

Role of gentamicin in post-burns perichondritis

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ABSTRACT

Background: Ear is a very prominent part of the face after nose and eyes, especially in Indian subcontinent wherein both the males and females it adorns a variety of ornaments to beautify the face. It is esthetically important. Burns are often neglected owing to no hearing impairment in this region. Important aspect in burns of ear is perichondritis and its management. **Objective:** The objective of this study was to study the role of gentamicin in post-burns perichondritis. **Materials and Methods:** In our study, five patients are identified with perichondritis in the past 1 year. All five patients were male and associated with facial burns. Youngest patient was 12 years of age and oldest patient was 45 years of age. All patients had the 2nd–3rd degree burns. Of five of three patients had accidental electrical burns, one had homicidal chemical burns, and one had accidental thermal burns. **Results:** In all five patients, we gave gentamicin from the day of start of perichondritis. On an average, all patients showed resolution at the end of 1–2 weeks except one patient, who developed abscess whose resolution came after 1 month of continue irrigation and wash and dressing. **Conclusion:** Ear burns are often neglected; perichondritis is common in the 2nd–3rd degree burns. Infection generally manifests within 2–4 weeks of burns. Intralesional gentamicin is cheap and effective treatment of perichondritis in burns.

KEY WORDS: Post-burns Perichondritis; Local Gentamicin Injection; Ear Burns; Ear Reconstruction in Burns; Ear Salvage in Burns

INTRODUCTION

External ear is particularly vulnerable to thermal burns because of their prominent projecting location on the sides of the face. It is very uncommon to find isolated burns of the ear. They are most commonly associated with facial burns either due to thermal burns or chemical or electrical contact injury. Facial burns represent one-fourth–one-third of all burns. Post-burns perichondritis is common sequel if not taken proper care.

Perichondritis usually presents as a pain accompanied by erythema and swelling. It is usually seen in the 3rd week of


burns. It usually starts in the helix and antihelix but may involve the whole cartilage. The most common organism responsible is *Pseudomonas aeruginosa* followed by Proteus and Staphylococcus. Most cases heal without abscess formation. However, when abscess occurs, it is difficult to treat and deformity of ear occurs to a significant extent.

Anatomical Consideration

The peculiarity of the ear cartilage is that it is very thin and is covered on its anterolateral aspect by an equally thin layer of subcutaneous tissue and skin which is tightly adherent to the perichondrium. This cartilage has no intrinsic blood supply and depends on diffusion from perichondrium which, in turn, depends on overlying skin for vascularity.

Involvement of Ear in Burns

In the case of partial thickness burns, the covering skin gets burned and edematous, thus getting separated from

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underlying cartilage. This interferes with the blood supply of the cartilage which then undergoes avascular necrosis. In full thickness burns of the ear, if the skin is completely charred, it may expose the cartilage which eventually sloughs out due to exposure and infection. The loss of the supporting structure ultimately results in deformity of pinna.

Chondritis or secondary infection of ear cartilage develops in the former, i.e., superficial and deep dermal burns and is seen 3–5 weeks post-burn. It is not possible to predict which burned ear will develop chondritis. It is characterized by dull ear pain which rapidly increases in intensity, not relieved by analgesics. Ear becomes warm, erythematous, swollen, and very tender, and cephaloconchal angle is increased. This usually starts along the helix or antihelix and gradually involves entire ear and may eventually form an abscess. In 95% of cases, cultures yield *Pseudomonas* and *Staphylococcus*. Proper head positioning and timely intervention can prevent destructive chondritis of the ears.

Management

Goals of treatment

The goal for ear reconstruction is to restore esthetic appearance of ear and maintains a superior sulcus which can accommodate glasses and to minimize complications from infection and fibrosis.

Acute Burns

Most of the burns heal without any operative intervention. The main goal or aim of treatment of acute ear burns is to prevent suppurative chondritis. “Chondritis of ear is better prevented than treated” - is a famous saying. The main consideration is to avoid pressure on burned pinna which cannot be overemphasized. Therefore, the patient should not lie on either side and neither uses a pillow under the head. Instead, a “donut” is used to keep the head elevated without the ears touching any surface. This prevents pressure necrosis of the ears and skin loss, thus preventing partial thickness burn from becoming a full thickness injury. There is no doubt that pressure on the burnt ear and further trauma of any kind has to be avoided to prevent further damage to an already compromised cartilage. The application of topical antibiotics like 1% silver sulfadiazine, sulfamylon, and 0.3% silver nitrate reduces contamination of the wound and allows partial thickness burns to heal. However, the most effective topical agent for the ear which can prevent and even treat chondritis is mafenide (sulfamylon) cream because of its excellent ability to penetrate the eschar and the cartilage and has a broad antibacterial spectrum with good bacteriostatic action. It has to be applied twice daily because of its active penetration. Like any superficial the second degree burn anywhere else on the body, in the case of ear also biological dressings can be used as they promote epithelialization and reduce the chances of infection, chondritis, and further ear damage.

A contour dressing with minimal pressure during bandaging is also helpful. An occlusive dressing also reduces the chances of nosocomial infection. With this local care, the swelling subsides and partial thickness burns heal with time. In case, skin is lost, but perichondrium is preserved, it will “take” a thin skin graft or else granulation and epithelialization can occur. If cartilage is exposed in a small area, it can be debrided and skin graft applied over its cut end.

