

STUDY ON RECONSTRUCTION OF AURICULAR DEFECTS IN PATIENTS WITH ACUTE INJURIES IN A TERTIARY CARE HOSPITAL

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Abstract

Background: Repair of auricular defects is aesthetically demanding to the surgeon due to the unique chondro-cutaneous composition of the auricle and the relatively delicate blood supply of the structures of the pinna. **Materials and Methods:** Forty patients with acute traumatic defects of the auricle, who presented between Feb 2022 to Jan 2023, to the Department of Plastic Surgery, Guntur Medical College, Guntur, were included in the study. **Result:** Most of the patients belonged to 21 – 30 years with males being more than females. The right side was more involved. The upper 1/3rd was more involved followed by the lower 1/3rd. Road traffic accidents were the most common etiology. **Conclusion:** Post traumatic auricular defects can lead to disfiguring deformities; hence reconstruction of such defects is imperative.

INTRODUCTION

Auricular injury is very common owing to its prominent position and the tendency of human nature to expose their ears towards direct facial trauma to avoid injury to the face.^[1] Auricle is made up of only elastic cartilage, without any bony support, which makes it even more vulnerable to avulsion injuries and thus disfiguring the face.

Auricular injuries may vary from simple lacerations to complete avulsions. A complex injury of the ear almost always involves cartilage exposure. Road traffic accidents, ballistic injuries, and animal/human bites are common causes of these injuries. The most popular anatomical classification of full-thickness defects of the ear is (1) defects of the upper third, (2) middle third, (3) lower third, (4) partial loss, (5) total loss, and (6) loss of lobule.^[2] The unique three-dimensional anatomy with multiple concavities and convolutions of the cartilage covered by a thin delicate skin, make reconstruction of auricular defects one of the most challenging surgeries.^[1,3]

There are several factors to be considered to achieve symmetry, normal position, and appearance of the auricle. The principal facets that ensure a successful ear reconstruction include attention to tissue manipulation during surgery, availability of well-vascularized functioning tissue, aesthetic considerations, psychosocial benefits of auricular reconstruction, and patient expectations.^[4-6]

The goal of reconstruction is to precisely duplicate the missing anatomical part about size, orientation, and anatomical landmarks.^[7] The methods of reconstruction include suturing and incorporation of flaps or grafts.

The main aim of this study was to evaluate and reconstruct acute injuries of the auricle.

MATERIALS AND METHODS

This prospective observational study was conducted between February 2022 to January 2023 in the Department of Plastic Surgery, Guntur Medical College, Guntur. Forty patients presenting with post-traumatic or post-assault ear defects with loss of ear or its parts were included in the study. Patients with acquired ear defects like ear deformities due to multiple ear piercings, keloid/hypertrophic scar over-ear, acute ear infections, neurofibroma, and congenital ear deformities like cup ear, cryptotia, etc, were excluded from the study.

All patients were subjected to a detailed history and general examination. A local examination of the damaged ear was done. Informed written consent was obtained from each patient according to the regulations of the local research ethics committee.

In all patients, debridement of the wound was done and skin margins were excised. Reconstructive surgery was done using general anesthesia in 26 patients and ring block local anesthesia in 14

patients. Post-operatively all patients were followed up to 3 months.

RESULTS

A total of 40 patients underwent reconstructive surgery in the Department of Plastic Surgery, Guntur Medical College, Guntur. The mean age of study patients was 32.17 years, with the youngest

patient 8 years old and the eldest patient 60 years old. The majority of the patients belonged to 21- 30 yrs of age group (40%).

35 (87.5%) patients were males, while the rest were females (n = 5; 12.5%). Male to female ratio was 7:1. The right ear was most commonly involved (n = 20; 50%), while the left ear was involved in (n = 18; 45%), and bilateral ears were involved in 2 patients (5%).

Table 1: Age-wise distribution of study patients

Age	No. of patients	%
1-10 yrs	2	5 %
11-20 yrs	4	10%
21-30 yrs	16	40%
31- 40 yrs	11	27.5%
41- 50 yrs	5	12.5%
51 – 60 yrs	2	5%
Total	40	

Table 2: Etiology

Etiology	No. of patients	%
Dog bite	1	2.5%
Human bite	1	2.5%
Road traffic accidents	38	95%
Total	40	

Road traffic accidents were the most common cause of auricular injuries (95%). There was one patient with auricular injury due to a human bite and one patient due to a dog bite.

