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Case Report

Tunneled forehead island flap in medial orbital socket defect

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ABSTRACT

Orbital exenteration in debridement of rhino-sino-orbital Mucormycosis leaves a deep bony socket with or without a bony medial or an inferior party wall, depending on the extent of intervention. The eye brow sparing technique is likely to retain sufficient skin to line this orbital cavity. Prosthetics with fine resemblance to the contra lateral eye are designed and worn to achieve facial aesthetics. These artificial eyes are usually well modeled to sit in the socket. A breach on the medial wall in an individual a sequel to severe rhinitis, sneezing, cellulitis and prosthetic friction was reconstructed with a tunneled forehead flap. These tunneled flaps are single stage procedures unlike the conventional ones with excellent cosmesis.

Keywords: Forehead tunneled island flap, Mucor, Orbit fistula, Reconstruction

INTRODUCTION

Reconstruction of facial infraorbital defects, an untoward sequel of Mucormycosis, is an issue confronting the rhinologist. Tunneled island flap was used in a patient with a wide defect involving the medial orbital region. Inspite of intricate pedicle dissection and likelihood of a trapdoor deformity these facilitate repair in a single-staged procedure.

The flap is so sited that its vascularity is not compromised neither by stretch tension or overlying tissue compression, while in the tunnel. The occasional, slight bulging is observed which is due to the pedicle; just over the undermined tunnel. This effect settles down with time and doesn't need corrective intervention. Moreover, the donor site scars are merged in the margins of the aesthetic units thereby retaining central facial symmetry. Tunneled island flaps have a utility in the reconstruction of the ala, nasal dorsum inferior and medial canthus region of the eye, when meticulously approximated, have an excellent outcome.[1-5]

A tunneled flap harvest, necessitates, a cutaneous island with similar dimensions, shape, color and texture to the surgical defect so created. Moreover, the flap paddle should be in" proximity" but not exactly in its "vicinity". The incision encircles the entire circumference of the flap on the surface, but retains a subcutaneous pedicle, with adequate length to allow mobilizing the cutaneous island towards the defect, via an underlying tunnel dissected between the recipient and the donor site. A patient with a fistula after treatment of Mucor, lying at the lamina papyracea region repaired with a tunneled flap is discussed.

CASE REPORT

In a 62 years old patient of mucormycosis, the radical debridement of the osteitic and osteomyelitic bone of the maxillary, ethmoid and sphenoid sinuses as well as the orbital contents resulted in an open orbital socket on the right-side (Figure 1). An artificial eye prosthesis was inserted in this socket.

During a bout of severe rhinorrhea with sneezing, redness and tenderness was noticed on the medial wall of the orbit, beneath the prosthesis. In spite of third generation antibiotics the cellulitis of the skin overlying the lamina papyracea did not subside and gave way to a, cm fistulous communication. Nasal endoscopy and microbiological evaluation for fungus was negative.

The defect was about 10 mm by 20 mm and was sited about two third behind the anterior lacrimal crest. The reconstruction of this defect was undertaken with a forehead island flap with the dissection of a subcutaneous pedicle up to the supra trochlear notch of the contralateral eye and then infero-medially tunneled anti clockwise to obliterate the defect (Figure 2 (a-c)).

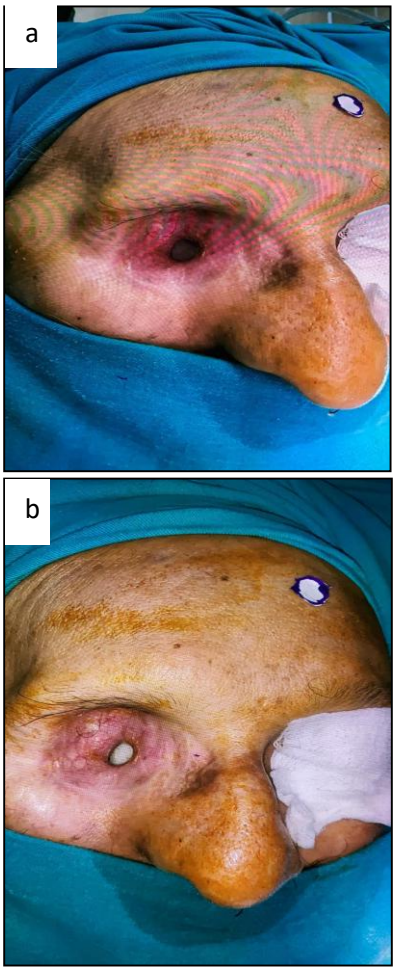

Figure 1 (a, b): Deep defect in the medial orbital region after sequestrectomy with template on forehead.

Figure 2 (a-c): Forehead Island flap mobilized through the subcutaneous tunnel created above the glabellar region.

Figure 3: Repair of the medial-orbital defect.

