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Original Research Article

The clinicopathological evaluation of diseases of external ear in tertiary diseases

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ABSTRACT

Background: As the major part of outpatient department (OPD) comprises of diseases related to external ear, it is a need to acknowledge the topic. These diseases are sometimes seasonal and variable according to climate. Diseases may vary according to patients' anatomy. Histopathological examination along with clinical prospective is required to remove the diseases. Advancement in radiology has made easier to determine the extension and involvement of disease. Aim of the study is to evaluate the extent of disease, its causative factors, various associations and effect of treatment.
Methods: The observational cross sectional study is done on 211 patients. Detailed study is done and microscopic evaluation is done whenever required. Biopsies and pus samples taken for the histopathological and microbial examination. The data collected and entered in Microsoft excel and analysed data is presented in from of frequency and percentage shown by pie charts and tables.
Results: Out of total 211 patients the commonest involved age group (56.4%) belongs to 21-40 years with 109 (51.7%) females and 102 (48.3%) males. 91% of the patients belong to lower rural socioeconomic status. Most common pathology found in my study was otomycosis in 95 (30%) cases. Other pathologies included otitis externa in 57 (27%) cases, auralmass in 33 (15.6%) cases perichondritis, keloid, preauricular sinus, pseudocystand EAC stenosis in descending order.
Conclusions: Aural polyps and aral masses are found to be more intrusive. Prompt consideration of such cases should be done as they have tendency of extending intracranially.

Keywords: Histopathological examination, Aural mass, Modified radical mastoidectomy, Malignancy, Cholesteatoma

INTRODUCTION

Diseases of external ears comprise approximately 60% of the total ear cases attended in the ENT outpatient department. There are certain external ear diseases which affect the population irrespective of age or sex, but surely depend upon the quality of lifestyle, hygiene, and delayed consideration of one 's own disease. Some of such diseases are otomycosis and furunculosis. Hot and humid climate favours the growth of fungus and lodgement of bacteria in the external ear canal. Diabetic patients and immunocompromised patients are predisposing to this condition. Persistent infection or delayed treatment can make the disease extensive. Ear plugging by hearing aid, cotton or by ear phones is common in old age people and teenagers, which is nowadays common cause of infections. Inflammation of the ear canal and accumulation of ear discharge toll the mucosa of external auditory canal and can predispose to otitis externa. The term - otitis externa includes a range of conditions, mostly characterized by inflammation of the external ear with common symptoms of pain, irritability, and fever. Infections, allergies, and environmental factors contribute to the occurrence of otitis externa with bacterial or viral aetiology. The anatomically narrow external ear canal is also prone to otitis external. Patient feels intense on examination Oedematous canal with aural mucoid discharge is commonly observed. Sometimes erosion of the canal mucosa is seen in

otoscopic examination as the patient has self-traumatizes the canal by scratching or putting the foreign body or by any quack medications. The disruption of canal mucosa causes easy invasion of bacteria. *Pseudomonas* spp. is common organism of otitis externa. Children with foreign body lodgement in ear canal present in OPD sometimes with severe pain. Generally, patients who have severe pain have a live insect in ear canal or got injured by self-manipulation of the foreign body in order remove it. There are corrosive foreign bodies which are to be removed on the urgent basis. Certain cases go to quack and to general practitioners on emergency basis. Improper manipulation and instrumentation cause trauma to the mucosa of auditory canal. Eroded mucosa provide surface to the microorganisms to lodge, this causes otitis externa in the external auditory canal. Often, foreign bodies are dislodged and get beyond isthmus during manipulation by expertise. Repeated trials for removal can also cause TM perforation and cause lots of bleeding. Corrosive batteries and cells are more traumatic. Lead reaction causes burn and severe erosion of mucosa. earliest consideration for prompt removal is necessary for such patients. Inert foreign bodies stay in the cavity, get surrounded with wax gives the sensation of aural fullness to the patient. Foreign body comes up as an incidental finding when the wax is removed. The cavity is packed with the antibiotic soaked wick to prevent the growth of bacteria. Trauma to the external ear is commonly due to road traffic accidents (RTA), and burns. Trauma can cause perichondritis to the patient. Perichondritis if not aspirated can cause permanent deformity of the pinna, which cannot be reversed. Perichondritis is extremely painful condition which cannot be dealt at the primary health centres. Majority of the RTA cases are referred to the tertiary centre which have lacerated and avulsed pinna. Mostly come with the primary suturing already done by expertise or general practitioners or quacks. Cartilage is sometimes pierced during suturing that may cause perichondritis, or sometimes cartilage is left exposed which makes the injury prone to infection. All this led to deformity in ear of the patient. Ear mass presented in OPD are sometimes ulceroproliferative or polypoidal. Mass may have different origin and may be associated with purulence. Such cases need to be investigated properly for diagnosis under radiology and pathology consultancy. Ear masses arising from middle ear found with serious pathologies like malignancies and cholesteatoma. These cases may need prompt surgical intervention as they may come up with intracranial extension. Tympanomastoid exploration, preauricular tract excision, cyst excision, foreign body removal is some of the common operations at tertiary set up that are related to diseases of external ear. OPD basis procedures like aural packing, foreign body removal, otomycosis removal, wax removal, steroid injection in keloids was done at tertiary centres with proper instrumentation. Small foreign bodies, fragmented foreign bodies inspection of the auditory canal can be better done with microscope. Inspection and cleaning of the ear canal when done under visualization of microscope then its termed as micro suction. The microscope allows the doctor to see clearly and therefore is better for safe and focused instrumentation under low pressure suction to clear the ear canal, and to assess the eardrum. Microscopic examination of ear canal enhances the accuracy of diagnosis, focused medication, and extent of canal damage. Pathological as well as histopathological analysis is available at the tertiary centres many of the rare cases are missed by the ordinary pathological labs. This led to delay in the diagnosis and thereby the treatment of the patients. such patients generally present in the tertiary centre in very pitiable condition. Repeated fine needle aspiration cytology (FNAC) and biopsy in our tertiary centre has come up with rare entities of diagnosis.