In full thickness burns, if the cartilage is not exposed, some authors suggest leaving the eschar to separate spontaneously as it acts as a biological cover for underlying cartilage preventing it from desiccation and applying split skin graft over the underlying granulation tissue later. However, if the eschar is suppurative, it should be debrided. The following reconstruction depends on the defect created. Temporoparietal flap or platysma flap for cover of exposed cartilage, and total ear reconstruction are the options.

Chondritis

For established suppurative chondritis, a number of approaches have been advocated. Antibiotic irrigation with polymyxin B 0.2% solution or culture-specific antibiotics every 2–3 h for 4–5 days with the help of catheter both anteriorly and posteriorly was reported by some authors. Iontophoresis using polar charged antibiotic compounds such as penicillin and gentamycin which are pulsed across avascular membranes was advocated by Greminger. Simple drainage of pus is insufficient as chances of recurrence are high. Cultures of pus drained may often be sterile. Therefore, excision of all underlying necrotic cartilage leaving skin intact after a bivalving incision in the ear which splits ear into anterior and posterior surfaces has been recommended by most authors. This prevents recurrence. The involved cartilage is soft and yellow and lacks resilience of normal hyaline cartilage. All the soft cartilage must be removed, leaving behind only cartilage of normal consistency. Gauze soaked in antibacterial solution is packed between the skin flaps which reduce further progression of infection, and light dressings are given over the ear. Dressing is to be changed after 24 h, and any residual necrotic cartilage should also be excised. Dressing is continued till secondary closure is achieved. Topical chemotherapy has a better influence on outcome of chondritis as systemic antibiotics are ineffective since cartilage survives by diffusion from perichondrium.

MATERIALS AND METHODS

In our study, five patients are identified with perichondritis in the last year 2017. All five patients were male and associated with facial burns. Youngest patient was 12 years of age and oldest patient was 45 years of age. All patients had 2nd–3rd degree burns. Patients were primarily seen and treated by our department. Ethical approval and consent to participate - written informed consent was obtained from the patient for publication of this case report and any accompanying images.

RESULTS

In our study, five patients are identified with perichondritis in the past 1 year. All five patients were male and associated with facial burns. Following is case wise description of all cases in our study [Figures 1-5].

DISCUSSION

All five patients were male and associated with facial burns. Youngest patient was 12 years of age and oldest patient was 45 years of age. All patients had 2nd-3rd degree burns. Of five of three patients had accidental electrical

burns, one had homicidal chemical burns, and one had accidental thermal burns. Initially, there was no any sign of perichondritis, but at the end of the 2nd-4th week, this patient gradually developed ear pain, redness, and swelling. Of five of three patients had the left side, one patient had the right side, and one patient had both ears perichondritis. Patients were started with intralesion injection gentamicin as soon as they developed signs of perichondritis. One patient developed abscess in a week of starting sign of perichondritis, a small incision for drainage of abscess was made and daily irrigation was done with gentamicin. Culture came out to be pseudomonas. In all five patients, we also gave intravenous gentamycin from the day of start of perichondritis. On an average, all patients showed resolution at the end of the 1-2 weeks except one patient, who developed abscess whose resolution came after 1 month of continue irrigation and wash and dressing.

CONCLUSION

Ear burns are often neglected; perichondritis is common in the 2nd-3rd degree burns. Infection generally manifests within 2-4 weeks of burns. Redness and exquisite tenderness are



Figure 1: Case 1: (a) Facial burns and perichondritis developing at 3-week period. (b) Post-therapy of gentamycin and standard treatment guideline over raw area, complete resolution with no residual deformity



Figure 2: Case 2: (a) Acid burns involving face and trunk. (b) Post 2 weeks: Perichondritis starting to develop, intralesional gentamicin started. (c) Post 4 weeks: Resolution of perichondritis and development of raw area



Figure 3: Case 3: Patient with 2nd-3rd degree thermal facial burns, signs of perichondritis at 3 weeks and then abscess. Patient was started on gentamicin injection wash; resolution was seen in a month. Post-therapy photos unavailable

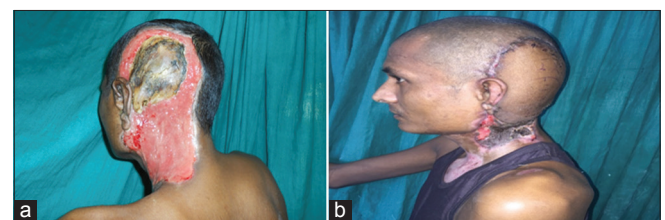


Figure 4: Case 4: (a) Another patient with scalp defect post-electrical burns had perichondritis 3-week post-burns, patient started on intralesional gentamicin. (b) Complete resolution of perichondritis in 2 weeks and post-anterolateral thigh free flap for scalp defect



Figure 5: Case 5: Perichondritis on 2 weeks of presentation. Patient treated with intralesional gentamicin, resolution in 1 week. Post-therapy photos unavailable

often associated with infections involving the cartilage. Treatment includes daily dressing and intralesional gentamicin, submitting a swab of the infected site for culture and sensitivity, and using an antibiotic, that is, effective against *Staphylococcus aureus* and *Pseudomonas aeruginosa*. The ear should be monitored for abscess development, and if an

abscess appears, debridement is appropriate. Despite prompt and appropriate treatment, deformities of the cartilage can still occur. Intralesional gentamicin is cheap and effective treatment of perichondritis in burns.

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