Reconstruction of a Large Posterior Scalp Defect Using Occipital Artery Based Pedicled Island V–Y Advancement Flap: A Case Report

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Abstract Repair of scalp defects using local hair bearing scalp is technically challenging. Transposition or rotation of local flaps to close the defect has its own disadvantages. Reconstruction of a large posterior scalp defect using occipital artery based pedicled V–Y advancement flap following the excision of a recurrent fibrolipoma of epicranial aponeurosis is reported here. It is possible to reconstruct the defect with hair bearing scalp in a single stage along with primary closure of the donor site using this technique.

Keywords Hair bearing scalp · Occipital artery · V–Y advancement · Pedicled flap · Direction of hair

Introduction

Restoration of hair bearing area is the primary goal in the reconstruction of scalp defects following surgery, trauma or burns. Primary closure of the defects is restricted because of unyielding nature of the scalp. Moreover very limited local scalp is available in the occipital region for reconstruction. Although there are reports of flaps based on the superficial

temporal artery [1] and more recently on the occipital artery [2, 3], most are pedicle flaps or island flaps. We have used occipital artery based pedicled V–Y advancement flap following the excision of a Recurrent Fibrolipoma of Epicranial aponeurosis and obtained good results both in closing the defect and restoring the scalp hair. We describe a case in which this procedure was used successfully.

Case report

A 37 year old male patient reported to our centre as a referral for the management of recurrent fibrolipoma of epicranial aponeurosis (Fig. 1). The recurrent lesion was superficially excised once 6 months back and the defect was closed primarily after undermining the adjacent skin. The surgical repair outlined below was used in the case following wide local excision of the lesion. The size of the defect was 150 × 50 mm (Fig. 2). The case was followed up routinely there after. The flap survived completely with no partial necrosis or baldness. The postoperative scar was inconspicuous because the suture line lay at right angles to the direction of hair (Fig. 3).

Operative Procedure

Preoperatively, a hand-held Doppler probe was used to trace the course of the occipital artery (Fig. 4). A triangular flap adjoining the defect was designed in such a way that the occipital artery entered the flap at an axis perpendicular to the direction of movement of the designed flap. The base of the island flap was designed over the superior aspect of the defect, and the tip of the flap near the vertex (Fig. 5). The distal border of the flap was incised to the periosteum

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Fig. 1 Case of recurrent fibrolipoma of epicranial aponeurosis

Fig. 2 Size of the defect 150 × 50 mm

Fig. 3 4 weeks postoperative

followed by subgaleal undermining of the flap was carried out toward the proximal side of the pedicle. Then a skin incision, which stops at the subcutaneous fat layer, was made in the proximal side of the flap. Undermining in the subcutaneous fat tissue is advanced proximally taking care not to injure the hair follicles. This helps preserve the nutrient vessel and its inclusion in the pedicle. Pedicle dissection toward the proximal side was then made under direct vision taking care not to injure the occipital artery until the flap reached the defect without tension (Fig. 6). At

Fig. 4 The course of occipital artery

Fig. 5 Orientation of flap design

Fig. 6 Occipital artery based pedicle flap raised

the level of the external occipital protuberance, the plane of flap elevation was subperiosteal in order to avoid injury to the occipital vessels in the substance of occipital muscle. The flap was then elevated and transferred to the defect. Suction drain was placed under the flap and the skin was closed by suture in two layers (Fig. 7). The donor site was closed in V–Y advancement fashion employing subgaleal undermining. The suction drain was removed after 3 days.

Discussion

The defects of scalp following the excision of benign or malignant tumors, burns or secondary to trauma should be

Fig. 7 Flap sutured over the defect

ideally replaced with hair bearing scalp. It not only gives aesthetic results but also reconstructs the defect with a tissue of the same histology. Local flaps can be transposed or rotated invariably lead to dog ear formation. If the defect is large the rotated flaps are inadequate. In the cases where donor site is not closed primarily the secondary defect is grafted with skin, resulting in bald patches. Unilateral rotation scalp flaps based on temporal vessels may also be a good choice, but they move the hairline downwards. Skin traction is a good choice for small defects, but if the defect is large and sutures are placed in tension there is chance of dehiscence postoperatively. Free flaps, such as the rectus abdominis and latissimus dorsi, provide excellent reconstruction in size, tissue bulk, and coverage, but they are much more complex procedures and their colour and texture is inferior to those of local flaps [4–6]. Bulky free flaps may also make the detection of recurrence more difficult. Fasciocutaneous flaps such as the radial forearm flap are also an excellent choice but, apart from being more complex procedures, are also accompanied by more donor-site complications [7]. Tissue expansion is an appropriate technique with many indications in reconstructions in the head and neck. One of its main advantages is that it provides an excellent tissue match for defects in visible areas. Aesthetic subunits are either preserved or replaced by similar local tissue. There are also several disadvantages: some of the complications are exposure and failure of implants, pain, haematoma, seroma, infection, bone resorption, ‘dog ears’, and wide scars leading to premature loss of expander. They also require multiple operations, weeks of expansion, and are rather costly [8]. It would also lead to change in the direction of the hair growth. A rotational flap does not require skin grafting of the donor site; however, this may not be feasible in large occipital defects. The occipital artery is the major vessel supplying to the posterior scalp. It has been highlighted in experimental and clinical studies [9]. This artery enters the occipital galea at the superior nuchal line and initially runs for about 5 cm in the occipitalis muscle and then in the

Fig. 8 3 months post op

galeal aponeurosis. It has rich connections with its counterpart on the other side. The vessel has abundant anastomosis with the ipsilateral posterior auricular artery, and through these connections the vascular territory extends right up to the vertex. Island flaps have been used for reconstruction of the scalp by many authors [1] for defects in the parietal and temporal regions using the superficial temporal vessels or its branches. The use of occipital artery based pedicled flap was first described recently for temporoparietal region in Moyamoya disease surgery [2]. However, the use of a scalp island flap for occipital defects was described this year in literature for the first time. The direction of the hair remains unaltered as the movement is in the horizontal direction. V–Y advancement in the occipital area has many advantages over the traditional local and regional flaps. The flap design is simple and well suited for midline defects. Moreover, the defect can be closed in a single stage without the need of a skin graft in all cases. Flap movement does not create any dog ears and carries negligible morbidity to the donor site. These flaps vessels can be protected by careful sub-follicular dissection. The procedure can be safely used to close defects up to 150 × 50 mm as in this case. But larger defects would necessitate bilateral flaps [3]. In conclusion, we achieved an efficient excision with an aesthetically satisfactory and relatively simple repair (Fig. 8).

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