

Original Article

Auricular Perichondritis: Clinical Search in a District Level Hospital

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Abstract:

Background: *Perichondritis refers to an inflammation of the perichondrium, a layer of connective tissue which surrounds cartilage. Auricular perichondritis, the commonest form, involves the pinna due to infection of a traumatic or surgical wound or the deep spread of superficial inflammation. This type of disease often leads to residual deformity, and its incidence in our experience seems to be increasing.*

Objectives: *The present study was conducted to determine the predisposing factors, pathogenic organisms, interventions and residual deformities of the disease in a peripheral medical college hospital.*

Methods: *This was a prospective study which was conducted in the Department of Otolaryngology – Head & Neck Surgery, Pabna Medical College Hospital, Pabna from January 2017 to June 2018. Follow up was for six months ending with assessment of pinna deformity. Data was analyzed using SPSS for windows version 22.*

Results: *Patients were from 15-75 years of age (range 60 years) with male predominance and peak in the fourth decade of life. The most common predisposing factors were trauma from motor vehicle accidents (30%) followed by high ear piercing (22%). Pseudomonas aeruginosa (48%) followed by Staphylococcus aureus (20%) were the most common organisms. Patients were treated with intravenous antibiotics but 76% also required surgical intervention. 68% developed residual deformities of the pinna with 50% being total and 18% being partial.*

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Conclusion: *Auricular perichondritis is a frightening disease which requires early management. As Pseudomonas aeruginosa is the most common organism, antipseudomonal antibiotics should be started as early as possible. Despite medical and surgical intervention, residual deformities may ensue.*

Keywords: *auricular perichondritis, pinna, trauma, Pseudomonas aeruginosa*

Introduction:

Perichondritis is an infection of the connective tissue of the ear that covers the cartilaginous auricle or pinna, excluding the lobule. The term perichondritis is itself a misnomer, as the cartilage is almost always involved, with abscess formation and cavitation. Perichondritis can be a devastating disease, and if left improperly treated, the infection can worsen into a liquefying chondritis resulting in disfigurement and/or loss of the external ear¹. Unfortunately, misdiagnosis and mistreatment are common. In one small retrospective review, the overwhelming majority of patients presenting to a large general hospital were prescribed antibiotics without appropriate antimicrobial coverage, resulting in a significant number of patients developing chondral deformities or “cauliflower ear”.

A number of causes of perichondritis have been identified, among them the common causes are minor trauma, burns, and ear piercing. Notably, damage to the cartilage is not a necessary prerequisite—infection can occur if the overlying meatal skin is subjected to even trivial trauma, such as a scratch with an infected fingernail. In a significant percentage of cases, no significant cause can be identified. Nonetheless, several authors postulate that a growing incidence of perichondritis may be associated with the rising popularity of high chondral ear piercing, which causes stripping of the perichondrium and microfracture of the avascular cartilage while directly introducing infection. Perichondritis has been noted to be the

presenting symptom of a number of disease processes marked by immunosuppression, including HIV-associated Non-Hodkin’s Lymphoma, relapsing polychondritis, and not uncommonly diabetes.

The most common microorganism responsible for perichondritis is *Pseudomonas Aeruginosa*, a gram-negative rod with intrinsic antibiotic resistance mechanisms. Co-infection with *E. Coli* was identified in half of cases. Because of the varying antibiotic sensitivities of these causative organisms, culture swab is recommended in all cases. The present study was conducted to determine the predisposing factors, pathogenic organisms, interventions and residual deformities of the disease.

Materials and methods:

This was a prospective cohort study which was conducted in the Department of Otolaryngology – Head & Neck Surgery, Pabna Medical College Hospital, Pabna from January 2017 to June 2018. Purposive sampling method was used to collect data. All patients presenting with auricular perichondritis over a period of one year from January 2017 and December 2017 were consecutively listed after obtaining informed written consent. A detailed clinical history including demographic details, medical history (diabetes mellitus, autoimmune diseases, recurrent otitis), recent medical history related to current illness (any surgical intervention on the infected ear within one month of the current hospitalization) possible predisposing events (trauma, acupuncture),

