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RESEARCH ARTICLE

A Case Study of 20 Cases of Traumatic Injury to Pinna Resulting in Perichondritis with Review of Literature

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ABSTRACT

Perichondritis of the external ear is a frightening and disfiguring complication of the traumatized ear leading to residual deformity in cases [1].

Here we have 20 cases of post-traumatic perichondritis, out of which nine were diagnosed in the earliest stages and treated with oral antibiotics only, seven were diagnosed after abscess formation and treated in the hospital setting with intravenous antibiotics. Four were diagnosed after abscess formation and treated with surgical intervention and intravenous antibiotics. The challenge lies in early diagnosis, proper analysis of the aetiological factors responsible, bacteriological agents involved, attempt to classify and stage this disease, and formulate a treatment protocol that should be advocated for the different disease stages.

KEYWORDS: Perichondritis; Preserve cartilage; Earlyperichondritis without fluctuant abscess; Fluctuant abscess and cartilage destruction; Debridement of necrosed cartilage.

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INTRODUCTION

'Perichondritis' refers to infection or inflammation involving perichondrium (cartilage) of the external ear - Auricle and External auditory canal.

Perichondritis usually happens secondary to a traumatic cause. Other causes include superficial infection of skin erysipelas or subcutaneous tissue of EAC pinna Cellulitis, which spreads deeply to involve perichondrium (perichondritis) or cartilage.

Presentation of auricular perichondritis is insidious. It presents with swelling over an area of trauma associated with a dull aching pain of increasing severity, tenderness, and redness.

The body of pinna is formed by a single piece of yellow elastic cartilage covered with perichondrium, from which its supply of nutrients is derived, as cartilage itself is avascular.

Any trauma, assault, or ear piercing causes injury to pinna and stripping of perichondrium, which causes a hematoma and may lead to cartilage necrosis with disfigurement of the shape of the pinna giving it a "cauliflower ear," pugilistic or "boxer's ear" appearance.

Different type of management options depends on the stage of perichondritis.

According to Prasad et al. [2]

Stage 1 Early perichondritis without fluctuant abscess.

Stage 2 Perichondritis with fluctuant abscess.

Stage 3 Perichondritis with fluctuant abscess and cartilage destruction.

Topical and oral antibiotics manage the mildest forms (cellulitis and prasad stage 1). Treatment with a broad-spectrum antibiotic with a high dose, IV to cover organisms in especially Pseudomonas aeruginosa

Stage 2 subperichondrial abscess with fluctuation requires – Drainage, pus swab for c/s

In resistant cases, Removal of the necrosed cartilage Total Chondrectomy via an incision at the helical margin, the ear being split in a bivalve fashion, necrotic cartilage resected, layer of mesh gauze placed between flaps changed daily.

The study helps find out relative incidence, frequency, presentation, complications of perichondritis of pinna, and best management for it.

MATERIALS AND METHODS

The Department of ENT did a retrospective case study on twenty patients diagnosed with perichondritis over two years. The data was structured in a proforma. This proforma included medical history, including duration of symptoms from the time of trauma, presence of co-morbid conditions, clinical features, microbiology report, radiological findings, and the mode of treatment the patient has undergone. An informed valid and written consent was taken from the patients. The data were summarised into a structured case report form. According to the data. Patients were split into three groups depending

on the stage of diagnosis: group 1(9 in number) – localized erythema, tenderness (milder presentation); group 2 (7 in number) – localized erythema, tenderness, swelling, secretions from the auricle (more severe presentation); group 3 (4 in number) - localized erythema, tenderness, swelling, secretions from the auricle, necrosis of the cartilage, blackening of pinna with the indurated leathery appearance of the auricle (severe presentation involving destruction of cartilage). We extracted the duration of treatment from the onset of treatment initiation the period of time from the start of symptoms until admission.

