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Microbiological Profile Of Adenoid Core In Children With Chronic Adenotonsillitis With And Without Chronic Otitis Media- A Comparative Study

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Abstract:
Objective: To determine the microbiological profile and antibiotic sensitivity pattern of adenoid core in children with chronic adenotonsillitis with and without chronic otitis media.
Design: Prospective, cross-sectional observational study.
Setting : Yenepoya Medical College Hospital, Mangalore, Karnataka, India.
Patients : Patients, 4 to 16 years old with chronic adenotonsillitis with or without otits media, unresponsive to medical line of management.

Methods : Fifteen patients with chronic adenotonsillitis (Group A) and fifteen patients suffering from chronic adenotonsillitis with chronic otitis media (Group B) were enrolled. Aerobic and anaerobic culture and antibiotic sensitivity of adenoid core specimens and middle ear swabs was done.
Results : Staphylococcus aureus was the commonest aerobic microorganism isolated in the adenoid core of both the groups. The same was also isolated in the middle ear swabs of patients who had chronic otitis media. Peptostreptococcus was isolated on anaerobic culture in group A while no growth was obtained in Group B. Cotrimoxazole, Gentamicin and Cephalosporins were the most effective antibiotics.

Conclusion : Similar organisms (Staphylococcus aureus) were isolated in adenoid core and middle ear swabs of patients suffering from chronic adenotonsillitis with chronic otitis media. This indicates that administration of appropriate antibiotics would help achieve a dry ear in these patients. Further appropriate antibiotics when administered to children having chronic adenotonsillitis alone would help prevent spread of infection to the middle ear.

Key words : adenoid core, bacteriology, chronic otitis media

I. INTRODUCTION

Chronic adenotonsillitiis (CA) and Chronic Otitis Media(COM) are persistent or recurrent infectious diseases occcuring during childhood with increasing incidence in developing countries like India. These infections co-exist if necessary interventions to the nidus of infection (adenotonsils), are not carried out.

The etiology and the pathogenesis of these co-existing diseases is multifactorial (immunologic,bacterial/viral infection,eustachian tube dysfunction)[1].

The potential pathogens in CA are Streptococcus pneumoniae (Strep pneumoniae), Staphylococccus aureus(Staph aureus), Haemophilus inflenzae(H. Influenzae) and Group A β haemolytic streptococci (β Haem Strep)similar to the organisms found in COM.
Adenoids have been found to have a reservoir of antibiotic resistant bacteria[2].
In this study, we have sought to prospectively identify and compare the organisms within the adenoid core and also find the most effective antibiotics to manage the infections in patients with isolated CA and those having CA associated with COM.

II. METHODOLOGY

This prospective cross-sectional observational study, conducted in the Department of Otorhinolaryngology at Yenepoya Medical College, Mangalore, India, comprised of 30 patients (15 males and 15 females each) aged 4-16 years who had CA with or without COM,unresponsive to medical line of management.

Fifteen patients with CA alone (Group A) and 15 patients having CA with COM (Group B) were enrolled into the study. Patients with acute upper respiratory tract infections or those on antibiotics for the last one month were excluded from the study.

A detailed history was obtained from parents/caregivers of every patient. ENT examination was performed. Plain X-ray lateral view ofNasopharynx was taken to confirm adenoids.

A swab of middle ear discharge was obtained from all patients who presented with COM.

All patients were operated under General Anaesthesia with orotracheal intubation. Adenoidectomy was done by curettage method and the specimen was cut into two pieces. One of the specimens was transported in normal saline while the other was transported in Robertsons Cooked Meat broth (RCM) and both the specimens were sent for culture and antibiotic sensitivity test.

Culture and Sensitivity:-

The ear swab specimen was inoculated in 5% sheep blood agar, chocolate agar and Mac Conkey agar plates, for the culture of aerobic organisms. Similarly part of the adenoid specimen was also inoculated.

For the culture of anaerobic organisms, the remaining adenoid specimen was inoculated into 5% sheep blood agar containing Kanamycin and incubated in an anaerobic gas chamber, to be examined at 48 and 96 hours.

The growth was identified by Gram stain and biochemical test as per standard microbiological procedures[3].

Antibiotic Sensitivity Test:-

The antibiotic sensitivity pattern of isolate was studied by modified Kirby-Bauer disc diffusion method and interpreted according to Clinical and Laboratory Standards Institute (CLSI) guidelines[4].

III. RESULTS

On culture of the adenoid core of patients who had presented with CA, 40% of inoculated specimens grew Staph aureus, 20% Klebsiella species(spp) and in 13% Escherichia coli (E coli).The other aerobic organisms found were Enterobacterspp, Streptococcus viridans(Strep viridans), β haem strep and Pseudomonas spp. Most common anaerobic organism isolated was Pepostreptococcusspp (Fig 1).

In patients who presented with CA with COM, 47% of adenoid core specimens grew Staph aureus, 20 % Strep viridans and 13% Pseudomonas spp(Fig 2). There were no anaerobic organisms isolated.

Culture of middle ear swab taken from patients in group B did not yield any growth in 73% of the cases while Staphylococcus aureus was isolated in 20% of the cases. The same organism was also isolated in the adenoid core of these patients.

