Evaluation of the Modified Distally Based Perichonderio-Adipo-Dermal Flap Technique for Treatment of Prominent Ear Deformity

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Abstract:

Background: Prominent ear is a common congenital deformity .Many operative procedure used to correct this condition which means no single method has been adopted. Some of these procedures adopt cartilage cutting technique while the others preserve the cartilage. Children with prominent ear may be concerned major psychological problem. Recently otoplasty is considered as corrective surgery for pre-school age children to get rid them from social embarrassment.

Aim: To evaluate of the modified Distally Based Perichondrio –adipo-dermal flap Technique for reconstruction of prominent ear.

Patients and methods: Eleven patients (21 ears), were involved in this prospective study at AL -Shaheed Ghazi AL Hariri Hospital and Sulaymaniyah Burn and Plastic Surgery Hospital between March 2017 to December 2017. We excluded the patients who had previously operated on (recurrent cases) and patients with combined congenital auricle deformity. Modified Distally Based Perichondrio –adipo-dermal flap Technique was used as a cartilage sparing technique for correction of prominent ear deformity.

Results: As a subjective perception and according to visual analogue scale ,most of our patients or their parents were satisfied with final results. Apart from one case of recurrence, no major complications were seen. Objectively, set back of the prominent ear was reached acceptable value.

Conclusion: Modified Distally Based Perichondrio –adipo-dermal flap Technique flap for correction of prominent ear deformity is simple and provide promising aesthetic outcome with minimal drawbacks, except those patients with deep concha.

Key words: Perichondrio –adipo-dermal flap, Prominent ear deformity, Cartilage sparing technique.

Introduction:

The auricle has been a target for human adornment, from the simple of earrings to the complex auricular modification of African tribes [(1)]. In the modern period, we depend on the ear for wearing glasses, hearing amplifier, and other technology, in this light, the auricle may has significance in recent culture, present as a critical structure for precise reconstruction [(2)].

The prominent auricle is the most common congenital deformity of auricle occupying (5%) of Caucasian population and is penetrate as autosomal dominant trait [(3)]. Although the physiological consequence is insignificant, the psychological consequence for the patient can be significant [(4)].

Ear may have a number of abnormality which lead to be prominent. It is vital to address each of this abnormality in planning of surgery [(5)]. The two most common are the lack of antihelical fold found in two third of cases and deep

concha bowl found in one third, some have a combination of both problem [6].
The goal of prominent ear correction to produce smooth, round, well defined anti-helical fold with conchoscaphal angle less than 90 degrees [7, 8].
Otoplasty is one of the few accepted cosmetic surgery to be performed in children for aesthetic reason rather than actual functional handicap [9, 10].

Surgical correction:

The history of otoplasty techniqueis variable. Luckett used full thickness incision within the cartilage along the desired location of the anti-helical fold [11, 12, 13]. Converse described the combination of full thickness incision and sutures to support the fold [14, 15].
Surgeons have used weakening of the cartilage along the fold, Stenstrom who recommend anterior cartilage scoring by scoring to bend the cartilage away from abrasion site [16, 17].
Conchal reduction has been performed using various procedures. However, the use of conch mastoid stich was popularized by Furnas and later changed by Spira et al [18]. Generally, otoplasty procedure can be divided into two broad categories: cartilage cutting technique and cartilage sparing technique. Cartilage cutting rely on weakening the cartilage by excision, scoring, and or abrading the cartilage. Sparing procedure is conservative and use permanent suture to bend the pinna into the desired shape [19]. In presence of stiff and thick cartilage, cutting procedure are preferred [20].

Aim of the study

In this study we are evaluating the use of the modified distally based Perichonderio –adipo-dermalflap for reconstruction of prominent ear.