Hence, clinicopathological evaluation of the diseases of external ear are necessary for the focused diagnosis and helps to decide the further management. The cumulative studies of different specialities enhance and expand the educative platform and diagnosing capabilities.

Estimated incidence of external ear diseases in central India

The estimated prevalence of 11.66 % was found for the external ear ailments in India.[1] Otitis externa, also called swimmer's ear, that involves diffuse inflammation of the auditory canal which may extend distally to the pinna and proximally to the tympanic membrane. Otitis externa in its acute form has an annual incidence of approximately 1 percent and a lifetime prevalence of 10 percent.[2]

Aims and objectives

Primary objectives were to determine the prevalence of patients with various external ear infections attending ENT department; and to study the presentation of various etiologies of the external ear infections.

Secondary objectives were to compare histopathology and cytology of various external ear infections, and to study the extent of the severity of infection of the external ear.

METHODS

The present study was conducted as part of post graduate thesis study at department of otorhinolaryngology and head and neck surgery, at Netaji Subhash Chandra Bose Medical College, Jabalpur.

Study design

It was an observational-cross sectional study.

Study setting

The study was conducted at OPD and IPD – department of otorhinolaryngology and head and neck surgery, NSCBMCH – Jabalpur, Madhya Pradesh.

Study population

Patients attended in OPD and admitted in ENT ward 5 were studied.

Study period

The duration of the study was from March 2021 to 31 August 2022.

Sample size

The sample size was 211.

Sampling technique

Conventional sampling method - time frame sampling was used as the sampling technique.

Sample size was calculated using right size (China Uganda Zimbawe version 2.0.0.2) statistical software.

Data collection tool was a semi structured questionnaire.

Inclusion criteria

Patients who attended ENT OPD and admitted patients; patients who were able to give consent; and patients with primary ear pathology were included.

Exclusion criteria

Patients with parotid swellings, and patients who did not give consent in the study were excluded.

Study design

Data collection and procedure

After obtaining permission from scientific research committee and institutional human ethics committee, the present study was conducted in Netaji Subhash Chandra Bose Medical College in Jabalpur, Madhya Pradesh. Convenient sampling technique was used and 200 participants were studied in this research project. After explaining the purpose of the study, written consent was obtained from all the study participants. Every patient was clinically assessed and examined, after which required radiologically based pathological investigations was done to facilitate the clinical decision making in these patients for diagnosis and initiation of treatment as soon as possible. Every parameter was recorded and master sheet was prepared, after which statistical analysis was done and results was explained as below.

Statistical analysis

Data entered in Microsoft excel was analyzed using statistical package for the social sciences (SPSS) version 20. 0 (Armonk, NY: IBM Corp). Qualitative variables like gender, diagnosis, ultra sound findings, outcome of patients were expressed in frequency and percentage and quantitative variables like age, biochemical parameters were expressed in mean and standard deviation. Kappa co-efficient was used to find the accuracy of ultra sound diagnosis and p value less than 0.05 will be considered as statistically significant.