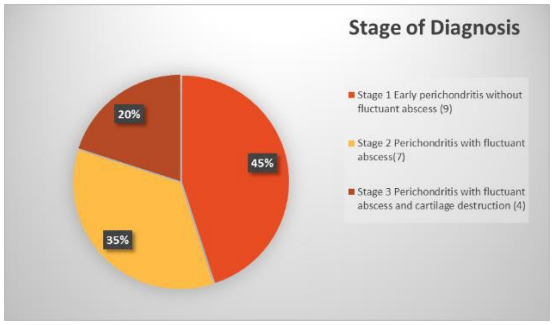

Figure 1: Stage of Diagnosis

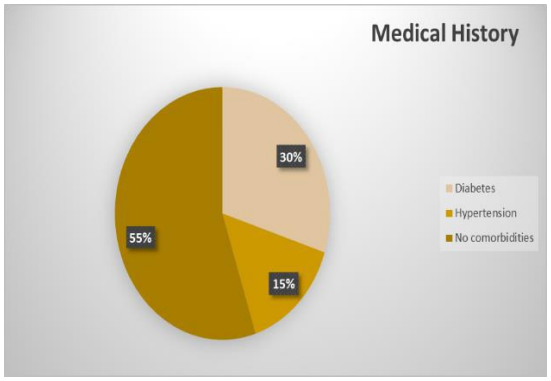

Figure 2: Comorbidities

Extracting a proper previous medical history/comorbidity history was found to play a crucial role in diagnosis and management in patients with perichondritis. Out of 20 patients diagnosed with perichondritis, six suffered from diabetes mellitus, 3 had a history of hypertension, 11 patients with no comorbidities. Diabetes mellitus was found to affect the healing rate in surgically managed patients hence was very important to maintain controlled blood sugar levels.

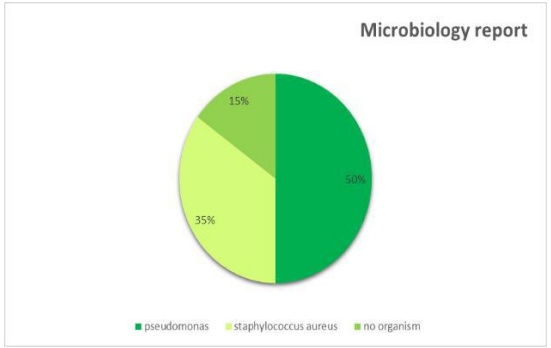

Figure 3: Isolated Organism responsible

Pseudomonas aeruginosa was found to be the most common causative organism isolated from patients of perichondritis responsible for producing an aggressive infection as it is resistant to many antibiotics. Ciprofloxacin and levofloxacin are most effective against gram-negative organisms like Pseudomonas aeruginosa. It can maintain antibiotic resistance and transfer such genes through conjugation and transduction [12].

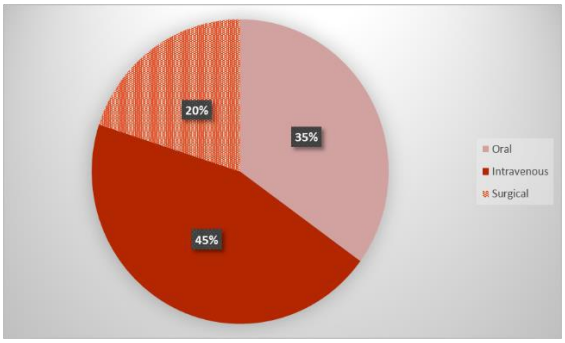

Figure 4: Mode of Treatment

Intravenous antibiotics are the mainstay of treatment in perichondritis, providing a fast recovery rate in maximum cases and good antimicrobial cover. They act as an adjuvant to cases requiring surgical management for better healing outcomes. They remain the first line of treatment in severe cases of perichondritis started on an empirical basis on admission and then changed or continued specific to the particular organism based on culture and sensitivity report.