Patients and Methods:

In this study eleven patients were presented with prominent ear. Their age was between (5-25) years, one case was unilateral and ten were bilateral. Those patients were operated on by using modified distally based flap in AL – Shaheed Ghazi AL- Hariri Hospital and Sulaymaniyah Burn and Plastic Surgery Hospital between March 2017 to December 2017. Patients who had been operated on previously were excluded from this study because the anatomy is distorted and we can't get a virgin flap. Patients with combined congenital auricle deformity are excluded from this study. Photographic profiles were taken in (frontal, back, lateral) views. Patients perceptions were assessed using visual analogue scale (1-4 unsatisfied, 5-7 good, 8-10 very good) [21]. The study design and data collection were done after getting approval of the Iraqi board for medical specialization. All the patients or their families were informed about the methodology and the purpose of the study and verbal consent of patients or their families were obtained.

Operative procedure:

Preoperative measurements of the distance between the most prominent part of the ear and mastoid at the junction between the upper and middle third of ear.
All operations were done under general anesthesia (except one case which was done under local anesthesia as a patient desire). After the antisepsis and draping, marking the anti-helical fold is performed by folding the ear toward the mastoid region and tattooing the new anti-helical fold using 25 gauge needle dipped with methylene blue as shown in **(figure: 1 A, B).** The post auricular skin to be de epithelialized is marked about

5mm lateral to sulcus ,the length of de epithelialized skin is the same length of previously marked anti-helical fold and its width is (5-8) mm as shown in **(figure :1 B).**Then (2%) xylocainewith (1:100000) epinephrine is infiltrated along the post auricle skin and mastoid region to ensure bloodless field.

De epithelialization of skin on the medial surface of auricle was performed using no 15 blade as shown in **(figure: 1 C)**. Enough amount of dermis is left at the raw area. The proximal edge is cut through using no 15 blade down to the cartilage so the flap that is elevated using scissor or perichonderial elevator is composed of perichondirum–adipose-dermal tissue flap. The flap dissected off the cartilage for 5mm distal to the marked anti-helical fold as shown in **(figure: 1 D)**.

The mastoid region is dissected by using blunt scissor to expose the mastoid fascia, with preservation of post auricular muscle as shown in **(figure: 1 D)**. Then the flap is fixed to mastoid periosteum by using 4/0 polypropylene sutures as shown in **(figure: 1 E)**. After tightening the knots, the antihelix is created along the previously marked side together with reducing the conchomastoid and conchoscaphal angles.

The skin is closed by 4/0 polypropylene suture as shown in **(figure: 1 F).** The medial and lateral surface of pinna is dressed using C shaped gauze impregnated with the antibiotic as first dressing layerto mold the newly shaped ear. Dry fluffy gauze with cotton is applied as addition dressing layers. These dressing layers are secured in place by bandaging.

On the first post op day the dressings are removed and the wound is inspected to rule out any collected hematoma and the patient discharged home and scheduled for regular visits on weekly interval for the first month and monthly for the next four to five months. The stitches are removed in the first visit after seven days. In each visit the wound is examined to assess healing process and any residual fibrosis or suture extrusion or any complication that may developed. Measurements and photographic documentation are recorded in each visit.

All the patients were kept on parenteral third generation cephalosporin and analgesia (acetaminophen) for seven days .Head bandage is applied for one month.

