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Methods to Evaluate Congenital Ear Deformity

Jacob Antony Chakiath[1], Ravi Kumar Chittoria[2]

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ABSTRACT

External ear defects are common and occur in roughly 5% of the total population. The common congenital ear deformities were anotia, microtia, crytotia, hypoplasia, constricted ear/cup ear/lop ear, prominent ear, stahl ear deformity. This manuscript shows methods to evaluate a case of congenital ear deformity.

Keywords: Congenital ear deformity; Microtia.

INTRODUCTION

The ear divides into three areas: the external, middle, and inner. Based on location, different malformations can present. A malformation is not only a change in appearance but also an alteration in function. External ear defects are common and occur in roughly 5% of the total population.[1] The most common malformations consist of combined external and middle ear deficits, called congenital aural atresia.[2] Microtia is a term used to describe the underdevelopment of the pinna, whereas anotia is a term used for an absence of pinna.

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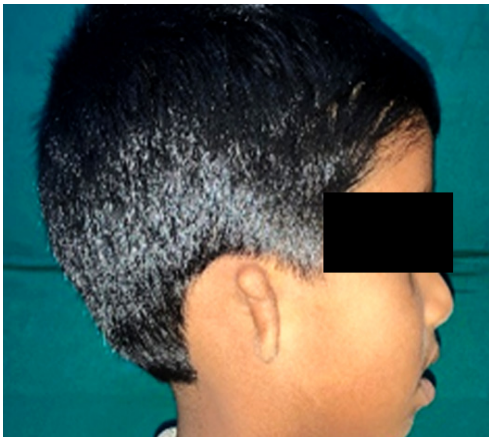
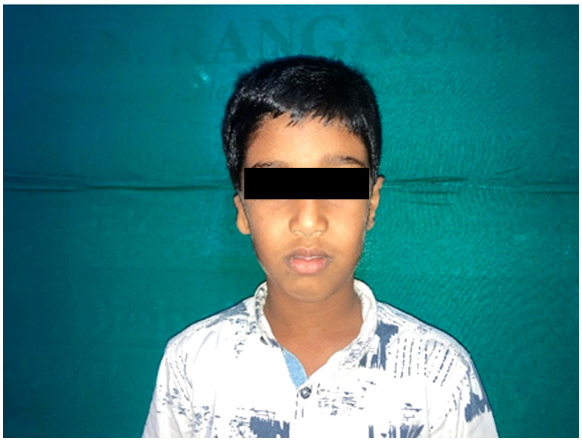
MATERIALS AND METHODS

This template of evaluation was made after going through standard text books in plastic surgery and extensive Google search. The common congenital ear deformities were anotia, microtia, crytotia, hypoplasia, constricted ear/cup ear/lop ear, prominent ear, stahlear deformity. The demonstrated template is a case of microtia. It's an example of template to show how to evaluate a case of congenital ear deformity.





Introduction

Before starting history or examination first introduce the patient under following headings:

Name:

Age:

Gender:

Occupation:

Address:

Education status:

Known Comorbidities:

CHIEF COMPLAINTS

Deformity of ear Since Birth

History of Presenting Illness

Inform whether history was taken from patient, parents or relatives.

Before taking details related to chief complaints ask antenatal, perinatal, post-natal, immunization & development history of the patient.

In the antenatal history ask about following details

- What is the birth order?
- Any infertility treatment taken?
- What was the age of mother and father at the time of conception?
- Is there any history of consanguinity?
- Is there any history of infection, fever, rashes, radiation exposure drug intake (phenytoin, steroids, retinoids, native drug or other teratogenic drugs), and comorbidities of themother (anaemia, folic acid deficiency, diabetes, hypertension, hypothyroidism, seizure disorders) during pregnancy?
- Was mother hospitalised for any illness during pregnancy?

In the perinatal history ask about following details

- Was the child born full term/pre-term?
- Was it a home or hospital delivery?
- Whether the delivery was normal vaginal delivery or by caesarean section?
- If born at home, who assisted in delivery?
- Was there any use of forceps/vacuum equipment?
- Did the mother hear the child cry immediately after birth or not?
- History of any cyanosis/breathing difficulties**?**

In the post-natal history ask following details

- Any history of pathological jaundice?
- Any ICU admission (reason & duration for admission)?

Any history of any emergency/elective surgeries done (for Pierre Robin Syndrome, ocular deformities, craniofacial microsomia, Treacher collins syndrome, Goldenhar syndrome, Tracheoesophageal fistula, Imperforate anus, congenital heart anomalies, renal anomalies etc.).

Any feeding difficulties postnatal (suckling difficulties).

IMMUNIZATION HISTORY

Whether baby has received immunisation according to the National Immunization Schedule.

Developmental history

Was there any delay in attaining developmental milestones for that age including IQ and performance in school?

History of presenting illness

In general, irrespective of type of congental ear deformity, ask:

- Whether it is unilateral or bilateral
- Which part of the ear is affected
- Any change in position of the ear
- Any change in shape of the ear
- Any change in size of the ear
- Any change in direction of the ear
- Any presence of accessory tissue (ear tags or

extra ear)

- Any presence of pits
- Whether external auditory canal absent or present

Ask history related to difficulty in swallowing, hearing, speech, closing of eyes, drooling of saliva, loss of taste, difficulty in frowning of eyebrows, deviation in mouth, difficulty in blowing.

Ask history of any other congenital defornities present in the body.

Ask any history of psychological, social, school/studies performance disturbance.

Ask history related to syndromes associated with congenital ear deformity (including Treacher Collins Syndrome, Goldenhar Syndrome, Craniofacial Microsomia, Hemifacial microsomia, etc).

TREATMENT HISTORY

Ask history of treatment (medical & surgical) received for the ear deformity. In case patient underwent some reconstructive surgeries then ask how many stages/numbers of surgeries have been performed. Ask what all donor sites have been used for cartilage, fascia & other tissues in previous reconstructive surgeries. Ask if any other surgeries have been performed for other problems like hearing, facial palsy related functional problems or any other congenital anomalies.

Past History

Ask any past history of comorbidities like diabetes mellitus, asthma, tuberculosis, hypertension, malignancies, blood disorders, drug allergy and hospitalization, surgeries, etc.

Family History

Ask history of any similar ear deformity or any other congenital anomalies in the family.

Personal History

Ask about patient's study performance, sleep, appetite, diet, bowel & bladder habits and any addictions, socio-economic status.

GENERAL EXAMINATION

Mention about patient's level of consciousness, coherence, orientation, built, nourishment, position & co-operation.

Mention about vitals of the patient including temperature, pulse, blood pressure & respiratory rate.

Head To Toe Examination

Mention in head to toe examination findings including pallor, icterus, lymphadenopathy, cyanosis, edema, clubbing, hydration, presence of any congenital anomalies (musculoskeletal or visceral) or associated syndromes including Treachercollins syndrome (down slanting palpebral fissures, Malar hypoplasia, hypoplasia of zygomatic complex, conductive hearing loss, mandibular hypoplasia, micrognathia), Craniofacial microsomia (facial clefts, macrostomia, retrognathism, craniosynostosis, external auditory canal atresia, preauricular tags), Goldenhar syndrome, etc.

Systemic Examination

In cardiovascular system mention about presence or absence of external chest wall deformities, normal heart sounds (S1, S2), added sounds (murmurs) and findings related to congenital heart anomalies (TOF, ASD, VSD, PDA etc).

In respiratory system mention about presence or absence of external chest wall deformities, chest wall expansion, chest wall circumference, previous surgery scars, normal vesicular breath sounds, any added sounds (wheeze/crepitations) or absence of breath sounds.

In the gastrointestinal system, mention about any palpable mass & bowel sounds.

In the central nervous system mention about any neurological deficits or palsies including facial nerve palsy and intelligence quotient (IQ).

In the Musculoskeletal system mention about any No spinal anomalies/any weakness of muscles

Regional Examination (Face) is done with adequate lighting, with patient in the sitting, lying down and standing position:

Regional Examination

In the Examination of face mention shape, if face is in the midline.

On inspection of the face in frontal profile:

- Scalp appears: Normal, hairs appear normal in colour, texture and distribution, hair line appears receded.
- In upper third of the face (hair line to nasion): Frontal prominence is there, eye brows appear normal, temporal region appears normal.
- Middle third (nasion to subnasale): Nose

appears normal, upper and lower lids appear normal, inter canthal distance appears normal, eyeball appears normal, zygomatic region appear normal.

- Lower third (subnasale to menton): Upper and lower lips normal, chin central position, cheeks appear normal, nasolabial folds: normal.
- Functional examination of face: Normal frowning, eye closure, cheeks puffing, smile normal.

On inspection of the face in right lateral profile

Scalp: appears normal

Temporo parietal region: appears normal

Forhead: appears prominent

Eyebrow: Normal

Zygomatic region: Appears normal

Cheek region: Appears normal

Ear: ear is absent on the right side with only vertical ridge with depression anteriorly, prominence of lobule, concha seen, auriculo-scalp angle not well defined, external auditory meatus not visible.

