



Microbiology of itchy ears

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Abstract

Objective: To study microbiology of external auditory canal in patients with itchy ears and to also study susceptibility profiles of pathogenic organisms to aid in appropriate management.

Materials & Methods: A total of hundred patients were selected. An external ear canal swab was taken. For recovery of bacteria, the samples were emulsified in a solution of BHI broth to study aerobic and anaerobic bacteria. Fungal microbiology was studied by KOH mount and fungal culture. Culture and sensitivity was done for the pathogenic organisms.

Results: Of the total hundred patients, 48% patients had no growth. There were no anaerobes isolated. Of the remaining 52% cases, 33% of the growth was aerobic bacteria and 19% of the growth was fungi. Of the aerobic bacteria, coagulase negative staphylococcus was isolated from 22 patients, staphylococcus aureus from 9 patients and pseudomonas aeruginosa from 2 patients. Of the fungal species, candida was isolated from 11 patients and aspergillus niger from 8 patients.

Conclusion: Our study concluded that there need not be an underlying bacterial or fungal infection to cause itching as evidenced by a condition called asteatosis. Hence, asteatosis should be considered as one of the differential diagnosis for chronic and persistent itching when all other causes have been ruled out. We also found that topical ciprofloxacin drops is equally effective against the common bacterial pathogens.

Abbreviations: BHI (brain-heart infusion), KOH (potassium hydroxide)

Introduction

The human external auditory canal is a wonderfully designed structure with self-cleansing properties whereby the cerumen coat migrates laterally and sloughs externally. Instrumentation and excessive cleaning of the ear canal often predispose to infection.

Infections of the ear may present with symptoms like ear ache, discharge, itching, fullness etc. Itching is one of the most distressing symptoms of ear diseases. It may even be psychological. In our routine clinical practice, we come across many a number of patients who complain of persistent itching of the ears. Some of these cases have some underlying pathological causes to attribute to, whereas very often we do also see cases where the underlying cause remains unknown.

External auditory canal can harbour certain microorganisms. Coagulase negative Staphylococcus, Staphylococcus aureus and Streptococcus pneumoniae are the most common bacteria isolated from the external ear canals of healthy people. Corynebacterium species (*Turicella otitidis* and *Corynebacterium auris*) have also been isolated in various studies. The third most common recovered bacteria are Streptococci and Enterococci species.¹

The prevalence of the disease is influenced by a number of predisposing factors such as climate (extremely moist and hot environments), chronic bacterial otitis externa, swimming, dermatomycoses, insertion of foreign objects and wearing head clothes.²

Nearly sixty one fungal species are involved in external otitis.³ The most common fungal agents causing otomycosis are *Aspergillus niger* (80%), *Candida albicans* (second most common), *Actinomyces*, *Trichophyton*, *Aspergillus fumigatus* and *Candida tropicalis*.²

Acute diffuse otitis externa (swimmer's ear), chronic otitis externa, otomycosis and scalp lesions are some of the commonest diseases which predispose to itching of the ear.⁴ It may also be associated with neurodermatitis and eczematous otitis externa.

In the present study we aimed to study the microbiology of external auditory canal in patients with itchy ears and to also study susceptibility profiles of pathogenic organisms to aid in appropriate management.

Methodology

All out-patients and in-patients of a medical university in coastal region of Karnataka with complaints of itching in the ears from July 2013 to October 2014 were studied. A total of 100 patients were studied. All patients above the age of 6 years who presented with itching of the ears were included. We excluded patients with middle ear infections- both discharging and non-discharging ears, patients with upper respiratory tract infections and patients with usage of topical ear drops less than 2 weeks. Study was started after obtaining ethical clearance. Relevant clinical data (demographic- age, sex, place, occupation) including history was obtained from the patient.

A detailed clinical examination was performed. Informed and written consent was taken from all the patients. An external ear canal swab was taken. For recovery of bacteria, these samples were emulsified in a solution of BHI broth. Aerobic and anaerobic microbiology were studied. Fungal microbiology was studied by KOH Mount and fungal culture. Culture and sensitivity was done for the pathogenic organisms.

Results

A total of 100 patients were studied, of which 57 were females and 43 were males. Female to male ratio was 1.32:1. 48% patients had no growth. In our study, there were no anaerobes isolated.

Out of the remaining 52% cases, 33% of the growth was aerobic bacteria and 19% of the growth was fungi. Of the aerobes isolated, coagulase negative staphylococcus was isolated from 22 patients, staphylococcus aureus from 9 patients and pseudomonas aeruginosa in 2 patients (Figure 1). Of the fungal species, candida was isolated from 11 patients and aspergillus niger from 8 patients (Figure 2).

Culture and sensitivity was done for the aerobes. Coagulase negative staphylococcus being the normal commensal was excluded from culture and sensitivity.¹ In cases with staphylococcus aureus, drug sensitivity was tested for amoxicillin, ampicillin, clindamycin, co-trimoxazole, gentamicin, methicillin, vancomycin, ciprofloxacin and erythromycin (Figure 3).