RESULTS

A total of 20 patients were studied for developing perichondritis secondary to the aetiological factor being trauma. A detailed medical history was obtained, stating the duration and time of appearance of symptoms, the severity of symptoms, presence of any comorbidity associated with the worsening of the condition, clinical presentation stage, Pus swab culture, and sensitivity was sent to confirm the causative organism, to start the most appropriate antibiotic cover for the patient. Pseudomonas aeruginosa was found to be the most common pathogen responsible, others being staphylococcus aureus less predominant. Radiological investigation in view of knowing the extent of disease, HRCT temporal bone was done by three patients showed the presence of a soft tissue swelling. Other routine blood investigations were sent to rule out any systemic pathology. According to the stage of clinical presentations, the patients were treated. Patients were split into groups according to the stage of presentation group 1(9 in number) – localized erythema, tenderness (milder presentation); group 2 (7 in number) – localized erythema, tenderness, swelling, secretions from the auricle (more severe presentation); group 3 (4 in number)

- localized erythema, tenderness, swelling, secretions from the auricle, necrosis of the cartilage, blackening of pinna with the indurated leathery appearance of the auricle (severe presentation involving destruction of cartilage) and treated, with only oral antibiotics, iv antibiotics, and surgical resection respectively. It was found that early diagnosis and appropriate instillation of treatment was the key to better management. Patients belonging to group 1 were given broad-spectrum antibiotics. Patients were belonging to group 2 received IV antibiotics primarily

providing cover against gram-negative organisms like pseudomonas and staphylococcus. The choice of drugs given were fluoroquinolones or cephalosporins, depending on the pus swab culture sensitivity report.

Figure 5: Clinical photo showing abscess formation from swelling with discharge from previousincision and drainage site

HRCT Temporal Bone – done to rule out any trauma to the temporal bone.

Surgical method:

An Incision and Drainage with Debridement of necrosed cartilage was done one week after administering intravenous antibiotics.

The incision was taken parallel to the margin of the helix and the skin flap over the conchal region. Elevation of skin flap done on one side, granulation tissue and pus were curetted and removed. Necrosed cartilage is excised till normal cartilage is visualised. The betadine-soaked umbilical cotton tape was placed under the skin flap.

Figure 6: Intraoperative picture

Figure 7: Post operative day 3

DISCUSSION

Perichondritis of the auricle is a rare entity. In a literature review, Bassiouny found only 191 cases described until 1981.[9] Perichondritis is a diffuse infiltrate of inflammatory or neoplastic leukocytes in the skin of the external ear. Acute malignant perichondritis, which is mainly seen in patients with diabetes, is caused primarily due to Pseudomonas infection and is rapidly infiltrative with subsequent involvement of the parotid gland and facial nerve, external auditory canal, and middle ear, and then temporal bone with brain invasion.[10] When present, it tends to spread quickly throughout the ear (sparing the lobule) and leads to catastrophic ear deformity [8]

Infection can be introduced into the auricular cartilage by trauma (most common), surgery, particularly while operating on the external auditory canal, or spread from a superficial focus such as meatal furunculosis.

Patients were split into three groups depending on the physical findings on admission: group 1(9 in number) – localized erythema, tenderness (milder presentation); group 2 (7 in number) – localized erythema, tenderness, swelling, secretions from the auricle (more severe

presentation); group 3 (4 in number) - localized erythema, tenderness, swelling, secretions from the auricle, necrosis of the cartilage, blackening of pinna with the indurated leathery appearance of the auricle (severe presentation involving destruction of cartilage).

Early diagnosis and treatment were the keys in the patients belonging to group 1, who were started on both oral and topical antibiotics. An antibiotic regime that provides adequate coverage for pseudomonas aeruginosa and staphylococcus aureus was incorporated. Fluoroquinolone antibiotics such as ciprofloxacin are available in both oral and topical forms and provide excellent staphylococcal and pseudomonal cover. Normally recovered on an outpatient basis.