Eyeball: Appears normal

Eyelids: along with lashes: Normal

Nasolabial angle: Appears normal

Lips: Normal

Chin: Normal projection

Cervico–mental angle: Normal

On inspection of the face in left lateral profile

Scalp: Appears normal

Temporo-parietal region: Appears normal

Forhead: Appears prominent

Eyebrow: Normal

Zygomatic region: Appears normal

Cheek region: Appears normal

Left ear: Appears normal in size and projection

Eyeball: Appears normal shape

Eyelids: Along with lashes: Normal

Nasolabial angle: Appears normal

Lips: Normal

Chin: Normal projection

Cervico-mental angle: Normal

On Inspection of the Face-In Posterior Profile

Bilateral ear projection and cephalo-conchal angle: Normal:

Occipital region appears normal

Vertex/Parietal region: Normal

Hairline and hair distribution: Normal

Neck symmetry: Normal

No ulceration, no swelling

Inspection in Bird's Eye View

Scalp and hair distribution: Normal

Anterior hairline appears low set

Forehead appears prominent

Eyebrows appear normal

Eyeballs appear normal

The nose appears in the midline, Nasal tip (position, angle, projection) and the lateral segment appear normal

Cheek regions appears normal

Zygoma and temporal region appear normal

Inspection in Worm's Eye View

Mandibular region: Mandible appears hypoplastic, chin and right mandible more hypoplastic

Lips appear normal

Cheek region appears normal

Nose: Tip, nostril floor, Membranous septum and lateral segment appear normal

Zygomatic region appears normal

Ears ear is absent on the right side with only vertical ridge with depression anteriorly, no reminisce of lobule, concha seen, auriculo scalp angle not well defined, external auditory meatus not visible

Left ear appears normal in size and projection

Orbital region appears normal

Frontal region appears normal with receded hair line

Palpation

- Scalp region: Findings of inspection confirmed
  - Head circumferene
  - Hair quality: Normal, hair plucking test-negative

- Skin: no scar, lesion
- temporalis present, contraction present
- STA pulsation present
- Sensation normal
- Fontanelle fused
- Suture lines: Normal
- No bony irregularity/deformity/swelling
- No tenderness or any other abnormality

- **Frontal region:** Findings of inspection confirmed
  - Skin: Normal
  - No bony deformity/swelling palpable
  - Frontalis muscle present, contraction present
  - Frontal sinus: Normal (torch test)
  - Sensation normal
- **Eyebrow region:** Findings of inspection confirmed
  - Hair: Normal in texture and distribution, Plucking test: Normal
  - Supraorbital margin: Normal
  - Sensations: Normal
  - No tenderness
  - No bony deformity/swelling palpable
- **Orbital region**: Findings of inspection confirmed
  - **Upper eyelid**: All Soft tissue structures from the skin to conjunctiva are normal including lid margin and eyelashes. Upturning test: Normal, Punctum is visible and normal. Upper eyelid movements are normal. Sensations normal. Position of upper eyelid normal in front gaze.
  - **Lower eyelid**: All Soft tissue structures from skin to conjunctiva are normal including lid margin, eyelashes and punctum. Pull down test: Normal. Sensations normal.

Eyeball/Globe Examination

Pupil: Normal size, shape, symmetry, direct and indirect light reflex: present

Iris: Normal size and shape, colour brownish with no hyper or hypopigmentation, no nodules

Sclera: Colour normal, surface: smooth, no abnormal pigmentation or nodularity

Sclera: corneal junction normal

cornea: sensation present, cornea clear

Palpebral fissures: size in cm, shape in cm, medial and lateral canthal: normal, equal bilateral, punctum: normal

fornices: both superior and inferior fornices normal, no foreign body

Orbital Rims: No tenderness, no step deformity, no mass palpable in the orbital margins.

Extra: ocular muscle function: Normal

NOSE

External Examination

- Finding of inspection confirmed, nose in midline
- Skin: Appears normal in all region including colour, texture, mobility with no swelling, tenderness and hypo or hyperpigmentation
- Bone (including nasal, vomer, frontal and maxillary spine): are normal with no elevation/depression, no tenderness or crepitus, no step deformity
- Cartilage (Upper and lower lateral): Normal
- Cottle test: Negative
- Nasal valve angle normal 10-15 degree
- Nasolabial angle
- Naso-collumellar angle
- Nasal lobule to nostril ratio= Normal (1:2)
- Tip projection = Alar base width

Internal Examination

- Normal nostrils, normal hair
- Membranous and cartilagenous septum normal
- On examination with Thudicum speculum-Septum/turbinate: Normal

Zygomatic Region

Inspection findings confirmed

No bony abnormalities/step deformity/Mass

No evidence of buccinator hypertrophy

No maxillary sinus tenderness

Lip and Chin

Function of orbicularis oris

Inspection findings confirmed

Sensations

- Vision
  - Visual acuity
  - Schirmer test
- Hearing
  - Rinne's test
  - Webber's test
  - External auditory canal Examination
- Lymphnode: preauricular/postauricular/ neck nodes

Intraoral Examination

Cleft in the palate is extending from ___ to ___

Width of the cleft, the gap in the palate is approximately ___ cms

Palatal shelves are horizontal and of adequate/ inadequate width

Palatal length is adequate / inadequate

Shape of the cleft

Position of the lower ridge of the vomer

Inclination of the palatal shelves

Length/symmetry/mobility of the soft palate

Degree of motion of the lateral pharyngeal walls

Distance between the posterior edge of the soft palate and posterior edge of the pharyngeal wall

Presence of passavant's pad

Amount of adenoid tissue (if visible)

Size and state of the tonsils

Ear examination is done in zones (upper, middle, lower third)

Upper third, mention about helix, antehelix, crus of helix

In middle third mention about tragus, antitragus, scaphoid fossa

Left ear: Normal. No anomalies detected

Right ear: Helix, antihelix, concha, scaphoid, triangular fossa, tragus, antitragus absent.

Ear Remnant With Hypo Plastic Lobule Positioned at the Same Level as the Opposite Normal Ear.

External auditory meatus not visualized

Hairline normal

Preauricular side burn +

No sinus, pits, scars noted in the preauricular/ postauricular region.

Hearing Test

Rinne's test

Weber's test

DIAGNOSIS

Feature	Anotia	Microtia	Constricted ear	Prominent ear	Cryptotia
Helix	Absent	Absent	Hooded	normal	Normal
Ante helix	Absent	Absent	Flattened	Norma	Normal
Concha	Absent	Remnant found in concha type	Normal	Normal	Normal
Tragus	Absent	Remanent found in concha type	Normal	Normal	Normal
Projection	Absent	Absent	Normal	Prominent	Absent
Auriculo cephalic angle	Absent	Absent	Normal	>150′	Absent

Congenital right sided lobule type microtia, with no other associated congenital anomalies, with conductive hearing loss

Investigations

To add on to my diagnosis

Hearing assessment

HRCT temporal bone

USG abdomen

Cardiac echo

Chest X ray

For anaesthetic fitness

CBC, BUSE, LFT, viral markers, blood grouping typing

DISCUSSION

Cryptotia

Cryptotia is a congenital ear deformity in which upper pole of ear cartilage is buried underneath the scalp. The superior auriculocephalic sulcus is absent but can be demonstrated when you pull up the helical pole. Various surgical corrections are reported from Japan, due to the high prevalence of cryptotia, as frequently as 1:400. Non-surgical ear moulding treatment may be applied if the child is in early neonate stage. The goal of surgical treatment is to create the retro auricular sulcus by skin grafts, Z-plasty, V-Y advancement, or rotation flap.[3] Common cartilage deformity associated with cryptotia is helix scapha adhesion, which may be addressed by cartilage remodelling techniques.

Stahl Ear

Stahl ear, a rare congenital auricular deformity, is characterized by the third crus extending toward the helical rim. Stahl ear is classified into three types:

Type 1: Obtuse-angled bifurcation of antihelix; looks as though superior crus is missing

Type 2: Trifurcation of antihelix

Type 3: Broad superior crus and broad third crus (protruded scaphoid fossa)

Ear moulding may work well if ear moulding is started in early infancy. Surgical treatment is broadly categorized into two types: cartilage/skin excision and cartilage alteration. Type 1 Stahl ear needs special a mention, to reconstruct missing superior crus, by using excised third crus or rib cartilage graft or creating superior crus by sutures or cartilage cutting.

Constricted Ear

Constricted ear is a concept proposed by Tanzer in 1975.[4] In constricted ear, helix and scaphafossa are hooded, and crura of antihelix is flattened in various degrees. One gains an impression that the rim of helix has been tightened. Constricted ear is often referred as cup or lop ear. Tanzer classified constricted ear into three groups based on the severity of defect/deformities.

Tanzer Classification of Constricted Ear

Group Description

I Involvement of helix only

II Involvement of helix and scapha

II-A No supplemental skin needed at margin of auricle

II-B Supplemental skin needed at margin of auricle

III Extreme cupping deformity; often associated with incomplete migration, forward title.

Stenosis of External Auditory Canal, and Deafness.

Tanzer group 1: Mild deformities of helix, often called lop ear. Defect involves helical cartilage with minimum skin defect. Musgrave technique is a useful method to expand the helix. Through either anterior or posterior skin incision, multiple cuts were made to the curled cartilage, fan upward and backward, fixed to the curved strut made of concha cartilage graft. The skin is then re-draped across the reconstructed framework. For milder constricted ear (group 1,2 A), focusing surgical correction to construct helical curve is the reasonable option while keeping the original elastic cartilage framework, avoiding hard rib cartilage framework. When superior crus is deficient, partial helix plus superior crus frame from rib cartilage[5] can normalize the deformity.

Tanzer group 2B: Has both skin and cartilage defect in the upper onethird of the auricle. The loss of folding may involve anti-helical crura, and hooding is more pronounced. The height of the ear is sharply reduced. Park[6] proposed versatile solution for group 2B constricted ear. For helical skin defect, Park modified the Grotting flap (postauricular flap), creating both skin flap and fascia flap with the same pedicle. For helical cartilage defect, eight rib cartilage is harvested, the helix is fabricated, and the entire length of helix is constructed.

Tanzer group 3: Most severe cupping and failure of migration. Brent recommends to treat severe constricted ear as if it is a form of microtia, when the construction is severe enough to produce a height difference of 1.5 cm. Nagata recommends treating severe constricted ear as a concha type microtia, to replace the defective framework with a full rib cartilage framework.[7]

Ear Molding in Miscellaneous Ear Anomalies

Matsuo, who first reported ear molding treatment for congenital ear deformities, states that when the ear deformities are not hypoplastic, non-surgical correction is easy and reliable.[8] Stahl ear responds well to the nonsurgical correction only during the neonatal period, whereas protruding ears and cryptotia respond until approximately 6 months of age (Matsuo). It is widely believed that the early initiation of molding is more effective because maternal estrogen in the neonate keeps ear cartilage soft and elastic.

Most agree that if ear molding is started after 3 months of age, the response tends to be poor.

Helix-antihelix adhesion responds poorly to the ear molding treatment and may not be the indication of the ear molding. Skin irritation is probably the most frequent complication, possibly due to tape or adhesive.

MICROTIA

Epidemiology and Pathophysiology

Microtia (small ear) is a congenital condition with unknown cause. Prevalence of microtia varies significantly among ethnic groups (0.83–17.4 per 10,000 births) and is higher in Asian countries for unknown reason. 80% to 90% of microtia is unilateral, and 10% to 20% is bilateral. There are more than 18 different microtia associated syndromes with single gene.