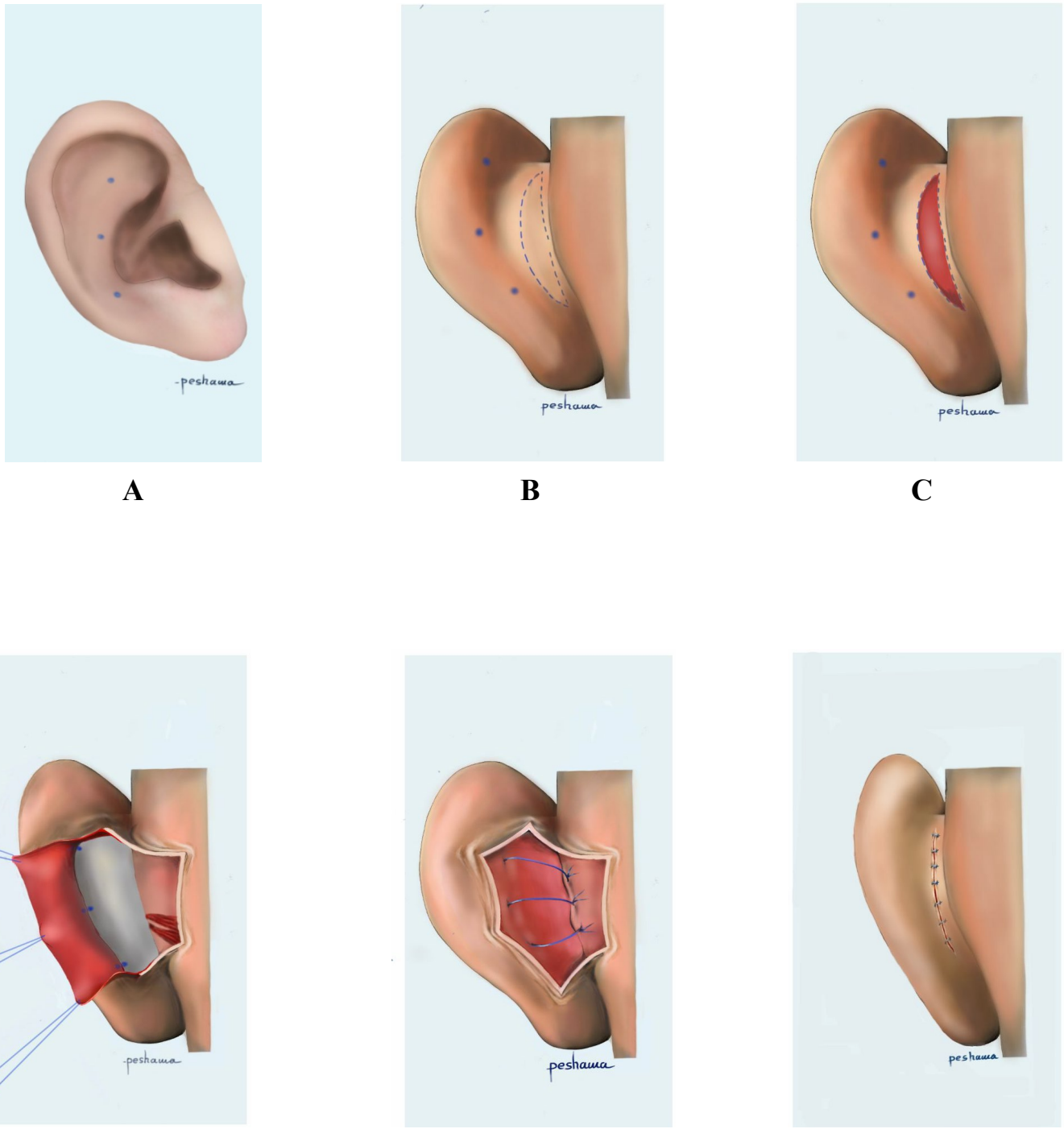

Figure (1): Operative technique.

Results:

Eleven patients (two female and ten nine male) were operated by these technique. Their age was between (5-25) years, one case was unilateral and ten were bilateral. The mean preoperative auriculocephalic distances were (32mm on the right side and 33 on the left side) while the mean postoperative distances were (18mm on the right side and 19 on the left side).

The follow up period were (6 to 12 months). Mean procedure time was (80-100) minutes.

Regarding patients' satisfaction, visual analogue scale was adopted to assess patients or their parent's satisfactions. Most of patients were satisfied as shown in **table (1).**

Hematoma, hypertrophic scar, asymmetry, recurrence and complicated some patients as shown in **table (2).**

Table (1): Patients' satisfaction.

Duration	Right ear	Left ear
First month	8.5	8.2
Third month	7.9	8.1
Sixth month	7.7	7.8

Table (2): Post-operative complications.

Complication	Incidence	Complication ratio	Note
Early complication			
Hematoma	1	4.76% (1/21)	Evacuation
Late complication			
Hypertrophied scar	1	4.76% (1/21)	Put on silicone cream
Failed case	1	4.76% (1/21)	Scheduled for revision
Asymmetry	1	4.76% (1/21)	
Poor definition of anti- helix	1	4.76 (1/21)	

Cases: Case no.1

Pre Post Pre Post

Figure (1): Photo of 7 years old child with 6 months follow up period.