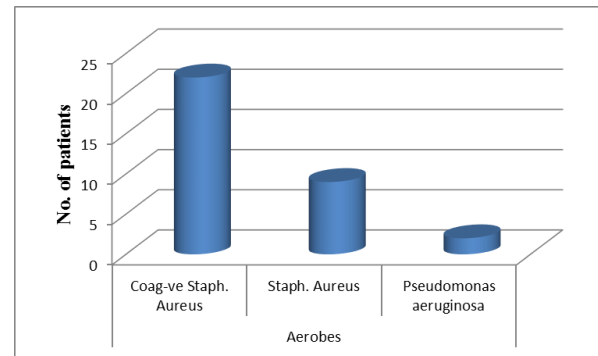


Figure 1: Showing aerobic growth

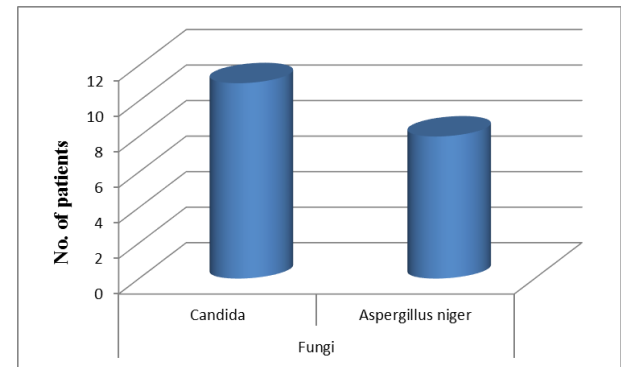


Figure 2: Showing fungal growth

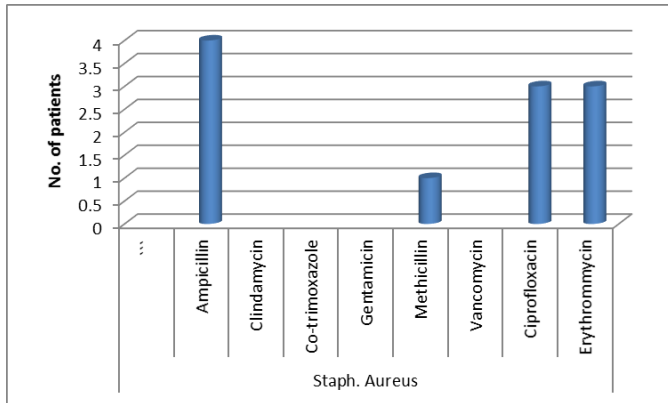


Figure 3: Drug sensitivity for Staphylococcus aureus

In cases with Pseudomonas aeruginosa, drug sensitivity was tested for amikacin, cefipime, ceftazidime, imipinem, piperacillin and tazobactam, tobramycin, cefuroxime and ciprofloxacin (Figure 4).

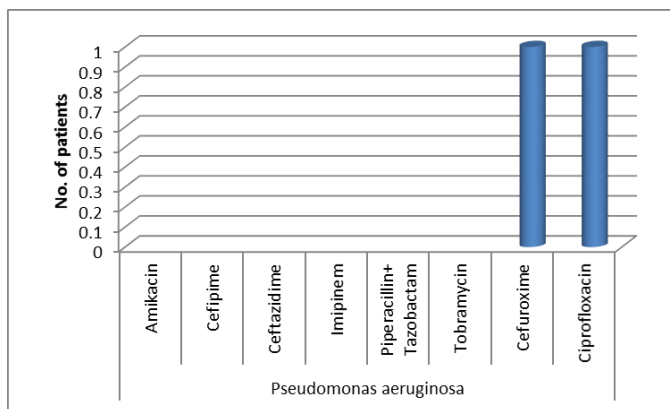


Figure 4: Drug sensitivity for Pseudomonas aeruginosa

Discussion

Itching or pruritis of ear is an irritating sensation accompanied by the persistent need to scratch. It's usually accompanied by redness, swelling, flakes, and scarring in the area of itchiness. Severe itching may compel patients to use instrumentation, thereby causing trauma to the external auditory canal. This predisposes to bacterial and fungal infections. Our study revealed that 48% patients had no growth, suggesting that there need not be an underlying bacterial or fungal infection to cause itching. All these patients had a dry canal skin without cerumen. This is attributed to a condition called "Asteatosis".