Chromosomal aberrations; however, there is no causal genetic mutation confirmed to date. A relatively common syndrome associated with microtia is hemifacial microsomia and Treacher-Collins syndrome. Isolated microtia rarely run in families. Treacher-Collins syndrome, inherited in an autosomal dominant fashion, often presents with bilateral microtia.

CLASSIFICATION

Many attempts have been made to classify microtia based on embryo genicdevelopment and severity of the deformities. Nagata's classification is based on surgical correction of the deformity[9-11]

Anotia: Absence of auricular tissue

Lobule type: Vestige ear with lobule, without concha, acoustic meatus, and tragus

Concha type: Vestige ear with lobule, concha, acoustic meatus, and tragus

Small concha type: Vestige lobule with small indentation of concha (need lobule type construction)

Atypical microtia: Cases do not fall into previous categories

Patient Assessment and Workup

About 20% to 60% of children with microtia have associated anomalies or an identifiable syndrome; therefore, individuals with microtia should be examined for other dysmorphic features. Microtia is a common feature of craniofacial microsomia, mandibular dysostoses (eg, Treacher-Collins and Nager syndromes), and Townes-Brocks syndrome, and these conditions should be considered among the differential diagnosis when evaluating an individual with microtia. If there is family history of syndrome, genetic counseling may be necessary.

Physical Examination

Identify the type of microtia, size, dimension, and type of normal auricle, if unilateral. Normal side may not be normal and may have subtle ear deformity such as helix-antihelix adhesion. Evaluate the symmetry of face, facial animation (partial facial paralysis is frequent finding), and dental occlusion. Hemifacial microsomia is often associated with difficult airway for intubation.

Diagnostic Studies

Audiologic testing to determine conductive versus sensorineural defect.

Temporal Bone Imaging

High resolution CT scan for evaluating middle ear ossicles to assess the possibilities of future otologic surgery.

MRI to determine the course of facial nerve, often displaced, especially in the absence of pneumatized mastoid.

Rule out the presence of cholesteatoma (squamous epithelium trapped in the middle ear), present in 4% to 7% of atresia.

Atresia and Middle Ear Anomalies

In bilateral microtia, early and conscientious use of bone conductive hearing aid is imperative for hearing and speech development. Most of hearing deficits in children with bilateral microtia are managed with hearing aids.

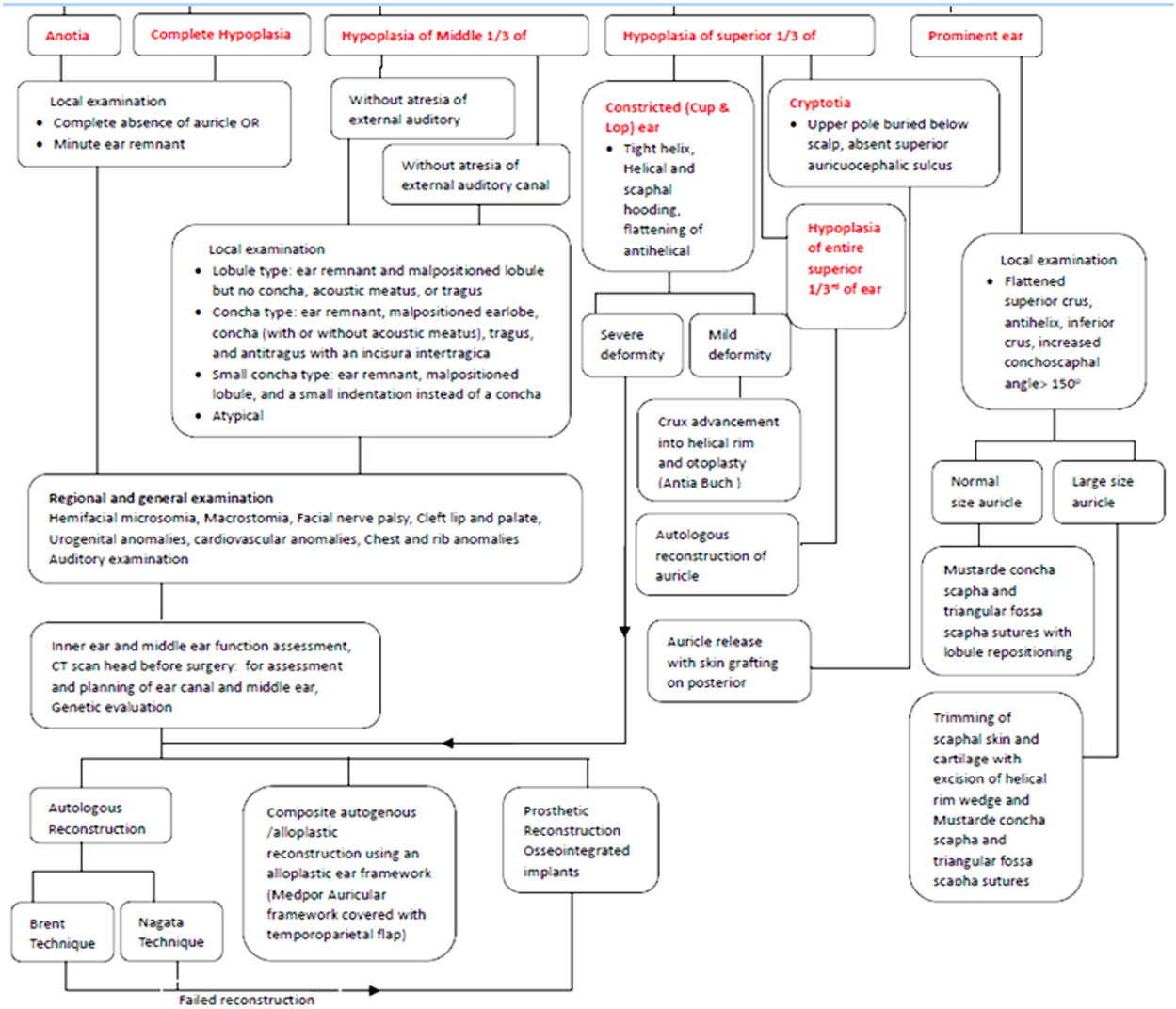
Treatments of microtia ideally involve reconstruction of the external ear and the restoration of normal hearing.[12] Hearing impairment in microtia is related to abnormal auditory canal, tympanic membrane and middle ear. The problem is conduction. Typically, microtia patients have a hearing threshold of 40 to 60 dB on the affected side. By comparison, normal functionallows us to hear sounds between 0 and 20 dB. Regarding middle ear surgery for hearing restoration, most surgeons presently feel that potential gains from middle ear surgery in unilateral microtia are outweighed by the potential risks and complications for the surgery, and this surgery should be reserved for bilateral cases. Careful selection of the atresia surgery candidate is important to achieve optimal outcome and more importantly to avoid unnecessary surgery

and its complications. Jahrsdoerfer criteria are a widely accepted guideline to select atresia surgery candidates.[13] The bone anchored hearing aid (BAHA; Cochlear, Mölnlycke, Sweden; and Ponto; Oticon, Kongeballen, Denmark) has been used since 1977, which does not need functioning middle ear or patent canal. In microtia patients, BAHA was initially started to use for bilateral microtia with bilateral conducting hearing loss: Unilateral BA HA is usually placed because a single aid will stimulate both cochlea simultaneously. The drawback of BAHA is the interface between titanium and skin: It may cause skin irritation or infection. BAHA has a retention rate of over 95% on long term follow-up, with a soft tissue reaction rate of 30%.[14]

Brents technique of auricular reconstruction

MANAGEMENT

Treatment Planning Algorithm



Source: @ Chapter 12: Microtia and congenital ear anomalies, Treatment Planning in Plastic Surgery by Dr Ravi Kumar Chittoria[15]

Stage 1: Auricular framework placement - donor site from contralateral 6,7,8,9 costal cartilage.

Stage 2: correction if malposition ear lobule.

Stage 3: Framework elevation.

Stage 4: Concha, triangular fossa, tragus reconstruction.

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How to Evaluate an Acquired Ear Deformity

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Abstract

Trauma and tumor are the most common causes of acquired ear defects that surgeons are frequently called on to treat. Trauma may result in hematoma or laceration of the ear. In addition, both trauma and tumor excision may result in skin or cartilage loss.

Keywords: Acquired ear deformity; Trauma.

INTRODUCTION

Acquired ear deformities present unique and varied problems which tax the ingenuity of the plastic surgeon. Case individualization is necessary, and a systematic assessment of the residual tissues is a requisite when planning an appropriate reconstruction. Trauma and tumor are the most common causes of acquired ear defects that surgeons are frequently called on to treat.[1] Trauma may result in hematoma or laceration of the ear. In addition, both trauma and tumor excision may result in skin or cartilage loss. Cases performed by one surgeon have been used to demonstrate the evaluation of acquired ear deformity.

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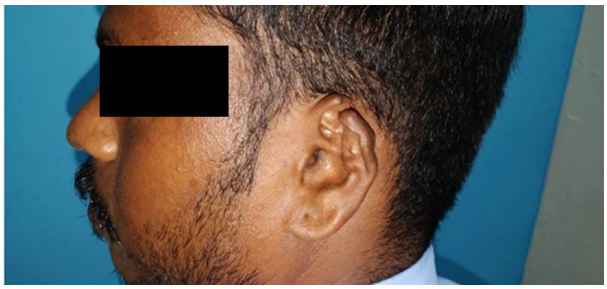
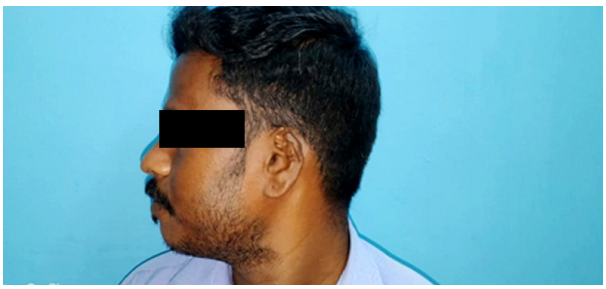
MATERIALS AND METHODS

This template of evaluation was made after going through standard text books in plastic surgery and extensive Google search. The common acquired ear deformities were trauma, hematoma, laceration, tumor of the ear. The demonstrated template is a case of tumor of the ear. It's an example of template to show how to evaluate a case of acquired ear deformity.