clinical data (body temperature and physical signs such as local hyperemia, swelling, discharge and tenderness), were taken from each patient. They were all examined properly to exclude other pathologies. All patients subsequently underwent routine hematologic and blood biochemical examinations and discharge from the pinna was sent for culture and sensitivity. All patients were treated with empirical intravenous ciprofloxacin after admission, and continued on ciprofloxacin if clinical response and culture and sensitivity were confirmed. Those sensitive to co-amoxiclav, ceftazidime or amikacin were shifted to these medications. Step-down to oral medications (ciprofloxacin or co-amoxiclav) was done when signs of acute inflammation resolved, the wound appeared healthy and culture revealed no growth. Those on ceftazidime or amikacin were maintained on parenteral medications until proper wound healing had been achieved. When associated with hyperemia, fluctuant swelling of the pinna and aspirated pus, surgical incision and drainage was also performed. Regular wound dressing was done in every patient with hydrogen peroxide (20%) sprayed into the wound, rinsed with normal saline, washed with povidone iodine 10% (betadine), rinsed with normal saline, swabbed with tetrachlorodecaoxide 1:55 dilution (oxoferin) with a cotton applicator and finally coated after 20 minutes with mupirocin 2% (T-bact) ointment. As the wound appearance improved, hydrogen peroxide, followed by povidone iodine and normal saline were successively discontinued. Tetrachlorodecaoxide was continued until crust formation, and mupirocin was used until epithelialisation. All the patients were followed up for six months after control of infection for assessment of pinna deformity as a sequelae of perichondritis. Deformity of pinna following perichondritis was classified into three: no deformity, partial deformity (part of the pinna

is deformed) and total deformity (whole pinna is deformed).

Statistical Analysis:

SPSS-23 for Windows (SPSS Inc., IL, USA) was used for statistical analysis. The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. *P* value less than 0.05 was considered to statistically significant.

Results:

A total of 50 patients were studied over a period of one year (76%) were male and 12 (24%) were female. Their ages ranged from 15-75 years, with a range of 60 years. Most patients (38 patients, 76%) were within the age group between 30-50 years.

Table I :
Predisposing factors for perichondritis of the auricle

Predisposing factors	No of Cases (n = 50)	Percentage (%)
Road traffic accident	15	30
Ear piercing	11	22
Burn	8	16
Post – surgical	7	14
Diabetes	5	10
Allergic reaction	4	8
Total	50	100

Among the predisposing factors, 15 cases (30%) were from trauma due to road traffic accidents, followed by ear piercing (11, 22 %). (Table I) *Pseudomonas aeruginosa* was the most common pathogenic organism isolated from the diseased pinna (48%) followed by *Staphylococcus aureus* (20%). Polymicrobial infection was found in 8%. (Table II)

Table II :
Pathogenic organisms isolated from perichondritis

Pathogenic isolates	No of Cases (n =50)	Percentage
<i>Pseudomonas aeruginosa</i>	24	48
<i>Staphylococcus aureus</i>	10	20
<i>Enterococcus faecalis</i>	5	10
<i>Streptococcus group A</i>	3	6
<i>Polymicrobial infection</i>	4	8
<i>Klebsiella pneumonia</i>	2	4
<i>Candida spp</i>	2	4
Total	50	100

Twelve patients (24%) responded to antibiotic therapy alone while 38 patients (76%) required additional surgical incision and drainage. Thirty patients (60%) responded with empiric ciprofloxacin and their culture sensitivity reports confirmed sensitivity to ciprofloxacin in twenty nine (29) or 58%. Eleven patients (22%) whose reports revealed

sensitivity to co- amoxiclav were shifted to it but only 10 or 20% were continued on a full course. One patient each on initial ciprofloxacin and co-amoxiclav subsequently had *Candida spp* on culture, prompting us to cease the respective antibiotics and continue with topical wound care alone. Six patients required amikacin and three (3) were shifted to ceftazidime. (Table III)

Table III :
Pathogenic Organisms and Antibiotic Sensitivities

Pathogenic Organisms	Antibiotic Sensitivity**											
	Ciprofloxacin			Co-amoxiclav			Amikacin			Ceftazidime		
	S	I	R	S	I	R	S	I	R	S	I	R
<i>Pseudomonas aeuroginosa</i>	22	2	0	24	1	23	1	23				
<i>Staph aureus</i>	3	7	7	3	0	10	0	10				
<i>Enterococcus faecalis</i>	3	2		5	2	3		5				
<i>Streptococcus Group A</i>	0	3	0	3	3	0	0	3				
<i>Klebsiella pneumoniae</i>	0	2	0	2	0	2	2	0				
<i>Polymicrobial Infection*</i>	1	3	3	1	0	4	0	4				
Total	29	19	10	38	6	42	3	45				

*Organisms in polymicrobial infection

Patient 1: E.coli, Enterobacter, Shigella, Proteus - Sensitive to ciprofloxacin.

Patient 2: H.influenzae, Shigella, Enterobacter - Sensitive to co-amoxiclav.

Patient 3: Proteus, Shigella, Enterobacter - Sensitive to co-amoxiclav.

Patient 4: Salmonella, H.influenzae, E.coli - Sensitive to co-amoxiclav.

**One patient each had Ciprofloxacin and Co-amoxiclav discontinued after *Candida spp* was grown; totalling 50 patients (48 reflected in this table).

All patients on Ciprofloxacin and Co-amoxiclav discontinued after *Candida* spp was grown; totalling 50 patients (48 reflected in this table).

Parenteral Ciprofloxacin and Co-Amoxiclav were eventually shifted to oral forms, and those on Amikacin and Ceftazidime were maintained on parenteral forms. All wounds healed sufficiently to cease oral or intravenous antibiotics within 20 to 46 days.