Asteatosis is a common condition of the external auditory canal where the skin surface is dry and lacks cerumen. Due to lack of cerumen, which is protective of the canal, there is a change in the pH of the canal which may make it more prone to external ear infections. The dryness of the canal skin leads to itching and subsequent scratching and irritation.⁵

Karakus et al studied the microbiology of external auditory canal in patients with asteatosis and itching and evaluated the efficacy of topical 2% Alcohol and boric acid solution in patients with normal flora. They concluded that despite normal otoscopic findings, external auditory canal cultures may show pathogenic colonization in patients with asteatosis. Topical administration of alcohol and boric acid solution relieves itching in patients with normal flora.⁶

Stroman et al studied the microbiology of normal external auditory canal and isolated bacteria from the canal, 96% were Gram-positive. Staphylococci were 63% of both the cerumen bacteria and the canal bacteria. Coryneforms represented 22% of the bacteria in cerumen and 19% in the canal. *Turicella otitidis* was the primary coryneform isolated from both the canal and the cerumen. Streptococci-like bacteria were 10% from the cerumen, 7% from the canal. In both cerumen and canal, *Alloiococcus otitidis* was more than 95% of the streptococci-like bacteria. Fifteen gram-negative organisms were isolated from the canal and cerumen, including four *Pseudomonas aeruginosa* strains. The percentages of *Staphylococcus epidermidis* isolates that had high-level resistance (> or =8 micro g/mL) were as follows: to neomycin, 28% from cerumen and 11% from the canal; to oxacillin, 28% from cerumen and 25% from the canal; and to ofloxacin, 15% from cerumen and 19% from the canal. Hence, they concluded that *Turicella otitidis* and *Alloiococcus otitidis* were present with a much higher frequency than previously described, lending evidence that they be considered normal otic flora. *Corynebacterium auris*, previously reported only in children, was isolated from normal adults.¹

Pakshir et al studied the mycoflora of human external auditory canal in Shiraz, Southern Iran. This study was conducted on 483 ear samples of 243 healthy individuals. These samples were collected by sterile swabs and were randomly cultivated on mycosel and sabouraud dextrose agar supplemented with antibiotics. They found that 28% individuals were positive for ear fungal infections. Hence, they concluded that normal fungal otic infections in the presence of predisposing factors could be a potential cause for otomycosis.²

Keyvan et al compared cerumen bacterial flora in acute otitis externa patients and healthy controls. In this study, cerumen was taken from 40 patients with clinically diagnosed acute otitis externa and 80 healthy controls. They found out that the isolated bacteria from cerumen of healthy subjects were totally different from those of acute otitis externa patients.⁷

Brook I conducted microbiological studies of the bacterial flora of the external auditory canal in children. The aerobic and anaerobic bacterial flora of the external auditory canal (EAC) was studied in 72 children. Aerobes only were isolated in 58 patients (80%) and anaerobic bacteria only in 2 (3%). Mixed aerobic and anaerobic isolates were recovered in 12 cases (17%). These findings demonstrate the polymicrobial bacterial flora of EAC in children where aerobic facultative and anaerobic bacteria are part of the normal flora.⁸

Campos et al conducted a study of common aerobic flora of human cerumen. They concluded that the organisms isolated as common bacterial components of human cerumen in their experience were similar to those found by other authors. However, the mean count was much higher. This could be related to climatic conditions and to the length of time the cerumen had remained in the external auditory canal.⁹

In our study, among the aerobes isolated, coagulase negative staphylococci accounted for 22 cases, followed by *Staphylococcus aureus* and *Pseudomonas aeruginosa* which was 9 and 2 cases respectively. All our patients were treated with a combination of Neomycin sulphate, Polymyxin B sulphate, Zinc bacitracin and Hydrocortisone (Neosporin H ointment). In patients who had complained of severe itching, oral anti-histamine was also added. The two cases which were positive for pseudomonas species were switched over to Tobramycin ear drops. One patient lost to follow up. The other patient improved significantly after one month with culture and sensitivity yielding no growth. The culture and sensitivity report suggested that topical ciprofloxacin drops is equally effective against both the aerobic pathogens grown in our study (*Staphylococcus aureus* and *Pseudomonas aeruginosa*).

Though fungi are known to cause intense itching, our study had only 19 cases probably because we excluded patients with topical ear drop usage. These patients were treated with a combination of chloramphenicol, clotrimazole, beclometasone dipropionate and lignocaine hydrochloride (Candibiotic ear drops). The extensive and sometimes unnecessary use of antibiotic eardrops for the treatment of otitis media and otitis externa has been linked to the increase in the prevalence of otomycosis. Secondary overgrowth of fungi is a well-known and recognized complication of the use of broad-spectrum antibiotics like quinolones.¹⁰

All our patients treated with a combination of antibiotic and a steroid ointment for a week had complete relief from symptoms of itching on follow up. Probably this combination is a good alternative for treatment of itching in patients with no bacterial or fungal pathology.

Conclusion

Itching is one of the most distressing of the ear complaints. There need not be an underlying bacterial or fungal infection to cause itching as evidenced by a condition called asteatosis. Hence, it is important to consider asteatosis as one of the differential diagnosis for chronic and persistent itching when all other causes have been ruled out. Our study showed that a combination of a topical antibiotic and a steroid is good alternative treatment for these cases. We also found that topical ciprofloxacin drops is equally effective against the common bacterial pathogens.

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