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Case Report

Limberg's flap technique: a defect repair method for ear lobe reconstruction in recurrent earlobe keloids: a case report

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ABSTRACT

The article acts to focus and aid in the localization of sound. Its shape is aesthetically important as it shows considerable inter-individual variability which reflects its multicomponent and is quite challenging for the surgeons during the planning of reconstruction as it is complex and equally important. It's complex undulating structure and topography includes fibro elastic cartilage, perichondrium and the skin. The ear lobule is an important reference point for symmetry of the face and its loss causes an obvious aesthetic abnormality. Excessive healing can be as significant as delayed or non-healing. Recurrent earlobe keloids are among the most challenging conditions and may have significant psycho-social impact for the patient. Their aesthetic considerations are serious and despite a variety of treatment options, they often proved to be recurrent. It is likely that more operative interventions are required for excessive healing. Type II A defects are characterized by loss of the ear lobule without presence of a nubbin of tissue attached to the cheek. The goal of surgery should be an aesthetically pleasing reconstruction that maintains symmetry with the opposite ear lobule. The Limberg-flap technique using a doubled-over skin flap allows a one stage reconstruction of the ear lobule. The aesthetic results are generally well acceptable and hence here we present a case where we combine this technique with the excision for better results of long-term refractory cases.

Keywords: Earlobe, Recurrent keloid, Excision, Limberg's flap, Reconstruction

INTRODUCTION

The term keloid was originally described in 1800s as "cheloid," derived from the Greek word "chele" means "crab claw".[1-4]

Hypertrophic scars and keloids represent an overabundance of fibroplasia in dermal healing process.[3] Hypertrophic scars rise above the skin level but stay within the confines of the original wound and often regress over time.[3] Keloids rise above the skin level as well, but they extend beyond the border of the original wound and rarely regress spontaneously, may present with refractory cases as well.[3]

The auricle is a complex structure of intricate cartilage folds covered by skin.[1] It has an undulating topography and structural configuration ranging from a firm rigid cartilage to the soft, spongy and elastic ear lobule.[1] The ear lobule is a special subunit of the auricle and deformities are more commonly acquired following trauma.[1] The ear lobule is an important reference point for symmetry of the face and its loss causes an obvious aesthetic abnormality.[1]

The natural response of the body to a traumatized tissue is the scar.[2] When there is an imbalance between anabolic and catabolic phases of the scar formation, the result is the appearance of a pathologic scar.[2]

Keloid formation is 15 times more common in darker pigmented ethnicities, with individuals of African, Spanish, and Asian ethnicities being especially susceptible.[2]

The ideal technique should be simple, expeditious, easily implemented and complication free. This article presents with a 37-year-old male patient suffering from recurrent earlobe who previously underwent the keloid excision was treated using a Limberg's flap after which the flap showed excellent results without any recurrence.

CASE REPORT

We present a 37-year-old male patient who had an ear piercing 4 years ago subsequent to which patient developed swelling in the left ear. Patient underwent Surgical excision consequently twice, which did not subside with the excision and came to our Outpatient Department presenting with the complaints of recurrent swelling in the same excised place. The swelling was associated with pruritic features, which continued to grow until it reached to the present size.

H/o recurrence of similar symptoms noted.

Past history

Patient underwent left ear keloid excision in the last 4 years subsequently for two consecutive times after which he presented with the complaints of recurrent keloids in the excised place.

Not a k/c/o diabetes mellitus/ hypertension/ TB/ epilepsy/asthma.

Examination

On examination there were two swellings noted in the left ear lobe.

Inspection

One on the anterior aspect of the earlobe with a measurement of 4×3 cm, solitary, round in shape with smooth surface, no discharging sinuses or dilated veins.

Another on the posterior aspect of the earlobe measuring 6×4 cm, solitary, round in shape with smooth surface, no discharging sinuses or dilated veins.

Palpation

Swelling on anterior aspect

All inspectory findings were confirmed, swelling was firm in consistency, non-tender, palpable with no local rise of temperature.

