

INCIDENCE OF BACTERIAL COLONIZATION IN THE OROPHARYNX OF PATIENTS WITH EAR, NOSE AND THROAT INFECTIONS

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ABSTRACT

Background: The ear, nose and throat infections are one of the common diseases for which patients often visit the primary care physicians. The oropharynx is a unique region of the human body colonised heavily by normal bacterial flora.

Aims & Objective: The present study has been undertaken to find the incidence of bacterial colonization in the oropharynx of patients with ear, nose and throat infections.

Materials and Methods: Forty patients in the age group of 5-75 years presenting to the ENT department with symptoms and signs suggestive of ear, nose, or throat infections were included in the study. Throat swabs in duplicate were taken using sterile swab stick and streaked onto a standard commercial sheep blood agar plate and MacConkey agar plate and were incubated at 37 °C. After 14 to 24 h of incubation, the plates were examined for the growth of bacterial colonies. The bacteria isolated were identified by standard biochemical tests.

Results: The viridans streptococcus is seen colonised in almost all the patients. *Streptococcus pyogenes* has been isolated from only one patient with acute pharyngitis. 3 patients showed the presence of *Klebsiella pneumoniae*. Among this, two patients suffered from acute pharyngitis and one from acute otitis media. A patient with chronic suppurative otitis media with acute pharyngitis showed the presence of *Proteus vulgaris*.

Conclusion: The results showed that the oropharynx remains same harbouring only the normal flora indicating that ENT infections in most of the cases are due to either viral or fungal. It can also be concluded that the presence of abundant normal flora in oropharynx should have inhibitory effect on the colonisation pathogenic bacteria.

Key Words: Oropharynx; ENT Infections; Bacterial Colonisation

Introduction

The ear, nose and throat infections are one of the common diseases for which patients often visit the primary care physicians.^[1] The important ENT diseases are allergic rhinitis, epistaxis, Otitis media, Sinusitis, Tonsillitis and Pharyngitis. Since for a long period of time a debate continues on how to evaluate and treat the patients with ENT infections.^[2,3]

The aetiology of ENT infections are varied and it may be bacterial, viral or fungal.^[4] The signs and symptoms may often mislead about the aetiology of the disease.^[5] At times it becomes very difficult for the physician to relate the bacteria with the disease.^[6-8] Hence the physician may advocate antibiotic therapy irrespective of the aetiology of the disease. This may lead to unwanted economic loss and stress to the patient if the ENT infection is due to the virus or fungi.

Acute pharyngitis is the common childhood illness seen in outpatient setting.^[9] Viruses and *Streptococcus pyogenes* are considered to be the most frequent causes of this disease.^[10] It was also demonstrated that a

significant part of non-streptococcal acute pharyngitis may be associated with *Mycoplasma pneumoniae* and *Chlamydia pneumoniae* infection.^[11]

Ear discharge is a common clinical problem throughout the world. This may be a clinical manifestation of acute suppurative otitis media (ASOM), chronic suppurative otitis media (CSOM) or otitis externa (OE).^[12] The aetiology of ear discharge may be bacterial, viral or fungi. The microbiological profiles of suppurative otitis media are well documented in developed worlds.^[13,14] However only few studies have been conducted in tropical and subtropical countries.^[15,16]

Acute bacterial sinusitis is a common complication of viral upper respiratory infection (URI) or allergic inflammation.^[17] The predominant bacterial species that are implicated in acute sinusitis are *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis*.^[18]

The oropharynx is a unique region of the human body colonised heavily by normal bacterial flora. It is in direct continuity with ear, nose and throat. Hence the flora here

is expected to be influenced by changes in these regions. With the multiple aetiology of ENT infections, it is quite important to know the bacterial colonisation of oropharynx in the ENT infections. Hence in the present study an attempt has been made to isolate and identify the bacteria from oropharynx from the patients with ENT infections.

Materials and Methods

Study Participants

All patients in the age group of 5-75 years presenting to the ENT department with symptoms and signs suggestive of ear, nose, or throat infections were included in the study. The diagnostic criteria used for classifying acute /chronic ear, nose and throat infections in this study are shown in Table 1.

Table-1: Diagnostic criteria used for classifying acute /chronic ear, nose and throat infections

Symptoms	Clinical Findings
Constitutional symptoms	Congested posterior pharyngeal wall
Throat pain	Congested tonsil
Odynophagia	Pus points on tonsil
Cough	Palpable Jugulo digastric node >1.5 cm
Nose block	Congested nasal mucosa
Rhinorrhoea	Discharge in the nasal cavity (thick mucoid/mucopurulent)
Post nasal drip	Post nasal drip (thick mucoid/mucopurulent)
Ear pain	Granular pharyngitis
Ear Discharge	Paranasal sinus tenderness
	Tympanic membrane congestion
	Tympanic membrane perforation with ear discharge

Presence of any 2 or more symptoms with any 1 or more relevant clinical finding is used for inclusion in the study and diagnosed as acute if the duration was less than 4 weeks and chronic if duration was more than 3 months. Any patient who had taken antibiotics during the preceding 10 days was excluded from the study. Also all patients with immunocompromised status were excluded from the study.