INTRODUCTION

Before starting history or examination first introduce the patient under following headings:

- Name:
- Age:
- Gender:
- Occupation:
- Address
- Education status
- Known Comorbidities

Patient might come to emergency or out patient department with following acquired deformities possible:

1. ***Only deformity***
   - Closed injury of the ear due to blunt injury, contusion, fall, assault, burn (flame, radiation, scald, chemical, flash type of electrical, frost bite), tumor etc.
   - Open injury of ear which healed: piercing of ear, laceration, abrasion, stab injury, avulsion, assault, surgery, bite,heavy earrings etc.
   - Infection – Exogenous: Due to
     - Bacteria (Staphylococcus, streptococcus, pseudomonas/mixed) leading frunle cellulitis, malignant otitis external
     - Fungal: Candida
     - Viral: Herpes zoster

2. *Endogenous: TB, Leprosy*
   - Only defect / loss
   - Loss of auricular skin/ cartilage: minor traumatic injury (abrasion, avulsion), burns (thermal burns, scald burn, electrical burn), bite (human bite, animal bite), etc.
   - Full thickness defect of auricle into six group (less than 25% or more than 25%).
     1. Upper third defect
     2. Middle third defect
     3. Lower third defect
     4. Helical rim
     5. Ear lobe loss
     6. Total loss

Causes of full thickness loss: sharp slash, flying glass, gunshot, flame or radiation burn, human or dog bite.

3. *Deformity with defect/loss causes are due to causes mentioned above.*

I will approach the patient under the following headings:

- Chief complaints
- History of presenting illness
- History of treatment
- History of past
- Personal history
- Family history
- Diagnosis

CHIEF COMPLAINTS

1. Unilateral/bilateral Deformity /Defect of earsince/Defect with deformity since duration.

History of Presenting Illness

Patient was apparently well duration ago, when he/she got injury/swelling/ulcer/inflammation/ other causes to right/left ear, treatment given following which the deformity/defect developed.

According to the possibility if the chief complaints I will proceed in history of presenting illness.

1. **History Related to Deformity only**
   - **Detailed history of closed injury**
     - History of blunt trauma, tumor, burn, irradiation.

History of blunt trauma followed by swelling: direct impact/fall.

Any external injury/swelling/hearing loss/ bleeding from ears.

Ask for any history of brain/cervical spine injury.

Any history of Hearing impairment:

- History of change in shape and progress
- History of increased in size
- History of pain(nature of pain, confined/ refferred, intermittent/continuous pain)
- History any other associated symptoms

History of tumor in ear: Rapid/ slow growing, when first noticed, any surgery done previously, any irradiation given.

History of Burns: The Mode of burns (Thermal,

Flame, Scald, Electrical, Chemical Blast).

Duration of the contact with the source

How it was extinguished/ Contact stopped/ Any symptoms of Facial, Scalp, Neck, air way/ Inhalational Injury or Poisoning.

- What was Total Body surface area involved?

Is the sensation preserved over the ear (loss of pain is a sign of second degree deep burn or above).

2. **Detailed history of open injury**

History of type of injury

Time lapsed between injury and deformity

History regarding duration to heal

History of any wound which took time to heal

History of Bite: Human Bite, animal bite (If animal rule out the risk of Rabies).

- Was The wound cleaned properly?
- Was the individual previously vaccinated for Tetanus/ was given any Tetanus Toxoid or Tetanus immunoglobulin injection given now?
- Was the alleged animal vaccinated for rabies?
- Was the individual previously given any anti rabies vaccine?
- Was any prophylactic antibiotics given?

Was the wound sutured or closed previously, or was the wound left open.

History of laceration/Cut Injury: The alleged weapon, is it corresponding with the nature of the wound (Medicolegal importance).

- Was the wound cleaned properly?
- Was the individual previously vaccinated for Tetanus/ was given any Tetanus Toxoid or Tetanus immunoglobulin injection given now?
- Was any prophylactic antibiotics given?
- Was the wound sutured or closed previously, or was the wound left open
- History of Ear blockage
- History of Ear Piercing – When was it done, where was it done, how was it done, what method was used?
- Done by whom? professional/quack/ medical
- What type of pierce was used?
- When was the deformity seen after the procedure?
- History of heavy earrings

- Detailed history regarding any endogenous infection/Exogenous.

Endogenous Infection.

- *History related to leprosy*

  Is there any hypopigmented patch anywhere in body with decreased sensation, decreased peripheral nerve sensations.

  History of trophic ulcer in hand, foot.

- *History related to TB*

Any history of chronic cough

Any history of lymphnode enlargement

Any history of ear discharge

- *History related other infection*
  - History of abscess
  - History of pain
  - History of discharge

Exogenous Infection

- What was the infection
- How it was caused
- Where was it treated
- What treatment was taken, duration, compliant or non-compliant
- Any discharge either purulent, serous

2. *Detailed history regarding only defect/loss*

- History if only skin or cartilage loss
  - History of burn – as above
  - History of any RTA- abrasion or avulsion, any treatment given, when it was given.

Ask if High velocity/ Low velocity, Ask for any history of ENT bleed, Loss of consciousness, vomiting, seizures, headache, any associated injuries to chest abdomen or long bones.

Any history of Hearing impairment

- Was the wound cleaned properly?
- Was the individual previously vaccinated for Tetanus/ was given any Tetanus Toxoid or Tetanus immunoglobulin injection given now?
- Was any prophylactic antibiotics given?

- Was the wound sutured or closed previously, or was the wound left open

History related to avulsion injury

History of complete avulsion/partial avulsion

History of immediate repositioning/delayed repositioning

History of reach to hospital from time of injury

History human bite or animal biteas above

- History related to full thickness loss
  - History of any sharp slash, flying glass, gunshot, flame or radiation burn, human or dog bite, trauma.

If avulsion injury History of avulsion as given above:

- Any history of tissue repositioning and suturing or any history of attempt for replantation
- When the primary treatment done
- History time lapsed between the injury and reach to hospital
- History of any surgical resection for any tumor
- History of any discharge/any ulcer
- History of any other associated injury
- History of loss of consciousness
- History of Deformity with defect
- Ask history about the etiology as above
- History of unable to wear mask/spectacles
- History of any other injuries
- History of tendency of keloid formation

Treatment History: Treatment history based on etiology.

Treatment history for deformity:

- Any treatment of burn ear
- Previous treatment Surgical / medical
- What surgery was done
- When it was done
- What is the difference after the surgery?
- Was there any history of recurrent ear surgeries?

Defect only

- Was any skin, flap, or cartilage used for surgery previously
- Any history of skin grafting
- Any history of tumor resection
- History repositioning of avulsed ear/ reimplantation
- Deformity with defect
- Treatment history as above

Past History

No past history of DM, Hypertension.

Any History of Immunocompromising conditions, bleeding disorders.

Any History of chronic Infections: Tuberculosis, Leprosy, fungal etc.

(Ask the treatment details).

Ask for any history of the ear infection.

Personal History

History of smoking, alcohol

Bowel and bladder habits

Marital status

Family History

Any history of Comorbidities, Similar illness, Keloid tendency in the family.

General Examination

Once patient received in emergency or OPD after taking the history, the general status is checked and examined.

Patient is conscious, oriented, afebrile, hydration fair, Built and nourishment.

Vitals

Pulse: Rhythm volume character, vessel wall conditions

BP: Normal or high

No Pallor/ icterus/ cyanosis/ clubbing/ lymphadenopathy/ oedema

Head to Toe Examination

Any evidence of asymmetry of the face , any external injury

any gross defect/dformity over the ear, nose, skull, chest, lower limbs

the finding of ear will be described later

Systemic Examination

Cardiovascular system: S1, S2+. No added sounds

Respiratory system: no chest wall anomalies.

Bilateral Air entry equal. Chest wall circumference:

Per Abdomen: soft, no mass palpable, non-tender

Central Nervous system: no focal neurological deficits, no evidence of facial nerve palsy

Musculoskeletal system: No spinal anomalies

Regional Examination

Regional Examination (Face) is done with adequate lighting, with patient in the sitting, lying down and standing position.

Regional examination

In the Examination of face mention shape, if face is in the midline.

On inspection of the face in frontal profile:

- Face: washed with warm saline/water
- Cleaning of dried blood clots/scabs
- Check for presence of edema, ecchymosis, deformity, facial asymmetry.
- Bleeding areas, CS Fleak.
- Associated soft tissue injury.
  - Scalp appears normal, hairs appear normal in colour, texture and distribution, hair line appears receded.
- Lacerations & contusions.
- Depressed fracture of the skull
  - In upper third of the face (hair line to nasion): Frontal prominence is there, eye brows appear normal, temporal region appears normal.

Racoon eyes

Middle third (nasion to subnasale): nose appears normal, upper and lower lids appear normal, inter-canthal distance appears normal, eyeball appears normal, zygomatic region appear normal.

- Bilateral circumorbital ecchymosis, gross edema 'Moon face.' Lengthening of middle third of the face 'Dish face deformity. Any swelling in medial canthal area The examination of Ear will be discussed in detail in local examination.
  - Lower third (subnasale to menton) upper and lower lips normal, chin central position, cheeks appear normal, nasolabial folds normal.
- Inspect for Asymmetry and deviationof mandible.
- Lacerations.
- Condylar depression (the condyle can be dislocated anterior to the articular eminence).
  - Functional examination of face normal frowning, eye closure, cheeks puffing, smile normal.

On inspection of the face in right lateral profile

Upper Third

Scalp: Appears normal

Temporo-parietal region: Appears normal/ scarred

Forhead: Appears prominent

Eyebrow: Normal

Middle Third

Zygomatic region: Appears normal

Cheek region: Appears normal

The examination of Ear will be discussed in detail in local examination

- Check for Battle's sign.