Swelling on the posterior aspect

All inspectory findings were confirmed, swelling was firm in consistency, non-tender, palpable with no local rise of temperature.

Patient had previously undergone excision of keloid in the same site.

A clinical diagnosis of reccurent earlobe keloid was given and subsequently patient was planned for the surgical excision with ear lobe reconstruction by Limberg flap technique which is further described.

Figure 1: Keloid in the anterior surface of lobule.

Figure 2: Keloid in posterior aspect of lobule.

Therapeutic intervention

The procedure was performed under general anesthesia and under aseptic precautions.

Local infiltration with 2% lignocaine hydrochloride mixed with adrenaline was given around the keloid and keloids was excised in toto.

The opposite normal ear lobule is used as a model for the type IIA ear lobule defect being reconstructed. The Limberg flap is outlined anterior inferior to the ear lobule defect ensuring that the side of the defect and the flap are equal in length.

The flap site was marked and incision was placed along the marked site. The flap was elevated at the level of subcutaneous tissue by sharp dissection. The scar at the inferior edge of the ear is excised and the Limberg's flap was rotated over the defect in the lobule.

Flap released from its adjacent structures and posterior defect was closed by suturing the flap to posterior part of the pinna. Burrow's triangle was created and secondary defect closed was closed. This once sutured, constitutes the curved free edge of the ear lobule. The edges of the secondary defect are appropriately undermined to facilitate direct closure.

The defect of the ear lobule is roughly a sector of a circle which would become a rhomboid if its posterior—medial layer was unfolded.

Sutures were placed along the edge with 4-0 Ethilon. Hemostasis achieved and patient withstood the procedure well.

Figure 3: Design of the Limberg flap.

Figure 4: Flap elevation.

Post-operative follow up

Patient was followed up post operatively for 3 months. Flap was healthy as well as the donor site was healthy and neither of the site did not show the recurrence of keloid.

Patient perspective

Patient perspective was satisfactory.

Figure 5: Dissection completed and flap transposed.

Figure 6: Flaps sutured and secondary defect is closed by direct approximation.

Informed consent

Informed consent was taken prior surgery.

DISCUSSION

The natural response of the body to a traumatized tissue is the scar.[2] The wound healing process has three different phases: the first is the inflammatory phase, the second - the proliferative phase or the granulation phase and the third is the remodelling phase or the maturation phase.[2] When there is an imbalance between anabolic and catabolic phases of the scar formation, the result is the appearance of a pathologic scar.[2]

Keloids are benign, hypertrophic fibrous lesions that generally develop following trauma or surgery.[3] They are more common in darkly pigmented people and are frequently found on the ear lobule as a result of ear piercing.[3]

Hypertrophic scars and keloids represent an overabundance of fibroplasia in dermal healing process.[3] Hypertrophic scars rise above the skin level but stay within

the confines of the original wound and often regress over time.[3] Keloids rise above the skin level as well, but they extend beyond the border of the original wound and rarely regress spontaneously, may present with refractory cases as well.[3]

The ear lobule is a special subunit of the auricle and deformities are more commonly acquired following trauma.[1] The ear lobule is an important reference point for symmetry of the face and its loss causes an obvious aesthetic abnormality.[1]

Epidemiology

Keloid formation is 15 times more common in darker pigmented ethnicities, with individuals of African, Spanish, and Asian ethnicities being especially susceptible.[2]

Aetiology

Keloids can result from a surgery or trauma, burns, skin inflammation, acne, chicken pox, zoster, folliculitis, lacerations, abrasions, tattoos, vaccinations, injections, insect bites, or ear piercing.[2] They tend to occur from 3 months to years spontaneously.[2]