Group 2 (7 patients) presented with features of a fluctuant abscess formation, systemic features like fever, and comorbidities like diabetes mellitus with uncontrolled sugars. Were admitted to the hospital for definitive treatment with iv antibiotics coverage for pseudomonas aeruginosa and staphylococcus aureus, sugar control for patients with diabetes, a pus culture sensitivity was sent in patients with discharge from the auricle.

Group 3 (4 patients) with swelling, secretions from the auricle, presence of necrosis of cartilage in these patients resistant to parenteral antibiotic treatment

Resembling case like any surgical abscess, the structure and texture of the pinna make it difficult to treat.[5] Conservative treatment alone is not an adequate model of treatment for severe cases, most of the time. Surgical procedures such as aspiration with a large-bore needle or incision and drainage are almost always required in advance with the medical treatment. Plaster moulds with pressure bandages are used after draining the wound to prevent fluid accumulation in the auricle. Some authorities prefer suturing perichondrium to the cartilage with soft rubber pieces or Leonard buttons (Down's Surgical) [8]. Frequently we see that multiple sittings of drainage of the wound are required till it resolves or the infection is controlled. Despite these treatment methods, we find that perichondritis spreads till some portion of the pinna is destroyed and a permanent deformity forms. Till now, most authorities reporting management of perichondritis or haematoma make an incision, drainage, suturing, and dressing at repeated sittings. The cause of resistance to treatment and the spread of the disease process is the deficiency in the humoral circulation at the site and the superadded infection by antibiotic-resistant organisms. Humoral insufficiency also decreases the cell's ability to affect killing bacteria. The resistant organisms lose their virulence after drainage is done. Many different surgical modalities have been described, but considerable disfigurement should be anticipated if severe disease. In an attempt to avoid considerable deformity, which frequently follows repeated simple incision, two surgical techniques were evolved. Excision method by Stroud in 1963 [5]. Stroud's technique comprised excision of the diseased cartilage with the overlying anterior skin and perichondrium; the defect can be grafted later.

Dowling et al.[3] used this method for early perichondritis localised to the antihelix and with minimal deformity when the helix was preserved. The advanced cases involving the entire auricle total chondrectomy were necessary. The auricle was split in a bivalve fashion along the edge of the helix and necrotic cartilage removed, a fine mesh gauze placed between the flaps and changed daily. Through and through tubal drainage by Stevenson 1964. [4] Stevenson used this method to treat cases of localised pseudomonas perichondritis via an endaural incision. Two fenestrated drains were inserted, one anteriorly, one posteriorly neomycin- cortisone solution was injected twice daily into tubes. Drains were removed on the 5th day. Wanamaker applied drainage technique to 6 cases following endaural surgeries, two tubes anteriorly and one posteriorly 0.5 ml of polymyxin solution 0.25 % solution was instilled every 2-3 hours.

CONCLUSION

Perichondritis of the auricle is a notorious disease. Its prognosis is based on its treatment on time. No surgical intervention is necessary in the earliest stages, and intravenous antibiotics alone will suffice in these cases, provided the condition is diagnosed early, and the treatment is started immediately. However, in the presence of an abscess, drainage is to be carried out at the earliest. Malignant otitis externa, causing perichondritis, requires very aggressive and quick surgical and medicinal intervention. In all cases, an effort to preserve cartilage as much as possible since the final aesthetic result depends on the amount of cartilage damaged or removed.

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AUTHORS' CONTRIBUTIONS

The participation of each author corresponds to the criteria of authorship and contributorship emphasized in the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals of the International Committee of Medical Journal Editors. Indeed, all the authors have actively participated in the redaction, the revision of the manuscript, and provided approval for this final revised version.

COMPETING INTERESTS

The authors declare no competing interests with this case.

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PATIENT CONSENT

Written informed consent was obtained from the patient for the publication of this case report.

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