Ecchymosis near mastoid process

Eyeball: Appears normal

Eyelids: Along with lashes: Normal

Lower Third

Nasolabial angle: Appears normal

Lips: Normal

Chin: Normal projection

Cervico: Mental angle: Normal

On inspection of the face in left lateral profile

Upper third

Scalp: Appears normal

Temporo: parietal region: Appears normal

Forhead: Appears prominent

Eyebrow: Normal

Middle third

Zygomatic region: Appears normal

Cheek region: Appears normal

The examination of ear will be discussed in detail in local examination

Which will described and examined later

No brusing over mastoid region

Eyeball: Appears normal shape

Eyelids: Along with lashes: Normal

Lower Third

Nasolabial angle: Appears normal

Lips: Normal

Chin:Normal projection

Cervico-Mental angle: Normal

On inspection of the face in Posterior profile

Bilateral ear projection and cephalo-conchal angle: Normal

Occipital region appears normal

Vertex/Parietal region: Normal

Hairline and hair distribution: Normal

Neck symmetry: Normal

No ulceration, No swelling

Inspection in Bird's eye view

Scalp and hair distribution: Normal

Anterior hairline appears low set

Forehead appears prominent

Eyebrows appear normal

Eyeballs appear normal/ any exopthalmos

The nose appears in the midline, Nasal tip (position, angle, projection) and the lateral segment appear normal

Cheek regions appears normal

Zygoma and temporal region appear normal

Inspection in Worm's eye view

Mandibular region: mandible appears symmetri -cal both sides / not

Lips appear normal

Cheek region appears normal

Nose: tip, nostril floor, Membranous septum and lateral segment appear normal

Zygomatic region appears normal

Right ear normal size and projection

left ear appears normal in size with discontinuity in helix and normal projection

Orbital region appears normal

Frontal region appears normal with receded hair line

Palpation

Upper Third

Scalp region: Findings of inspection confirmed

Any laceration size of laceration measured and extent

Any depression

- **Frontal region**: Findings of inspection confirmed
  - Skin: normal
  - No bony deformity/swelling palpable
  - Frontalis muscle present, contraction present
  - Frontal sinus: Normal (torch test)
  - Sensation normal
- **Eyebrow region**: Findings of inspection confirmed
  - Hair: normal in texture and distribution, Plucking test: Normal
  - Supraorbital margin: Normal
  - Sensations: Normal
  - No tenderness
  - No bony deformity/swelling palpable

Middle Third

- **Orbital region:** Findings of inspection confirmed
  - **Upper eyelid:** All Soft tissue structures from the skin to conjunctiva are normal including lid margin and eyelashes. Upturning test: Normal, Punctum is visible and normal. Upper eyelid movements are normal. Sensations normal. Position of upper eyelid normal in front gaze.
  - **Lower eyelid:** All Soft tissue structures from skin to conjunctiva are normal including lid margin, eyelashes and punctum. Pull down test Normal. Sensations normal.

Eyeball/Globe Examination

Pupil: normal size, shape, symmetry, direct and indirect light reflex present

Iris: normal size and shape, colour brownish with no hyper or hypopigmentation, no nodules

Sclera: colour normal, surface smooth, no abnormal pigmentation or nodularity

Sclerocorneal junction normal

Cornea-sensation present, cornea clear

Palpebral fissures: size ____cm, shape ___cm, medial and lateral canthal: Normal, equal bilateral, punctum: Normal

Fornices: Both superior and inferior fornices

normal, no foreign body.

Orbital Rims: No tenderness, no step deformity, no mass palpable in the orbital margins.

Extraocular muscle function: Normal

- Vision
- Visual acuity
- Schirmer test

NOSE

External examination

- Finding of inspection confirmed, nose in midline
- Skin: Appears normal in all region including colour, texture, mobility with no swelling, tenderness and hypo or hyperpigmentation
- Bone (including nasal, vomer, frontal and maxillary spine) are normal with no elevation/ depression, no tenderness or crepitus, no step deformity
- Cartilage (Upper and lower lateral): Normal
- Cottle test: Negative
- Nasal valve angle normal 10-15 degree
- Nasolabial angle
- Nasocollumellar angle
- Nasal lobule to nostril ratio= Normal (1:2)
- Tip projection = Alar base width

Bimanual palpation

Instrument is placed in the nose and pushed laterally in the medial canthal area to test for instability and crepitation, which suggests an unstable nose fracture.

Palpation of Nose

- Simple method to gather information on the function of the internal patency of the nose.
- The nose can be retruded and impacted at the nasofrontal suture area with lack of support for the nasal septum and cartilages.

Internal examination

- Normal nostrils, normal hair
- Membranous and cartilagenous septum normal/ hematoma
- On examination with Thudicum speculum-Septum/turbinate normal
- Tilt test with positive halo sign (as illustrated)
- Comparison of the concentration of glucose between fluid and patient's serum
- Laboratory analysis for beta-transferrin

Zygomatic region

Inspection findings confirmed

No bony abnormalities/step deformity/Mass

No evidence of buccinator hypertrophy

No maxillary sinus tenderness

- Depressed malar prominence
- Subcutaneous emphysema
- Orbital rim step-off

Lower Third

Lip and chin

Function of orbicularis oris

Inspection findings confirmed

Mandible:

- Areas of tenderness, step deformity.
- Abnormal mobility.
- Inferior border continuity.
- Angle of mandible.

Intraoral examination

- Palatal hematoma and/or palatal lacerations can be noted in the sagittally split palate.
- Blood Clots / Avulsed teeth
- Eccymosis/ Hematoma

Buccal Sulcus at buttress region, Sublingual region, Greater palatine foramen

- Step Defects in Occlusion
- Gagging of occulsion
- Anterior open bite & Shift of midline
- Buccal & lingual sulcus tenderness, alteration in contour, crepitus
- Mandible palpation
- Mobility of maxilla

Differentiating Leforts

Pull forward on maxillary teeth

- Mobility of the midface may be tested by grasping the anterior alveolar arch and pulling forward while stabilizing the patient with the other hand. testing for mobility of the midface Distance between the posterior edge of the soft palate and posterior edge of the pharyngeal wall Presence of passavant's pad.

Amount of adenoid tissue (if visible)

Size and state of the tonsils

Local examination of the ear

- Inspection

Frontal, oblique, full lateral and posterior:

  - The skin over the FTP areas, scarred or normal
  - Hair distribution over the scalp and sideburns
  - Muscles: masseter and temporalis, Temporalis Fascia area any scar present/ not
  - Mouth opening
  - Neck movements, eye closure
  - Superficial temporal artery pulsation: seen?
  - Examination of normal ear
    All the features of auricle were normal at normal place and position

- Ear examination of affected ear

Left ear: helix, antihelix, concha, scaphoid, triangular fossa, tragus, antitragus, lobule present/ absent any disfigurement.

- Examine for laceration or collapse of the external canal.
- Examine the tympanic membrane for rupture or a hemotympanum.

Note: Blood in the ear canal may indicate skull base fractures or external auditory canal lesion resulting from a condylar fracture enumerate the deficiency describe any ulcer, swelling, discharge

External auditory meatus visualized normal/ stenosed

Preauricular side burn normal, scalp looks normal

Postauricular angle 21-30 degree from scalp

No sinus, scars noted in the preauricular/ postauricular region

PALPATION

No warmth , No tenderness

Inspection findings confirmed

Measure the ear remnant as well as the normal ear

Lateral Protrusion of the Helix from the scalp

Postauricular angle 21-30 degree

Long axis tilt of the normal ear 20 degree posteriorly

The distance of the ear from the side burn, from the lateral orbital margin, eyebrow, ala of nose.

If any swelling the swelling is soft, firm

- Any fluctuation
- Any displacement
- Compressible/not

If any ulcer base of ulcer confirmed

External auditory canal Examination

Lymphnode: preauricular/postauricular/neck nodes

The template of the normal ear is placed on the affected ear and the deficiency is marked and the percentage of the defect is quantified

Defect / deformity / deformity with defect of:

1. Upper ^{3rd}
2. Middle^{3rd}
3. Lower^{3rd} auricular
4. Lobule Defect: Partial, Total

Total Ear defect amounts to:

1. Less than 25%
2. More Than 25%
3. Total loss

Superficial temporal artery pulsations +

Skin elasticity is assessed

No evidence of facial nerve palsy

Hearing Test

Rinne's test

Weber's test

Examination of The Donor Areas

Chest, Temporalis fascia, opposite ear, retro-auricular areas, nose, upper arm, thighs.

Diagnosis

Acquired Defect / deformity/ deformity with defect of The Right Ear (<25%, >25% or Total) post burn/trauma/swelling/surgery/infection/etc involving the superior/middle/inferior 3rd with/ without hearing loss.

Investigations

To add on to my diagnosis

Hearing assessment

HRCT temporal bone

USG abdomen

Cardiac echo

Chest X ray

For anesthetic fitness

CBC, BUSE, LFT, viral markers, blood grouping typing

DISCUSSION

Trauma to the ear

Trauma may be physical or chemical as in thermal injury, or it may be mechanical as in wrestling, boxing, motor vehicle accidents, brawling, sports or job related accidents, pierced ears, and human or animal bites.[2]

Human and animal bites

Emergencies caused by human and animal bites involve about 1% of all emergency injuries. The most common bites are by dogs, with children being the most affected. The incidence of dog bites in the United States is 1 to 2 million per year. Infection is the most common complication of bites, occurring in about 1.6% to 30% of cases.[3] Conservative deobridement and immediate prophylactic antibiotics are important to prevent infection.

Blunt trauma

The main complication of blunt trauma of the ear is the formation of hematoma.

Hematoma of the ear (Cauliflower ear)

The main complication of blunt trauma of the ear is the formation of hematoma. Blunt trauma (or excessive traction on the auricle) causes a shearing force that separates the cartilage from the overlying perichondrium.[4] The force also tears blood vessels in the perichondrium. Blood fills the space between the perichondrium and cartilage and further separates the cartilage from the perichondrium, producing a convex surface that replaces the normal contour of the lateral surface of the ear. Subsequently, the blood clot becomes fibrosed, causing thickening, which obliterates the convolutions of the ear. Postoperative bleeding may follow the same mechanism. Because the cartilage does not contain blood vessels, but depends on the perichondrium for oxygen and nutrition, separation of the cartilage from its covering perichondrium by the accumulated blood deprives the cartilage of its blood supply. This results in cartilage necrosis or infection.[5]

Signs and symptoms

These include painful swelling that obliterates the normal contours of the lateral surface of the ear. It may appear immediately or several hours after the trauma.