Table 3: Site of ear involved

The site of the ear involved	Patients	%
Upper 1/3rd	25	62.5%
Middle 1/3rd	2	5%
Lower 1/3rd	8	20%
Unclear	5	12.5%
Total	40	

The upper 1/3rd of the ear was involved in 25 patients (62.5%). Lower 1/3rd was involved in 8 patients (20%), middle 1/3rd was involved in 2 patients (5%). The extent of involvement was unclear in 5 patients (12.5%)

Table 4: Timing of repair

Timing of repair	Patients	%
Immediate	24	60%
1st week	12	30%
2nd week	1	2.5%
>2 weeks	3	7.5%
Total	40	

Most of the ear defects were repaired immediately (60%), while 30% underwent reconstructive surgery within 1st week of trauma. 7.5% underwent surgery after 2 weeks.

Table 5: Repair technique

Management technique	Patients
Suturing	27
Flaps	13
Grafts	2

27 patients required suturing, 2 patients required graft and 13 patients required flaps to reconstruct. Post-operatively complications included raw area exposure in 1 patient with graft, suture line blackening in 3 patients, and cartilage exposure in 2 patients. After 3 months of follow-up, all patients were satisfied with the outcome.

DISCUSSION

Many challenges exist when evaluating and treating ear trauma because of the unique three-dimensional anatomical architecture of the auricular cartilage.^[8] Auricular defects may result from traumatic avulsion, burns, trauma, or tumor extirpation. In our study, all patients experienced traumatic etiology. The average length of an adult ear is 5.5 cm to 6.5 cm, with the width equivalent to 60% of its length.

The age of the patient is an important variable in auricular reconstruction because growth is fairly rapid in early life, attaining nearly 87% to 97% of the final height and width by five years of age. Development is fully completed by early adolescence. The cartilaginous framework remains stable in the latter stages of life while the lobule undergoes elongation, and narrowing and becomes ptotic.^[9]

The majority of the patients in the present study were 21-30 years of age. The mean age of the study group is 32.7 yrs. Kolodzynski et al,^[10] observed similar mean age of 29.7 years in the female group and 33.2 years in the male group in his study of 105 patients.

Males to females ratio was 7:1 in the present study. Alireza et al,^[11] had male to female ratio of 4.7:1 in their study.

The right ear was most commonly involved in the present study. A study done by Katwala PK et al,^[12] also had right-side predominant injuries.

Wang,^[13] divided auricular defects into central, peripheral, and large central and peripheral defects. Peripheral defects were further subdivided into upper one-third, middle one-third, and lower one-third defects. We adhered to this classification in our patient selection. The upper 1/3rd was most commonly involved in the present study.

Geary and Davis,^[14,15] advocated chondro-cutaneous flaps as the stability of helical defects cannot be accomplished by cutaneous flaps alone. Gavello described that the defects of the lobule are best reconstructed with a folded transposition flap.^[16] These flaps of various designs have been used in the reconstruction of auricular defects. Although the aesthetic outcome of chondro-cutaneous flaps is considered to be good, the size of the reconstructed auricle is smaller and the contour is rounded when compared with the contralateral side.^[17-19] In the present study, 13 patients required flaps for reconstruction.

Cartilage grafting and soft tissue cover is another option for reconstruction of full-thickness defects in the upper one-third of the auricle. Autologous cartilage sources for grafting include the contralateral concha, nasal septum, or costal cartilage.⁷ Brent²⁰ advocates the usage of both ipsilateral and contralateral conchal cartilage grafts for reconstruction of partial auricular due to its delicate structure. Costal cartilage, although frequently used for total auricular reconstruction, is thicker requires precise cutting, and is not suitable for one-stage grafting repair of partial auricular defects.^[21] 2 patients underwent graft repair in the present study.

All patients involved in the present study were post-traumatic cases. Aesthetic outcome was satisfactory in all of the patients without any functional problems because of the adequate ear projection and maintenance of the post-auricular sulcus. A few minor complications were encountered in our

patients such as blackening of the suture line, raw area exposure, and cartilage exposure.

CONCLUSION

Reports regarding the reconstruction of post-traumatic auricular defects are scarce in the recent literature. Hence this study was done to assess the outcomes of reconstructive surgery in patients with acute injuries of auricle.

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