After six months follow-up, 34 patients (68%) developed residual deformity. These were further subdivided into 25 (50%) with total deformity of the pinna and 9 (18%) with partial deformity. (Table IV)

Table IV :
Deformity following perichondritis

Type of deformity	No of Cases (n = 50)	Percentage (%)
No Deformity	16	32
Partial deformity	25	50
Total deformity	9	18
Total	50	100

Discussion:

Perichondritis of the auricle is a frightening and perturbing complication of the traumatized ear that can lead to residual deformity.¹ It usually results from trauma which may include injuries following road traffic accidents, post-surgery and burns.^{2,3,4,5} Contaminated wounds following road traffic accidents are more prone to perichondritis of the pinna. The popularity of high ear piercings has been increasing among teenagers⁶ and when performed by untrained, unqualified persons without maintaining aseptic technique, may increase the incidence of aural perichondritis, as seen in our study. Skin moisture fosters the proliferation of the most common causal agent.⁷ Patients usually present with unbearable pain, erythema of

pinna and rise of body temperature. If left untreated, the disease progresses as diffuse edema of the pinna and subsequent abscess formation leading to cartilage necrosis and cauliflower deformity. Bassiouny³, Dowling *et al.*⁸ and Apfelberg *et al.*⁹ found that *Pseudomonas aeruginosa* is the most common pathogenic organism responsible for this disease followed by *Staphylococcus aureus*¹⁰ which was consistent with our findings. These pathogens are usually sensitive to ciprofloxacin or co-amoxiclav, as seen in our study.

Other pathogens include *Enterococcus faecalis*, *Streptococcus group A* and *Klebsiella pneumonia* which may be treated with ceftazidime and amikacin, again reflected in our study. Four patients had polymicrobial infection with *Escherichia coli*, *Enterobacter*, *Shigella*, *Proteus*, *H. influenzae* and *Salmonella* found on culture. Of the four patients, three were sensitive to co-amoxiclav and one was sensitive to ciprofloxacin. Auricular perichondritis not only involves the perichondrium but also the chondral cartilage. The regeneration of damaged cartilage is difficult and necrotic chondrocytes will eventually be replaced by dense fibrosis and scar formation, which will cause consequent ear deformity.¹¹ In our study, residual deformity of pinna was found in 68% of cases after six months follow-up. Indeed, auricular perichondritis is a very frightening and frustrating disease. It requires prompt intervention and management, despite which permanent remodeling of the pinna may occur. Perhaps the best way to prevent sequelae of this disease is still highlighting education on the risk factors and early intervention with administration of proper medications.

Conclusion:

With prompt diagnosis and treatment with antibiotic therapy, the symptoms usually

settles within few days. As *Pseudomonas aeruginosa* is the commonest causative organism, sensitive antibiotic should be given. Cosmetic deformity depends on the severity of the infection and the damage to the underlying cartilage. This is especially important in perichondritis with abscess formation, which requires surgical treatment, and cartilage may be damaged. Early treatment requires to prevent complications such as deformity.

References:

1. Davidi E, Paz A, Duchman H, Luntz M, Potasman I. Perichondritis of the auricle: analysis of 114 cases. *Isr Med Assoc J* 2011 Jan;13(1): 21–24.
2. Prasad HK, Sreedharan S, Prasad HS, Meyyappan MH, Harsha KS. Perichondritis of the auricle and its management. *J Laryngol Otol* 2007;121(6):530-4.
3. Bassiouny A. Perichondritis of the auricle. *Laryngoscope* 1981;91(3): 422-31.
4. Prasad KC, Karthik S, Prasad SC. A comprehensive study on lesions of the pinna, *Am J Otolaryngol* 2005; 26(1): 1-6.
5. Templer J, Renner GJ. Injuries of the external ear. *Otolaryngol Clin North Am* 1990; 23(5): 1003-18.
6. More DR, Seidel JS, Bryan PA. Ear piercing techniques as cause of auricular perichondritis. *Pediatr Emerg care.* 1999;15(3):189-192.
7. Das P. Piercing the cartilage and not the lobules leads to ear infections. *Lancet Infect Dis* 2002;2(12):715.
8. Dowling JA, Foley FD, Moncrief JA. Chondritis in the burned ear. *Plast reconstr Surg* 1968; 42(2) :115-122.
9. Apfelberg DB, Waisbren BA, Masters FW, Robinson DW. Treatment of chondritis in the burned ear by the local instillation of antibiotics. *Plast Reconstr Surg* 1974;53(2): 179–83.
10. Stirn A. Body piercing: medical consequences and psychological motivations. *Lancet* 2003; 361(9364): 1205-15.
11. Stroud MH. A simple treatment for suppurative perichondritis. *Laryngoscope* 1963; 73(5):556-63.