Treatment

The goal of treatment is to remove the accumulated blood and to maintain pressure on the area for several days to prevent recurrence. If the blood is simply aspirated, the clotted blood may be replaced by seroma formation. Although some prefer to treat hematomas initially by aspiration and pressure dressing, the author prefers to do incision of the skin and perichondrium and to drain the blood. It is preferable to place the incision in the inner side of the antihelix and parallel to it to hide the scar. The wound is then inspected for further bleeding that may need cauterization, and a suction tip is inserted under the skin flap. Cotton soaked in saline, molded to the lateral surface of the ear, is then applied. Head dressing is also provided. Other authors prefer to apply one or two mattress sutures placed through the hematomatous area and tied over pledgets of fluffed gauze to furnish adequate compression. The late treatment of the cauliflower ear deformity consists in carving out the thickened tissue (consisting of fibrous tissue and new cartilage) and application of pressure dressing.[6]

Laceration of the ear

Lacerations of the ear may be minor to extensive. Clean lacerations caused by sharp objects are repaired using 6-0 nylon sutures with exact approximation of the edges. When the skin edges are crushed, minor debridement of the edges may be necessary. When the skin and the cartilage are involved in a clean laceration, the author prefers to approximate the edges of the cartilage and to do skin to skin repair.[7] When the helical rim is involved, a key suture should be placed initially at the rim and preferably using a vertical mattress suture to evert the wound edges that are flattened after the edema subsides and levelled with the wound. If the wound edges, by comparison, were inverted, the inversion persists as a depressed scar, trapping the shadows as light is cast across the surface and causing grooving of the helical rim. Mladick believes that suturing the cartilage is detrimental, and the author agrees. When the laceration involves the external canal, traversing the cartilage or the bony cartilaginous junction, stenosis of the

canal may result prolonged stenting of the canal is indicated to prevent its stenosis. When the wound is in the form of partial skin avulsion, the avulsed skin can be repositioned and sutured in place as a full thickness skin graft.[7]

Thermal injury of the ear

Flame, flash, blast, scalds, and steam burns

Burns of the ear invariably demonstrate a mixture of the three degrees of burn. They are characterized by central coagulation, with peripheral areas of stasis and hyperemia. Thermal deformity of the burned ear may result from direct thermal injury. Because the cartilage is avascular, it accumulates its nutritional substance from the overlying perichondrium. Disruption of this mechanism propagates further tissue loss and deformity. Chondritis may develop, leading to resorption of ear cartilage and ultimately deformity of the ear.[8]

MANAGEMENT

In addition to the general management of burns, the most important factor in treating burned ears is to prevent supportive chondritis from developing.[9]

Topical Antibiotics

Mafenide (Sulfamylon) cream is the best topical antibiotic agent suitable for the ear because of its ability to penetrate the eschar and the cartilage. Mafenide cream has a broad antibacterial spectrum with good bacteriostatic effect and relatively low toxicity. It should be applied twice daily because of its active penetration; little of the agent is left on the wound after 3 hours. Avoidance of pressure on the ear is essential. This can be done by minimizing the dressing, using a soft pliable dressing, and preventing the use of a pillow.[10]

Management of the eschar

Premature excision of the eschar should be avoided because the eschar acts as a biologic coverage to the underlying cartilage, preventing it from desiccation. When the eschar is suppurative, then debridement is indicated. Pseudomonas is the usual infective organism in this situation.[11] When only the skin is lost from a burn, and the perichondrium is intact, granulation and epithelialization occur. If the skin and the perichondrium are lost, the area does not heal and surgical debridement and late reconstruction are indicated.

Management of suppurative chondritis

Iontophoresis uses polar charged antibiotic compounds, such as penicillin and gentamycin, which are pulsed across avascular membranes, and has been recommended by many authors. If the condition of the patient is not ready for reconstruction and there is loss of skin and perichondrium, the author prefers to cover the bare cartilage with a split thickness skin graft to act as a temporary biologic dressing until reconstruction can begin.[12]

Chemical burns

Chemical burns may be caused by acids, alkalis, or organic compounds. The severity of chemical injuries is related to (1) the agent involved, (2) concentration of the agent, (3) volume of the agent, (4) duration of contact, and (5) how fast water irrigation is started after the burn and for how long. Unlike acids, alkali burns are unusually severe because penetration of the OH ion is deep and progressive. Immediate irrigation with water is essential. Irrigation should be continuous until definitive treatment is begun or until the patient experiences a decrease in pain or burning sensation. This irrigation is very important not only to minimize any tendency for the burn to progress in depth, but also to provide some degree of comfort.[13]

Electrical burns

Most tissue damage is caused by heat generated by current flow; that is why the thermal damage is extended in depth and plane and may involve deeper structures. Not only acute but chronic radiodermatitis may result from exposure to ionizing radiation. Chronic radiodermatitis may occur and is characterized by atrophy of the skin. Malignant change may develop later as a result of radiation injury.

Frostbite

The effect of cold thermal injury (frostbite) on the skin of the ear may occur as a result of direct cellular injury through crystallization of tissue water, or indirect effects secondary to microvascular changes leading to thrombosis and ischemia. The frozen ear does not become painful until it begins to warm. Immediate treatment is started with rapid warming. The use of low molecular weight dextran or heparin is important because it limits thrombosis and diminishes the amount of tissue loss. The rewarming is accomplished by cotton soaked with warm saline and treated aseptically.

Tumors of the ear

Benign tumors[14]

Keloid [15]

Keloid is defined as a benign tumor of dense fibrous tissue, developed in the dermis as an excessive overaccumulation of collagen during the healing process. It represents a failure of the normal check reins of healing. The cause of keloid is unknown. Excessive scar tissue was described in the Smith Papyrus in Egypt about 1700 BC. Trauma to the dermis is always the inciting factor. This trauma may be caused by surgical incision, burn, laceration, pustules, ear piercing and even spider bite. Local and general factors may influence the creation of keloid. Local factors include the following:

Surgery: the pattern and direction of the surgical incision, tension of closure, and localized contusion may influence the development of keloid.[15]

Thickness of the skin involved.

Infection

Foreign body, especially keratin (from hair and sebaceous glands)

Anatomic sites: keloid is more common in the earlobe.

General factors are as follows

Races: keloid occurs in all races except albinos, but occurs 15 times more often in patients with darker skin compared with lighter skin. Keloids occur exclusives in humans.[16]

Sex: keloid occurs with the same prevalence in males as females.

Age: keloid occurs at its highest incidence in the second decade.

Hormones: estrogen and androgen may influence the occurrence of keloid because it is seen most often in youth, regresses after menopause, and enlarges during pregnancy.[17] Connective tissue disease: connective tissue diseases are usually associated with keloid formation.

Ear piercing is the most common cause of the earlobe keloid. Keloid appears as a mass of fibrous tissue in an area of previous trauma. It is itchy, tender, tense, and red. The keloid varies in size from small to large. Small abscesses with draining sinus tracts are not uncommon.

Treatment

Because the cause of keloid is still unknown, there are many modalities of unsatisfactory treatment.[1] Simple excision is one of the most long standing forms of treatment. The recurrence rate of surgery alone, however, is as high as 45% to 100%.[18] It should be noted that the medial surface of the ear is not immune against keloid formation, as many authors believe. Keloid of the medial surface of the ear frequently occurs. The author noticed that keloid may occur as pedunculated keloid with narrow base (this type of keloid can be excise easily and the ear can be reconstructed) or keloid with wide base (this type of keloid is made more difficult to excise and the ear is much more difficult to reconstruct). Surgery is usually combined with other treatment modalities.[2] Pressure is used after keloid excision on the earlobes. Using pressure day and night for 4 to 6 months is beneficial in reducing abnormal scarring. The mechanism of pressure is not clear, but the success rates of at least partial reduction of scars are from 60% to 85%.[3]

Intralesional corticosteroid injections may be used alone or combined with other therapies, of which the combination with surgery is the most commonly used method. The recurrence rates with corticosteroid injections alone are 9% to 50%. Injection is most effective on younger hypertrophic scars, and can only flatten older scars and provide symptomatic relief. In cases of painful injections, the steroid can be mixed with lidocaine. The complications of corticosteroid injections are (1) atrophy of surrounding tissue (if accidentally injected); (2) depigmentation of the skin; (3) telangiectasia, necrosis, and ulceration; and (4) cushingoid features. Corticosteroid injections in combination with surgery show a recurrence rate of 0% to 100%. Triamcinolone acetonide (Kenalog cream or ointment, 0.1%; or Aristocort, 0.5%) can be applied topically for a long time without systematic effects. It only affects the symptoms of keloid, but not its mass.[4] Radiation is mainly reserved for keloid resistant to other treatment, because the potential morbidity from radiation, especially in children, is high. It has the possibility of carcinogenicity and possible interference with growth in children. The response to radiation alone is 10% to 94%. Surgery followed by radiation has a higher success rate of 25% to 100% when treatment is started immediately after surgery. Complications of radiotherapy include hyperpigmentation, pruritus, paresthesias, and pain.[5] Treatment with silicone materials was introduced by Perkins et al. When silicone is applied over hypertrophic scars or keloid, it decrease its volume in 60% to 100% of cases without complications except for rashes.