Measures

A standard questionnaire regarding ENT manifestations was filled after each participant examination. A detailed clinical history was taken and physical examinations were conducted.

Ethical Considerations

Informed written consent was obtained from all participants. The ethical clearance was obtained from institutional ethical committee (IEC).

Collection of Swabs

Throat swabs in duplicate were taken using sterile swab stick from the posterior pharyngeal wall and both tonsils. The swabs were then inserted into a sterile plastic transport tube and were delivered to the clinical laboratory within 2 to 4 h.

Isolation and Identification of Bacteria

The swab was streaked onto a standard commercial sheep blood agar plate (HiMedia) and MacConkey agar plate and were incubated at 37°C. After 14 to 24 h of incubation, the plates were examined for the growth of bacterial colonies.

The haemolytic pattern of the colonies were noted in the blood agar plates. One representative beta-haemolytic streptococcal colony from each plate was subcultured and catalase and oxidase tests were performed to ensure the absence of staphylococci and *Neisseria* species.

The lactose and non-lactose fermenting colonies were noted on the MacConkey agar plates and the colonies were subjected to biochemical tests for its identification.

Results

A total of 40 patients with different ENT infections were taken for this study out of which 13 were male and 27 were female. The Table 2 depicts the number of patients with various ENT infections.

Table-2: Number of patients with various ENT infections

ENT Infections	No. of patients		Total
	Male	Female	
Acute pharyngitis	6	8	14
Acute pharyngotonsillitis	1	4	5
Acute tonsillitis	0	1	1
Acute pharyngitis and acute rhinitis	1	0	1
Adeno tonsillitis with acute otitis media	0	1	1
Chronic pharyngitis with sinusitis	0	3	3
Acute otitis media	0	1	1
Acute otitis media with sinusitis	0	1	1
Acute otitis media with tonsillitis	1	1	2
Chronic suppurative otitis media	1	4	5
Chronic sinusitis	1	3	4
Chronic tonsillitis	2	0	2
Total	13	27	40

The oropharyngeal swabs were collected from all these patients to study the bacterial colonisation. The swabs were streaked on both the Blood agar and MacConkey agar. Table 3 shows the results of the various bacteria isolated. From the table it is evident that the viridans streptococcus is seen colonised in almost all the patients. *Streptococcus pyogenes* has been isolated from only one

patient with acute pharyngitis. 3 patients showed the presence of *Klebsiella pneumoniae*. Among this, one patient suffered from acute pharyngitis, one from sinusitis and one from acute otitis media. A patient with chronic suppurative otitis media showed the presence of *Proteus vulgaris*.

Table-3: Bacteria isolated from oropharynx of the patients with ENT infections

Bacteria Isolated	ENT infection	No. of Patients	Incidence
<i>Streptococcus pyogenes</i>	Acute pharyngitis	1	1 (2.5%)
Viridans streptococcus	All	40	40 (100%)
Coagulase negative staphylococcus	Acute pharyngitis	3	5 (12.5%)
	Acute pharyngotonsillitis	1	
	Sinusitis with pharyngitis	1	
	Acute pharyngitis	1	
<i>Klebsiella pneumoniae</i>	Acute otitis media	1	3 (7.5%)
	Sinusitis with pharyngitis	1	
<i>Proteus vulgaris</i>	Chronic suppurative otitis media	1	1 (2.5%)

Discussion

A considerable heterogeneity of bacterial flora of oropharynx was expected in the ENT patients. In contrast the present work showed only viridans streptococcus, a normal flora of oral cavity^[19] to be the predominant bacterium irrespective of the ENT conditions.

Another important finding in the study is that out of 16 patients only one patient with acute pharyngitis showed the presence of beta-haemolytic Group A streptococcus, a predominant bacteria in the acute pharyngitis. Remaining patients showed only the presence of viridans streptococcus. It has been proved that about 85 to 90% of the cases of acute pharyngitis are due to virus.^[20] Treating such patients with antibiotics will no way help to relieve from the disease.^[21] In a study conducted, about 85% of the acute pharyngitis patients got relieved of symptoms without any antibiotic treatment.^[22] The present study again confirms the fact that a clinical rule should be set up for treating cases of sore throat.^[23,24] It is suggested that every institution should have a system to monitor the use of antibiotics in various departments and ensure their use only when indicated.

Another important finding of this study is the isolation of *Klebsiella pneumoniae* and *Proteus vulgaris*. Probably these bacteria would have descended from other infected sites into the oropharynx.

Conclusion

The present study was aimed to find the bacterial colonization of oropharynx in different ENT infections. The results showed that the oropharyngeal flora remains same harbouring only the normal flora indicating that ENT infections in most of the cases are due to either viral or fungal aetiology. It can also be concluded that the presence of abundant normal flora in oropharynx should have inhibitory effect on the colonisation pathogenic bacteria.^[25]

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