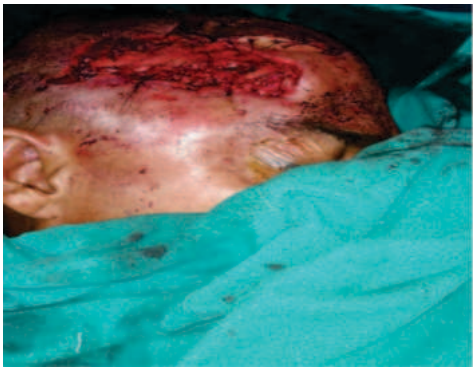

Figure 3:- Intra-operative picture after flap inset

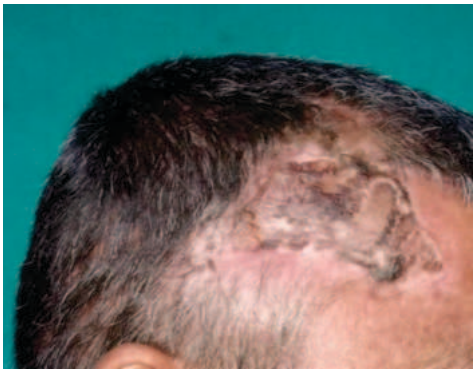

Figure 4:- Follow-up picture after 3 months

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