RESULTS

Around 75% of the patients have normal ear canal. In the hospital-based study, the clinicopathological study of diseases of external ear in tertiary centre, the following conclusions are made. Out of total 211 patients the commonest involved age group belongs to 21-40 years with 109 (51.7%) females and 102 (48.3%) males. 192 (91%) of the patients belong to lower rural socioeconomic status. Most common pathology found in my study was otomycosis in 95 (30%) cases. Other pathologies included otitis externa in 57 (27%) cases, aural mass in 33 (15.6%) cases perichondritis, keloid, preauricular sinus, pseudocyst and EAC stenosis in descending order. *Aspergillus niger* was most frequently cultured 150 (77%) of total otomycosis patient) fungus. 10 patients of total otomycosis cases also had otitis externa. Otitis externa 169 (62% of total cases) more prevalent in females. Most frequent microorganisms isolated were *Pseudomonas aeruginosa* and *Staphylococcus aureus*. There were 25 cases who presented with foreign body in ear canal. Foreign body like cotton ball is commonly found in adults (11 cases) whereas vegetative foreign body (12 cases) and button batteries (2 cases) are found in children. Inert foreign bodies (1 cases with plastic bead) are sometimes found lodged with the impacted wax.

Keloid was seen in 20 (9.5%) cases. 7 cases of post trauma came with perichondritis on follow up. perichondritis was also found as post-operative complication in 1 case. 3 patients who had delayed their follow up have developed permanent deformity of ear pinna. Patients with mass in auditory canal (15 cases). 3 patients who had delayed their follow up have developed permanent deformity of ear pinna.

Preauricular sinus (congenital anomaly) was seen in 5 cases. 4 of them were associated with abscess. Patients with mass in auditory canal (15 cases), bleeding tendency on touch with limited probing was found as malignancy in 5 cases according to the histopathological examination. In which 4 cases were of squamous cell carcinoma. 10 cases had cholesteatoma in middle ear cavity. A case of conchal bowl mass proved as spindle cell tumor and confirmed with immunohistochemistry markers.

Status of tympanic membrane in the patients who visited OPD with external disease is shown in Table 2. In 40.8% of patients, TM is not visualized due to foreign body, wax, atresia, or mass.

Table 1: Clinical changes in ear canal found in the patients.

Changes in ear canal	N	%
Trauma	5	2.4
Post auricular	4	1.9
Pre auricular	5	2.4
Lipoma	2	0.9
Keloid	20	9.5
Perichondritis	5	2.4
Embedded fbm earlobe	4	1.9
Pre auricular sinus	5	2.4
Post auricular sinus	1	0.5
Pre auricular tag	2	0.9
Normal	158	74.9
Total	211	100.0

Table 2: Status of tympanic membrane in the patients who visited OPD with external disease.

Tympanic membrane	N	%
Not visualized on pathologic ear	86	40.8
Perforated on pathologic ear	29	13.7
Intact	96	45.5
Total	211	100.0

Table 3: Type of hearing loss found in the patients.

Hearing loss	N	%
Mild	52	24.6
Moderate	54	25.6
Moderate to severe	11	5.2
Severe	4	1.9
Profound	2	0.9
WNL	60	28.4
Cannot be done	28	13.3
Total	211	100.0

Table 4: Radiological investigation recommended.

Radiological findings	N	%
Sinogram	6	2.8
HRCT temporal bone	26	12.3
USG swelling	11	5.2
None	168	79.6
Total	211	100.0

Table 5: Diagnosis made after the investigations.

Diagnosis	N	%
Otitis externa	57	27.0
Foreign body	17	8.1
Otomycosis	95	45.0
Pseudocyst	5	2.4
Canal stenosis	4	1.9
Aural mass	33	15.6
Total	211	100.0

DISCUSSION

Otitis externa is an inflammatory process of the external auditory canal. There are multifactorial reasons, that can be infectious and non-infectious factors. *Pseudomonas aeruginosa* and *Staphylococcus aureus* are the most common organisms isolated from the swab taken from the ear canal. The ear canal becomes boggy with pulsatile granulation tissue-like swelling. In some cases, inflammation can extend to the outer ear, such as the pinna or tragus. OE can be classified as acute (lasts less than 6 weeks) or chronic (lasts more than 3 months).

Ear wax removal

Losing ear wax

Earwax is the protective sebum for ear canal. Too much earwax removal when you clean your ears, irritates the ear canal's delicate skin. Ear injury probing the objects in the ear while self-cleaning pushes the wax deeper and causes the injury to canals skin. Most common probing objects found in the study was pen, clip, bobby pin, stick, and pencil. More than half of the ear wax injury is found in the right ear as most people have right as their dominant hand.