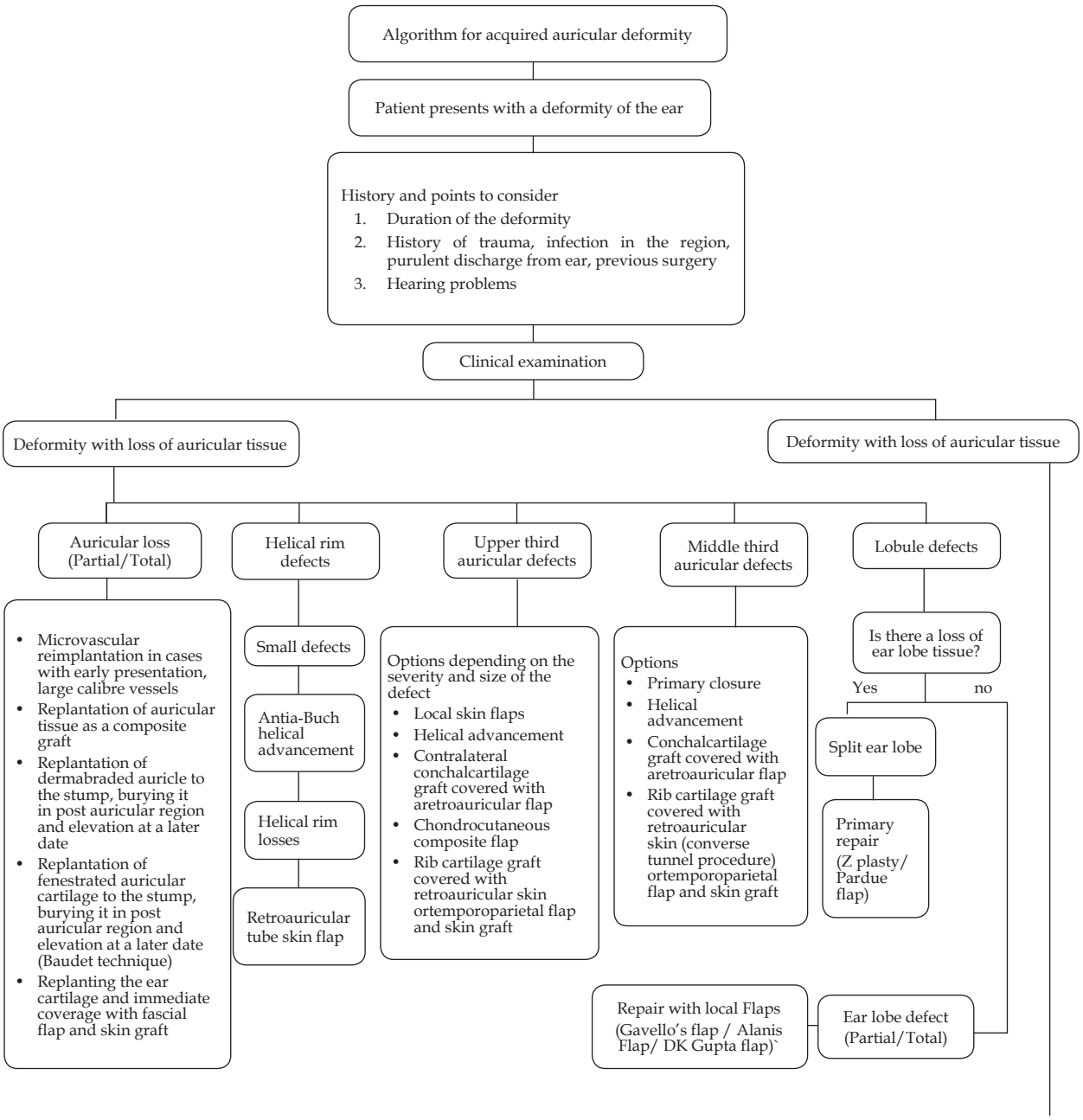
When silicone is applied after surgical excision, it can prevent the formation of the hypertrophic scar or keloid in 75% to 85% of cases. The silicone must be worn 24 hours a day for at least 3 months using tape. Its mode of action is unknown.[6] The recurrence rate of keloid after laser treatment is from 45% to 93%, which is still unacceptable.[7] The response rate after cryotherapy is comparable with that of laser. Both laser and cryotherapy are painful.[19]

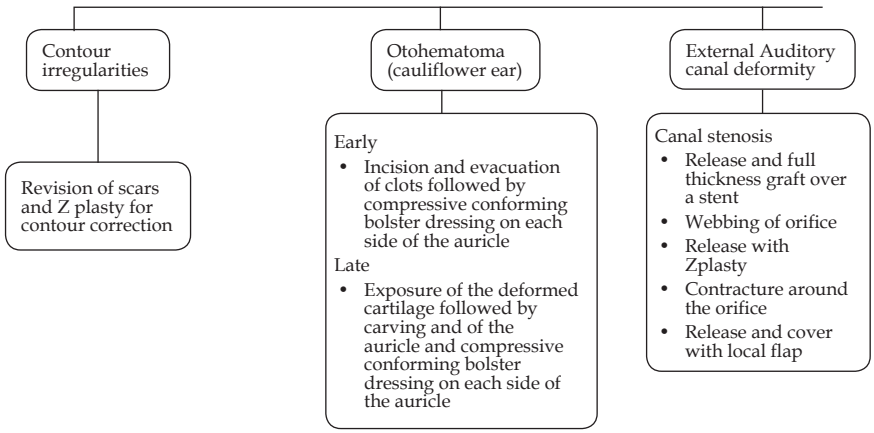
Pigmented lesions

Lesions in this category include junctional, intradermal, and compound nevi, and melanotic freckle of Hutchinson.

Epidermal and Adnexal Lesions

Chondrodermatitis nodularis chronica helicis is a common chronic inflammatory, painful, popular esion on the upper rim of the ear. The lesion is firmly attached to the cartilage and is treated by simple excision of the underlying degenerated cartilage alone without removal of the overlying skin Persistence and recurrences are common. Taylor treated 12 lesions with carbon-dioxide laser. The pain from the lesions was gone immediately following laser surgery and there were no complications or recurrences of the lesion after 15 months of follow-up. Epidermoid cyst may become





Source: *@ Chapter 13- Acquired ear defect (auricular econstruction), Treatment Planning in Plastic Surgery by Dr Ravi Kumar Chittoria*[21]

infected, after which it is difficult to enucleate the entire cyst wall because of adherence to surrounding tissues. It is important to remove the lining sac to prevent recurrence. Seborrheic keratosis is another epidermal and adnexal lesion.[20]

Vascular lesions

These include such lesions as hemangioma, lymphangioma, and arteriovenous fistula. These lesions should be diagnosed, differentiate from malignant lesions and they should be properly managed.

Management treatment Planning Algorithm

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Original Article

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Challenges in Management of a Deaf and Dumb Patient with Venous Ulcer

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Abstract

The most common cause of lower extremity ulcers is by far venous problems that result in a persistent rise in venous pressure. Venous ulceration, which accounts for 80% of lower extremity ulcerations, is the most severe and disabling consequence of chronic venous insufficiency in the lower limbs. Due to the return of varicosities and the patient's non-compliance with the treatment, venous ulcers frequently recur. Patients who are congenitally deaf or dumb and scheduled for plastic surgery are cases that call for extra consideration and care. The level of preoperative training that is necessary can be determined by conducting a preoperative assessment of the patient's communication skills, educational background, and fundamental comprehension capacity. In order to develop successful communication between the patient and the healthcare professional, it may be helpful to hire a sign language or communication specialist. The healing process can be sped up by early mobilisation, careful use of sedatives and analgesics in the postoperative phase, and allowing a family member to visit and converse with the patient. This case study describes the treatment of a patient who is deaf and dumb and is having surgery for venous insufficiency.

Keywords: Venousulcer; Deaf; Dumb; Challenges.

INTRODUCTION

Perioperative management of deaf and dumb patients can be a challenging task. Proper care should start before surgery in order to ensure a smooth postoperative recovery. A communication professional must be involved in order to fully comprehend the patient's demands and teach the patient how to follow instructions. To keep the patient pain free and comfortable, it is crucial to utilize sedatives and analgesics carefully. Following surgery, the patient should be maintained awake long enough to comprehend the body's internal needs and to respond appropriately to outside stimuli. Better postoperative care can be provided with adequate preoperative planning and coordinated team efforts involving specialists. One of the frequent side effects of venous insufficiency illnesses is venous ulcers. Vein ulcers, often referred to as stasis, insufficiency, or varicose ulcers, are brought on by malfunctioning venous valves, which raise vein pressure.[1] These often happen on the distal leg's medial or lateral side. Venous insufficiency, or the consequent venous hypertension, causes blood to pool when it is not pushed back towards the heart as effectively. Due to their chronic nature and recurrence, they are challenging to control. Healthcare professionals

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are burdened by chronic wounds since many of them take weeks or months to heal, frequently requiring complicated treatment plans and a multidisciplinary approach. In our article discusses about the challenges of managing a deaf and dumb patient with venous ulcer.

MATERIAL AND METHODS

This study was conducted in the Department of Plastic Surgery in a tertiary care institute. Informed consent was obtained from the patient after explaining the patient through videos and picture format along the sign language health care staff (fig. 1).

Department scientific committee approval was obtained. It is a single center, non-randomized, non-controlled study. A 50 years old lady, who was deaf and dumb since birth, hailing from Tamil Nadu, with no known co-morbidities was admitted with infected ulcer over the left leg. On assessment, she was found to have incompetent Saphenofemoral junction of the left lower limb. The patient was initially treated with conventional dressing. As the ulcer did not show any evidence of healing and was infected (fig. 2).

Fig. 1: Resident doctorexplaining the patient and relative along with the sign language expert healthcare staff about the treatment plan

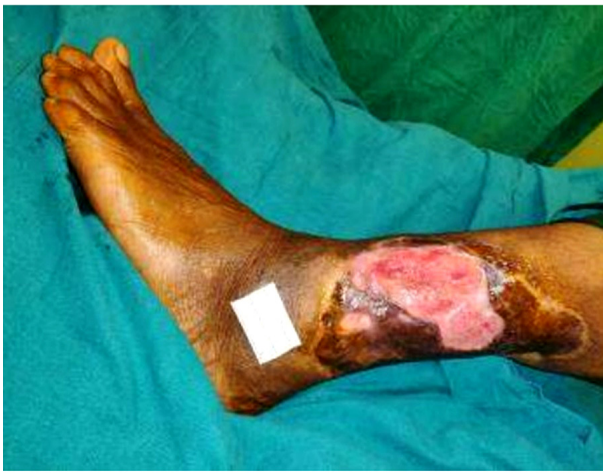

Fig. 2: Wound at presentation

Infection was managed with local antimicrobials & antibiotics according to culture sensitivity. Wound bed was prepared in accordance with TIME concept mentioned in the guidelines, the ulcer was serially assessed and documented according to bates – Jensen wound assessment tool.[2] We used regenerative methods like autologous platelet rich plasma therapy (fig. 3), low level laser therapy (fig. 4) vitamin D granule and sucralfate therapy for wound bed preparation. In addition, we used heterografting of wound with collagento supply growth factors to the raw area, in accordance with SWCR guidelines were done to aid granulation of raw area. As wound was wet in nature, moisture control was done using negative pressure wound therapy (fig. 5). His wound bed gradually improved, in the meantime incompetent saphenofemoral junction and multiple incompetent perforators were ligated. Once wound bed and patient was ready for reconstruction, clinical decision was taken to reconstruct with a skin graft (fig. 6).