Clinical features

They vary in size from few millimetres to large, pedunculated lesions with soft rubbery or hard consistency.[2] While they project above the surrounding tissue and are rarely found in the underlying subcutaneous tissue.[2] Certain body sites have higher incidence of keloid formation.[2] The most affected areas are: chest, shoulders, upper back, nape, cheeks and earlobes.[2] It was believed that keloids appear most often in areas of high skin tension.[2] In contrast to this idea, palms and soles are rarely affected by keloid, and the ear lobe, area with minimal skin tension, is one of the most common sites of keloids appearance[2]. Frequently, the patients accuse pruritus and pain.[2] In Caucasian patients, the keloid scars are erythematous and telangiectatic, while in darker skinned patients they are hyperpigmented.[2] Unlike hypertrophic scars, which, after reaching a certain size, stabilize or even regress, the keloids do not regress spontaneously and recurrence rate is high as described in the epidemiology.[2]

Pathogenesis

The keloid scar has a genetic predisposition and an autosomal dominant inheritance.[2] Familial keloids have been described in two rare syndromes: Rubinstein-Taybi syndrome and Goeminne syndrome.[2] The keloid formation process is poorly understood.[2] It is known that it appears in predisposed individuals in presence of a trigger, such as skin trauma.[2] The skin trauma might be secondary to surgical wounds, burns, body piercings, folliculitis, acne.[2] Most of the keloids develop in the first 3 months, but some may appear up to 1 year after skin trauma.[2] Recent studies show that both the severity of inflammation and the type of immune response predispose to the formation of excess scar tissue.[2] In the scar, densely populated by inflammatory cells, fibro genic factors like transforming growth factor (TGF)-β1 and β2 are released.[2] The decreased levels of TGF-β3 and matrix metalloproteinases lead to accumulation of extracellular matrix.[2] Development of a Th-2 response stimulates fibrogenesis and Th-1 predominance attenuates the tissue fibrosis.[2] The scar tissue of keloids presents a more prolonged inflammatory period.[2] All these may help to explain why keloid scars spread beyond the margins of the original wound.[2]

Limberg's flap technique

Defects of the ear lobule are three dimensional requiring the surgeon to seek creative reconstructive options.[1] Type II A defects are characterized by loss of the ear lobule without presence of a nubbin of tissue attached to the cheek.[1] Such defects are typically seen in individuals having an unattached ear lobule.[1] Reconstruction thus requires thoughtful planning.[1] The goal should be an aesthetically pleasing reconstruction that maintains symmetry with the opposite earlobe.[1]

Some reconstructive options are: They broadly fall into five categories: preauricular flap reconstruction; postauricular flap reconstruction; superimposition of two opposing or paired flaps; and tissue expansion using a tubed flap; and a combination of techniques.[1]

Limberg described the rhomboid skin flap in 1946.[1] The underlying flap design is based on the transposition of a rhomboid or parallelogram with 120˚ angles located where there is lax skin, whereas the other two angles are 60˚ each.[1] Some technical details need to be emphasized.[1]

The Limberg flap is a durable flap that is based on a random pattern cutaneous and subcutaneous pedicle.[1] The flap is elevated slightly beyond the base of the flap going from distal to proximal.[1] There may be a standing cone deformity, which is excised with a burow's triangle excision.[1] This also facilitate transposition of the flap.[1] It may, however, be a little bulky and need defatting after 3-4 months.[1] The donor defect is also visible and needs careful suturing to give a fine scar.[1] This method is not suitable if the loss is greater than an ear lobule.[1]

The Limberg-flap technique using a doubled-over skin flap encompasses several advantages.[1] It allows an immediate, one stage reconstruction of both the anterior and the posterior surfaces of the ear lobule.[1] It is technically simple and may be performed under local anaesthesia.[1] Skin grafts are not required and the flap is very safe and predictable.[1] The aesthetic results are generally well acceptable, and it offers the great advantage of a good colour match between the neo lobule and the surrounding skin.[1]

Figure 7: Flaps sutured and secondary defect is closed by direct approximation.

CONCLUSION

The Limberg flap technique remains useful in the reconstruction of type IIA defects. It provides satisfactory results and alleviates the drawbacks of the numerous alternative techniques. It is recommended for immediate and delayed reconstruction of the ear lobule and for the prevention of the refractory ear lobe keloid.

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