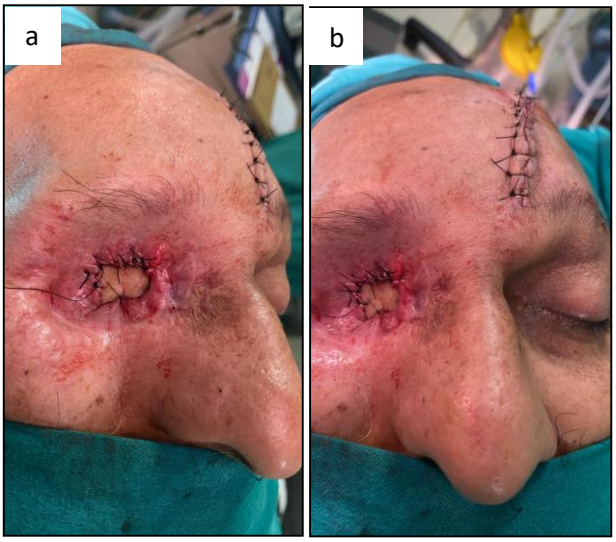

Figure 4 (a & b): 2 weeks after surgery.

The skin was undermined all round fistula

A 360-degree support to the flap paddle was provided by remaining intact lamina papyracea, in the vicinity of the fistula. The flap was sutured in two layers. Subcutaneous tissue to periosteum with Vicryl and skin to skin with ethilon (Figure 3).

Two weeks after the procedure there the defect was imperceptible. The final outcome was considered satisfactory by the patient and by the surgical team (Figure 4).

DISCUSSION

The "tunneling "concept has wide utility in the resurfacing of surgical defects of the nasal vestibule, upper lip ear, ear lobe and the concha. "Flip-flop flap ", is the popular nickname in surgical forums.[3,6-8] Being a modified island flap, extensive irrigation is required. It is quite mobile and the undermined tunnel facilitates a straight trajectory towards the area of concern.[3,9] This flap needs only a single stage procedure, though technically demanding, thereby avoiding the morbidity of subsequent interventions.

Island flaps are utilized in the region of the dorsum and ala of the nose, specifically in intact alar crease and the lateral nose; in order to allow tunneling of the flap through these structures.[4] The configuration of this flap allows planning of the scar on the donor site to be placed in transition areas of the facial aesthetic units.10 Thereby one can repair large defects of the nasal region, where tissue mobility is reduced, retaining thereby color and texture of the surrounding skin and preserving the alar crease.

These flaps are unique as they can cover deep defects, next to the eye. Secondary intention healing is often an acceptable option here, but glabellar or frontal tunneled island flaps can be employed in, extensive and deep defects to obliterate the concavity of the medial can thus or the infraorbital region.[1] Tunneled Island flap in fact is difficult to harvest and requires meticulous, precise, patient and slow dissection of the pedicle. One has to measure precisely the length of the pedicle to compensate for the shortening to be expected on mobilizing and tunneling the skin paddle and thus not shearing thee flap and traumatizing the structures beneath during the transposition.[10]

The flap is so located so that its vascularity is not affected, neither by stretch tension or overlying tissue compression, while in the tunnel. The occasional, slight bulging is observed which is due to the pedicle; just over the undermined tunnel. This effect settles down with time and doesn't need corrective intervention. These flaps often present with a trapdoor effect which can be minimized by deliberately reducing the flap area in 20 to 25% and also by undermining the circumference of the recipient site.[3,5]

Minimal trapdoor effect does not require any intervention but mere frequent local massage of the flap can in fact is beneficial in some regions, like when recreating the round shape of the ala nasi.[10] Other complications for surgical interventions, namely hemorrhage, infection and necrosis may too be noted.

CONCLUSION

Tunneled forehead island flap is a modified conventional island flap, with an excellent outcome in the reconstruction of the vicinity of the eye and the nose. In spite of the likelihood of developing a trapdoor deformity it is an ideal procedure to repair defects at crucial sites in the head neck region, thereby retaining symmetry of the mid face.

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REFERENCES

1. Mombaerts I, Gillis A. The tunneled forehead flap in medial canthal and eyelid reconstruction. Dermatol Surg. 2010;36:1118-25.
2. Kersaf S, Sacak B, Bayraktaroglu S, Ozcan A, Ugurlu K, Bas L. A novel approach for the reconstruction of medial canthal and nasal dorsal defects: frontal hairline island flap. J Craniofac Surg. 2008;19:1653–7.
3. Cook JL. Tunneled and transposed island flaps in facial reconstructive surgery. Dermatol Surg. 2014;40:S16–S29.
4. Kearney C, Sheridan A, Vinciullo C, Elliott T. A tunneled and turned-over nasolabial flap for

reconstruction of full thickness nasal ala defects. Dermatol Surg. 2010;36:1319-24.
5. Krishnan RS, Clark DP, Donnelly HB. Tunneled transposition flap for reconstruction of defects of the nasal ala. Dermatol Surg. 2007;33:1496-501.
6. Kishi K, Imanishi N, Shimizu Y, Shimizu R, Okabe K, Nakajima H. Alternative 1-step nasal reconstruction technique. Arch Facial Plast Surg. 2012;14:116-21.
7. Fader DJ, Johnson TM. Ear reconstruction utilizing the subcutaneous island pedicle graft (flip-flop) flap. Dermatol Surg. 1999;25:94-6.
8. Wang SQ, Goldberg LH, Kimyai-Asadi A. Tunneled island pedicle flap for an earlobe defect. Dermatol Surg. 2007; 33:835-7.
9. Georgiade NG, Mladick RA, Thorne FL. The nasolabial tunnel flap. Plast Reconstr Surg. 1969;43:463-6.
10. Mahlberg MJ. Tunneled melolabial pedicle flap for small but deep lateral alar rim facial. Dermatol Surg. 2013;39:1527-9.

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