Case no.2

pre post pre post

Figure (2): 25 years old male with deep concha with 6 month follow up

Case no.3

Pre Post Pre Post

Figure (3): 11 years old child with recurrence of deformity on right side with 6 months follow up.

Case no.4

A. Post op hematoma**.**

B. Evacuation under **GA.**

of antihelix.

Figure (4): hematoma of auricle.

Discussion:

The goals of prominent ear reconstruction are production of natural, symmetrical looking ear and minimal complications [22].

Despite the wide spectrum of otoplasty surgical options, each one is associated with own its complications. In cartilage cutting procedure, major complications can occur like hematoma, cartilage infection and the subsequent irreversible auricular deformity if not treated properly, in addition to being less naturally in terms of perfection, while technique that protect the cartilage from

being cut (sparing cartilage technique) are safer because of minimal cartilage disturbance, but these techniques are associated with relative high recurrence rate and suture related problem as compared with cartilage cutting procedures.

Ercan Cihandideet al used the distally Perichondirum–adipo-dermal flap to reconstruct (twenty patients, 37 ears). They fix the flap by using two stitches. Their results were very promising (only one patient underwent recurrence) [23].

Mandal A et al achieved good result using post auricular fascial flap to aid the conchoscaphoid and conchomastoid stitches. Their recurrence rate was approximately (5%) [22].

Our results are in consistence with that of Arcan Cihandideet al and MandalA et al. Regarding the objective measures evaluation that were dependent on comparing the auricular _cephalic distance between the pre and post-operative status; the majority of patients gained good improvement.

The subjective perception of the patients that was reflected by visual analogue scale was good (their or their parent's perception was ranging between 7.5-8 on visual analogue scale). Hence; theses promising results can be explained by:

1-Tension produced by three layer flaps is spreading equally along the helical rim, so there will be even and more naturally appearing anti-helix.

2- The adhesion and fibrosis between the composite flap and mastoid periosteal is of significant value to prevent or minimize the recurrence that is seen in higher rate in Mustarde and Furnas suture technique (24% recurrence rate) [24] .

3-The neo-chonderiogenesis that is stimulated by elevation of three layer flap is another additive supporting factor establishing a new strong anti-helical fold [23].

After six months follow up, the mean auriculocephalic distances showed increase (3-4) mm; this mandate overcorrection in future.

artilage scoring (especially anterior scoring) and invasive procedures were criticized because of the poor aesthetic un natural appearing ears beside the significant complications that might be the sequalae including (hematoma, chonderitis, anterior skin necrosis, and cartilage damage with associated irregularities). We are in an agreement with these argues hence we didn't adopt any anterior scoring for all our patients.

Percutaneous adjustable closed otoplasty technique has been developed with promising results and with several advantages. However the suture material and suture carrier used in this technique is not available all the time and they are costly in addition the associated complications like epithelial inclusion cyst and cutaneous dimples which are caused by passage of these sutures.

Suture extrusion can be encountered if the knot is been not well buried completely. Lastly, because of cheese cutting effect and decrease in tensile strength of the suture, partial relapse in the deformity could be encountered [4].

Horlock et al used post auricular fascial flap in combination with Mustarde and Furnas suture so as to reduce the incidence of suture extrusion [25]. Hence using three flaps can also be used as an adjunct procedure to cover suture material or used as a primary technique for otoplasty. The preserved post auricular muscle provided additive coverage for suture knots. However ;the disadvantage of this technique as that it require careful and meticulous

dissection in order to obtain adequately thick flap without perforation of the cartilage and flap.

Conclusions and recommendations:

Distally based Perichonderio –adipo-dermalflap technique is a simple, less traumatic procedure for correction of prominent ear. It provides natural looking round contour anti-helical fold with low recurrence rate and without major post-operative complications. However this technique needs careful and meticulous dissection. These patients with deep concha gained less promising results. Hence; we can state that distal based Perichonderio –adipo-dermalflap is suitable for reconstruction patients with prominent ear deformity a part from those with deep concha.

Hence, we recommend using three layerflap for correction of prominent ear deformity except those with deep concha. However, larger number of patents and longer follow up period are required to ensure the versatility of this technique .

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