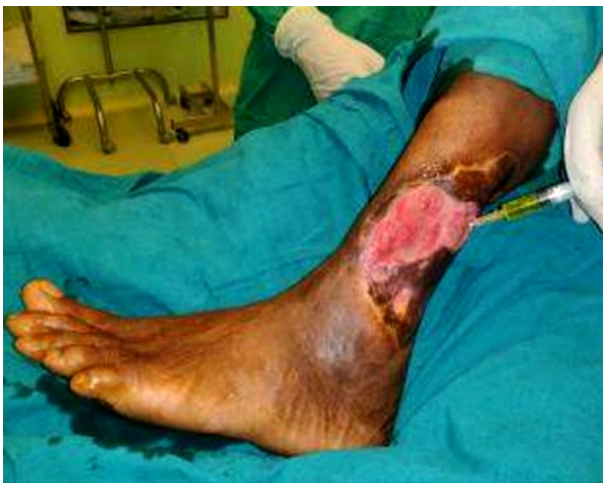

Fig. 3: Autologous platelet rich plasma application

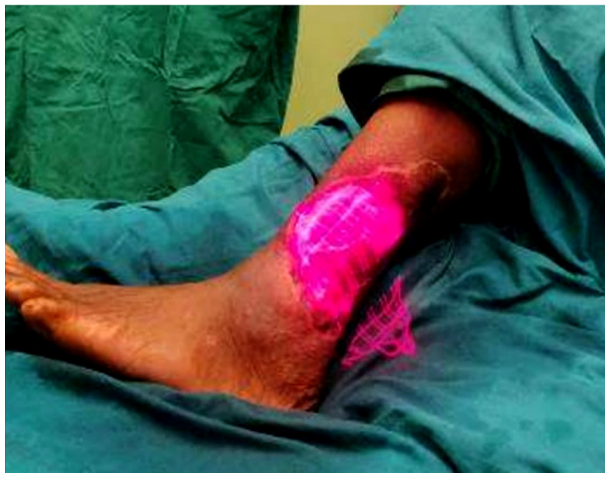

Figure 4. Low level laser therapy application

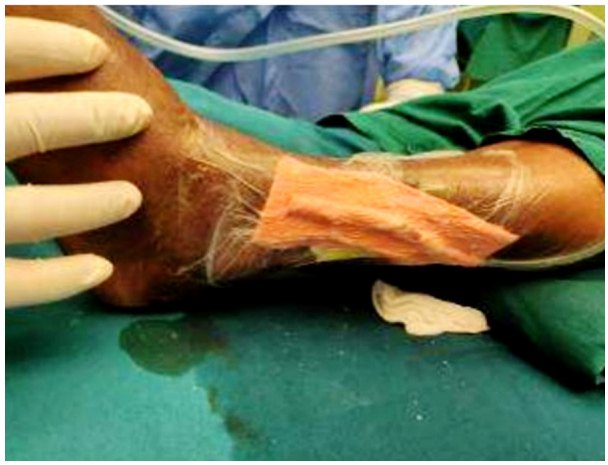

Fig. 5: Negative pressure wound therapy

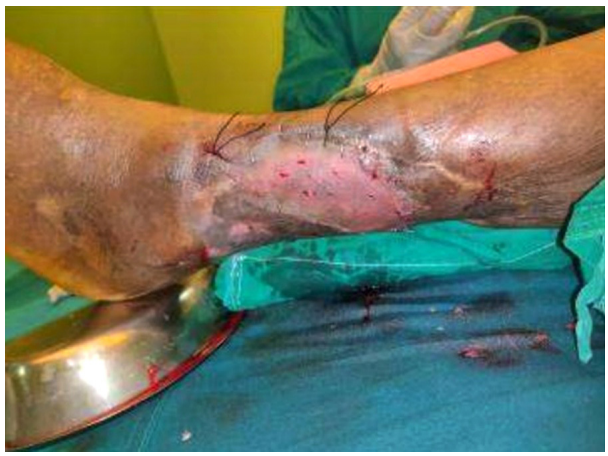

Fig. 6: Split skin grafting done

The patients' husband and son had normal hearing and speech functions. The preoperative visit focused on educating and interacting with

the patient and her husband. Due to the poor educational background of patient's husband and other relatives, the patient was explained about the surgical procedure and anticipated postoperative course by writing and making pictures, showing videos to explain the patient. The patient was taught to express pain by showing the visual analogue scale (VAS). The formal preanesthetic check-up revealed no significant co-morbidities. On the day of surgery, the patient was briefed about the procedure and the postoperative course in the presence of his wife and family members.

RESULTS

Since the patient cannot communicate their issues, clinical and objective assessment should be taken. The diagnosis, surgical strategy, and postoperative care are all explained to the patient's attendant and any family members. Family members should be given more time with the patient after they are stable. The amount of sedative and analgesic medication given to patients after surgery was adequate so that they can participate fully in their recovery. Our patient can't read or interpret written materials, thus communication takes place through videos and pictures. With good graft take, the wound healed well (fig. 7). Patient was successfully discharged.

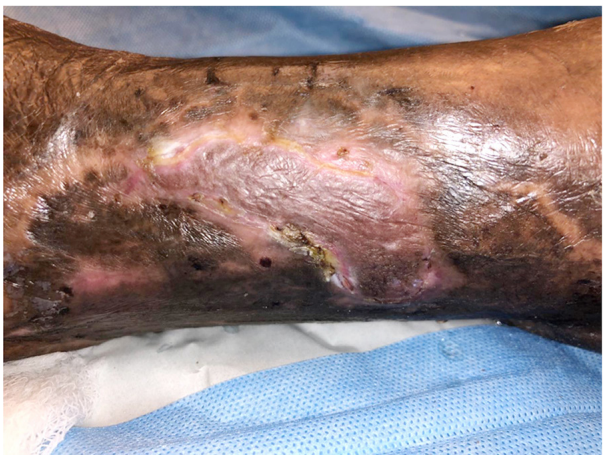

Fig. 7: Healed wound at the time of discharge

DISCUSSION

WHO estimates that 278 million individuals worldwide suffer from a disabling hearing impairment.[3] About 5 million persons in India have considerable auditory loss, according to data from the 2011 Census of India on disabilities.[3] According to research, hearing loss is the second most frequent reason for impairment. Hearing loss that is congenital is present from birth. It may run in the family, be brought on by fetal anomalies, or be brought on by birth trauma. Congenital hearing loss has a genetic component in more than 50% of cases. This component is primarily autosomal recessive inheritance, although it can also be autosomal dominant or X-linked.[4] While 20% of congenital deafness is related with different syndromes as Alports, Crouzon, Usher, Down, Treacher Collins, Pendred, and Stickler syndrome, about 80% of congenital deafness is non-syndromic.

Three levels of deafness have been identified in the literature: sudden onset deafness, hearing loss following speech development, and deafness at birth. The individuals in the latter group are also prelingually deaf.[5] The deaf population is at danger of receiving insufficient medical attention and health related information due to communication barriers between the deaf individual and medical personnel. Few healthcare professionals have the necessary experience to handle patients who are physically challenged. The perioperative management of congenitally deaf and dumb individuals admitted for any surgery is exceedingly difficult. In our case, videos and photographs were used to explain the surgery and postoperative care to the patient and patient family due to the patient's weak educational background and the patient's husband and other relatives' subpar understanding. The patient can be taught to convey pain by discussing VAS, and the sign language specialist can also be used to describe the deep breathing exercises and lung expansion maneuver.

Poor postoperative pain assessment and management can have severe impacts on the patients, including anxiety, insomnia problems, irritability, aggression, and unneeded stress and suffering.[6] Additionally, to these physiological effects, post-operative pain can cause heart rate and blood pressure to rise, delayed stomach emptying those results in nausea, vomiting, and paralytic ileus. Chest infections might develop if you don't cough and breathe deeply. All of these factors taken together may cause delayed mobilization, extended hospital stays, and costly consequences. To ensure that pain is adequately controlled, an accurate assessment of postoperative pain is therefore crucial. In this particular group of patients, it could be challenging to subjectively assess pain.[7]

Due to the usual occurrence of post-operative delirium following surgery, controlling delirium or psychosis in this patient could be exceedingly challenging; thus, all precautions were taken to prevent delirium or psychosis. Sedatives and analgesics were administered sparingly after surgery to keep the patient at ease and awake enough to grasp and express the issues.[8]

For patients with permanent hearing loss and deaf mutism, cochlear implants are a viable treatment alternative. Cochlear implants are now the sole recognized and established treatment option for both pediatric and adult deafness. However, early detection of hearing loss and the placement of a cochlear implant may indicate a rapid improvement in listening abilities.[9]

Finally, we must keep in mind that achieving greatness in care is not possible without the assistance of skilled healthcare professionals. Anesthesiologists, who are regarded as perioperative physicians, can affect the perioperative outcome through preoperative optimization, active patient education, appropriate anesthetic technique selection, prompt implementation of preventive measures to lessen post-operative adverse events, and perioperative rehabilitation programs. When caring for patients, especially those who are weak and unable to speak for themselves, nurses should be morally, ethically, and professionally committed to their work. For the best therapy and pain alleviation, these unique groups of patients need ongoing assessment and the proper care, unlike other patients.[10]

Venous ulcers are more likely to come again. Prior to surgery, it's important to assess and make adjustments for physical factors that could hinder surgical wound healing, such as the availability of equipment for the prevention and treatment of venous ulcers, testing of tolerance for care in the desired position, and factors related to diabetes, malnutrition, and long-term recurrence.[11] Once a venous ulcer has healed, suitable preventative measures should be performed. Along with routine clinical examinations, patient education about skin care, limb elevation, and exercise, a carefully chosen and accurately calibrated compression stocking is helpful in preventing recurrence. Saphenofemoral junction ligation, perforation ligation, and stripping of superficial veins, either through endovascular or open surgery, are the main treatments for venous insufficiency.[12] Compression stockings are used in a conservative manner to treat patients who are not healthy enough or not good candidates for surgery.

CONCLUSION

The treatment of chronic venous ulcers is a therapeutic challenge. The perioperative management of congenitally deaf and dumb patients posted for high risk surgery is difficult. The successful outcome depends on upon proper planning and a coordinated team effort. The following recommendations can help in optimizing the management like preoperative assessment of the patient including their understanding and communication skill, Early extubation, early removal of catheters and tubings, and early mobilization should be encouraged to prevent postoperative psychosis. The objective assessment of pain and effective pain control protocol should be done. Properly trained nurses and paramedical staff should be engaged in the care of these patients.

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Corporate (collective) author

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[9] National Statistics Online—Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/HSQ20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

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