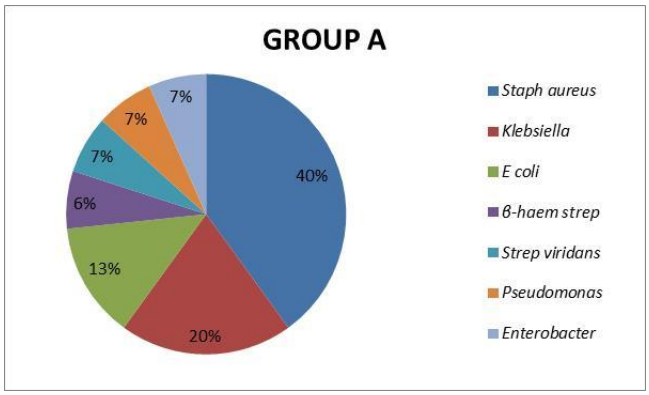

Fig I: Bacteriology isolates in Group A

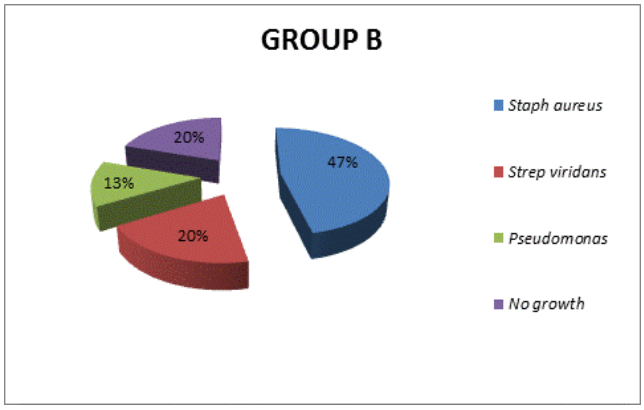

Fig 2: Bacteriology isolates in Group B

IV. DISCUSSION

A number of studies have been carried out to find the bacteriology of adenoids. In this study, we sought to identify the organisms that tend to coexist in both the adenoid core and in the ear swab, in patients suffering from CA with COM and also compare it with the adenoid core pathogens of patients suffering from CA alone.

A study done on adenoid core of patients with chronic adenoiditis reported β haem strep(94%), Staph aureus (90%), Strep pneumoniae (87%), H. influenzae (54%) and Moraxella catarrhalis (43.8%) while other studies observed α and γ haemolytic streptococci followed by H. influenzae, Moraxella catarrhalis, Staphylococcus aureus[5,6,7]. In our study the most common aerobic organisms cultured were Staph aureus (40%), Klebsiellaspp(20%), E. coli and βhaem strep. The commonest anerobic organisms isolated in an earlier study were Peptostreptoccusspp, Prevotellaspp and Fusobacteriumspp while another reported Fusobacteriumsppand Bacteroidesspp to be the commonest [6,7]. In the present study, 60% of the adenoid core specimens did not yield any growth on anaerobic culture while 40% showed Peptostreptococcus spp.

Previous studies which evaluated the bacteria in patients with CA and ear disease have reported varying types of aerobic organisms. While some reported Staph aureus to be the commonest isolate, others found H. influenzae to be common. Some others have reportedα-haemolytic streptococci to be the commonest [1,2,8]. Observations of the present study found Staph aureus to be the commonest (40%) followed by Strep viridans (20%) and Pseudomonas spp(13%). Anaerobes were not isolated in the adenoid core in any of the patients suffering from CA in association with COM.

Culture of ear discharge specimens in prior studies found H. influenzae, Strep pneumoniae and Staph aureus to be the commonest [1]. In this study, Staph aureus (20%)was the most common isolate, followed by Strep viridans. The ear swab isolates were found to correspond with organisms found in the adenoid core of the same patients.

Clindamycin and Co-amoxiclav were found to be effective against H.influenzae, Moraxella catarrhalisand Staphaureus in previous studies [9], while in our study Gram positive organisms like Staph aureus, Strep viridians and βhaem strep were observed to be sensitive to Cotrimoxazole, Gentamicin and Cephalosporins. Gram negative organisms like Klebsiella, E coli, Enterobacterand Pseudomonas spp were observed to be most sensitive to Cephalosporins followed by Cotrimoxazole and Gentamicin. Clindamycin and Ampicillin which showed resistance to organisms in Group A patients however were found to be sensitive to organisms isolated in Group B patients.

A thorough knowledge of the varying microbial patterns and their antibiotic sensitivity profile in the adenoid core,based upon studies carried out from time to time would enable address the infection with appropriate use of antibiotics and, thus help prevent middle ear complications due to spread of infection. A limitation of this study was

the small sample size. Studies on a larger sample would enable better understanding.

V. CONCLUSION

Staphaureus was observed to be the commonest aerobic organism isolated from the adenoid cores of both the groups. The same was also noted in the ear swab cultures. Early and appropriate medical intervention in patients presenting with CA would help prevent spread of disease to the middle ear. In patients who presented with CA with COM, administration of appropriate antibiotics would enable achieving a dry ear. Cotrimoxazole, Gentamicin and Cephalosporins were found to be the most effective antibiotics in group A while Ampicillin and Clindamycin were found to be effective in group B. Further study on a larger sample size needs to be carried out for better understanding of the microbiological profile.

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