Swimming in fresh water

Swimming in fresh water may cause glue ear and otitis externa. Polluted water enters in the canal and causes infection and inflammation. bacterial lodgement causes otitis externa.[4]

Foreign body and insects

Insects

Insects crawl and die in the ear canal, usually found in the low socioeconomic patients who tend to sleep on floor. Due to intense nerve supply of the canal, it is very painful for the patient. it is counted as the emergency for many patients. In young children, it is challenging to figure out the real cause of pain in ear. Redness, swelling, or discharge (blood, inflammatory fluid, or pus) are the main signs of injury to the ear. Small children often scratch or rub their ears repeatedly.[5] Earwax impaction causes the symptom of a "fullness" or pressure, decrease in hearing on the affected side. In extreme cases, dizziness, nausea, and vomiting, or unsteady walking results from inflammation of the ear or build-up of pressure on the eardrum causing dysfunction of the middle ear.[5]

Potential harmful foreign items in the ear

Organic material (bugs, plants, or food) have the tendency to swell up in the ear canal, this way they obstruct the canal and reduce the hearing and make the pain severe. Button-type batteries from household gadgets or watches are exclusively dangerous and required to be removed as earliest as possible. batteries may leak chemicals which

may cause burn and severely damage the ear canal even within an hour. It is an utter emergency.

Auricular hematoma

The collection of blood under the skin of the outer ear is called auricular hematoma. the pocket of blood under the skin makes it swollen and soft and tender like a water balloon. This collection should be drained earliest as diagnosed. The bolster dressing is often placed for the compression as to prevent the blood from re-accumulating.[6]

Figure 1: Auricular hematoma.

Pre auricular sinus

Preauricular sinuses (ear pits) are common congenital abnormalities.[7] They are usually asymptomatic, they manifest as small opening at the near anterior to the external ear mainly ascending limb of the helix, most frequently on the right.[8] Sinuses may become infected, most commonly with gram-positive bacteria.[8] Recurrent infections is a clear indication for complete excision and provides the only definitive cure. The sinuses can be removed by tracing the path, by sinusectomy.[9] The path can be traced by instilling the methylene blue.

Figure 2: Infected preauricular sinus.

Aural polyp

The presence of an aural polyp signifies well-established disease of the middle ear cleft with a greater potential for complications and often obscures an underlying cholesteatoma.

The aural polyp is more often the symptom of the underlying well established disease of the middle ear cleft.[10] Presence of aural polyp signifies the potential complication like cholesteatoma, malignancy, and tubercular infection. Aural polyps may also just arise from the canal. Removal or biopsy of the aural polyp sometimes may become disastrous as it may lead to huge amount of bleeding. Aural mass with extensive involvement may show up as the mass emerging from the postauricular region.

Figure 3: Involvement of postauricular skin due middle ear carcinoma.

Figure 4: Aural mass.

Figure 5: Congenital anomaly of right ear.

Limitations

The study is limited generalizability of study findings, as the study was conducted in tertiary care referral hospital and may represent serious cases in the spectrum of the disease like ear trauma with severe head injuries.

CONCLUSION

As according to my study, otomycosis is more prevalent in men who are involved in outdoor activities. Hence, they are more often exposed to fungal spores. Most of the patients had unilateral otomycosis. it is found that the patients have the tendency of poking their ears by unhygienic foreign bodies. Most of them complained of ear discharge, pain, obstruction and difficulty in hearing. Aspergillus niger was most frequently cultured fungus. Patients presented with the complaints of severe ear pain, itching and discharge. Simple acute otitis externa is treated with ear canal mopping, topical antiseptic and antibiotic therapy, and sufficient analgesia. Hearing loss, light-headedness, ear pain, and persistent ear discharge were common complaints. Foreign bodies were removed by proper instrumentation and syringing. Sometimes foreign bodies impacted with wax. They come up incidentally on wax removal. Few impacted foreign bodies in children which were usually impacted or already manipulated wrongly by general practitioners was removed under general anesthesia and microscopic vision. Preauricular sinus (congenital anomaly) was seen in young patients, mostly females. Most of them were associated with abscess. Till date, no patient has come with recurrence. Patients were operated for sinusectomy after remission of infection. Keloids were seen among the patients with piercings or who had history of trauma on the ear pinna. Keloids also appear to have a severe fibrotic reaction. Intralesional-triamcinolone + hyaluronidase was given. Significant reduction in the size is observed. Perichondritis was also found as post operative complication. Culture directed specific antibiotics according to pus culture and sensitivity and painkillers gave good results in recovery of the patient. Patients who had delayed their follow up have developed permanent deformity of ear pinna. 15 patients were present with mass in auditory canal, malignancy and cholesteatoma was differentiated on the basis of histopathological examination. A case of conchal bowl mass proved as spindle cell tumor and confirmed with immunohistochemistry markers. Hence, to conclude, the external auditory canal diseases are the common entity in ENT OPD and most of them can be treated with early intervention.

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