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Auricular Perichondritis in a Tertiary Rural Hospital

ABSTRACT

Objective: Auricular perichondritis refers to inflammation involving the perichondrium of the external ear. It is a very serious disease which may lead to permanent deformity of the pinna. We describe the predisposing factors, pathogenic organisms, interventions and residual deformities in a prospective consecutive sample of patients.

Methods:

Design: Prospective Cohort Study

Setting: Tertiary Rural Government Teaching Hospital

Participants: All patients presenting with auricular perichondritis for a period of one year between March 2011 and February 2012 were consecutively enrolled and a clinical history and demographic details were obtained. Routine hematologic, blood biochemical examinations and culture / sensitivity of discharge from the pinna were conducted, and empiric intravenous ciprofloxacin was administered and continued if confirmed by culture and sensitivity. Those sensitive to co-amoxiclav, ceftazidime or amikacin were shifted to those medications. Medications were shifted to oral forms when available and indicated by resolution of acute inflammation, wound healing and no growth on cultures. Parenteral medications were maintained until the same parameters were achieved. Surgical incision and drainage was also performed when indicated, followed by a standardized wound care regimen. Follow up was for six months ending with assessment of pinna deformity.

Results: Of the total study population of 50, 76% were male and 24% were female; 15-75 years of age (range 60 years) displaying male predominance and clustering 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 isolated. All were managed with intravenous antibiotics but 76% also required surgical intervention. Sixty-eight percent developed residual deformities of the pinna with 50% being total and 18% being partial.

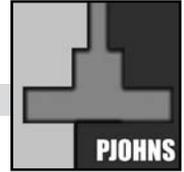
Conclusion: Auricular perichondritis is a frightening disease which requires early management. As *Pseudomonas aeruginosa* is the most common organism, antipseudomonal antibiotics should be started as early as possible. Despite medical and surgical intervention, residual deformities may ensue.

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

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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.¹ The present study was conducted to determine the predisposing factors, pathogenic organisms, interventions and residual deformities of the disease in a local rural setting in West Bengal, India.

MATERIALS AND METHODS

With institutional ethical review board approval, this prospective series was conducted in the Department of ENT, Burdwan Medical College and Hospital, Burdwan. All patients presenting with auricular perichondritis over a period of one year from March 2011 to February 2012 were consecutively enrolled after obtaining informed consent. No other inclusion or exclusion criteria were applied.

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).

The data was tabulated and analyzed manually using means and percentages.

RESULTS

A total of 50 patients were studied over a period of one year. Of these, 38 (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.

Among the predisposing factors, 15 cases (30%) were from trauma due to road traffic accidents, followed by ear piercing (11, 22%). (Table 1) *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 2)

Table 1. 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

Table 2. 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
Polymicrobial infection	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 3) All patients on

Table 3. 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 aeruginosa</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
Polymicrobial Infection*	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:
 Patient 2- H.influenzae, Shigella, Enterobacter:
 Patient 3- Proteus, Shigella, Enterobacter:
 Patient 4- Salmonella, H.influenzae, E.coli:

Sensitive to ciprofloxacin.
 Sensitive to co-amoxiclav.
 Sensitive to co-amoxiclav
 Sensitive to co-amoxiclav

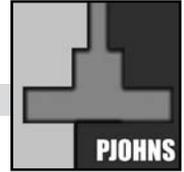
**One patient each had Ciprofloxacin and Co-amoxiclav discontinued after *Candida spp* was grown; totalling 50 patients (48 reflected in this table).

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 4)

Table 4. 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,^{2,3} 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.

Dowling *et al.*,⁸ Apfelberg *et al.*⁹ and Bassiouny³ 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 remodelling 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. Future

studies should investigate the role allergic reactions may have as important contributing factors to auricular perichondritis, as we were unable to do so in this study.

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