

ISOLATION AND IDENTIFICATION OF BACTERIAL CAUSATIVE AGENTS OF CHRONIC SUPPURATIVE OTITIS MEDIA IN NAJAF GOVERNORATE

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Abstract

Chronic suppurative otitis media (CSOM) is relatively a common problem in a different age groups in most areas of the world. for this reason, this prospective study was done to evaluate the clinical and bacteriological status of patients suffering form this disease .A total of 344 ear swabs were obtained from 300 outpatients .with active from of CSOM and with a mean age of 22.5 ear years. 256 of them had unilateral and 44 had otorrhea .A total of 450 isolates microorganism (424 aerobic and 26 anaerobic) were obtained from all ear swabs in which Gram – negative bacteria was presented in 271(60.2%) while Gram – positive bacteria and unidentified pathogens were appeared in 166 (36.9%) and 13(2.9%) respectively .No growth was found in 14(3%) cultures out the 464 ear swabs (in addition to other pathogens were presented in low percentages. *Pseudomonas aeruginosa* (the predominant pathogens in this study) represented in 21.6%from all isolates followed by other pathogens which include *Staphylococcus aureus* (18%), *Proteus* species. (14.2%), *Escherichia coli* (10%), *Klebsiella pneumoniae* (8.4%) Anaerobic bacteria which includes *Bacteriodes* species (3.1%) and *Peptostreptococcus* species(2.7%) were also detected and isolated in 5.8% from all isolates .The peak of the incidence of CSOM was found in the childhood , age (1- 10 years) and then the peak showed a general decline with the advancement of age.

الخلاصة

يعد التهاب الأذن الوسطى القيحي المزمن من المشاكل الشائعة في أغلب بلدان العالم وفي مختلف الفئات العمرية ولذلك اجريت هذه الدراسة لغرض تقدير الوضع السريري والبيولوجي للمرضى الذين يعانون من هذا المرض 344 مسحة اذنيه قد جمعت من 300 مريض خارجيا (152 انثى و148 ذكر) يعانون من انصباب الاذن الوسطى من النوع النشط وبمعدل عمري يقدر بـ 22,5 ، 256 مريضا كان لديهم انصباب من اذن واحدة و 44 لديهم انصباب من الذنين معا، فحسوا في قسم الانف والاذن والحنجرة في مستشفى النجف التعليمي في محافظة النجف وخلال الفترة الزمنية من بداية شهر كانون الاول لعام 1999 الى نهاية شهر تموز عام 2000 . اظهرت النتائج بان هناك 450 عزلة والاحياء المجهرية الممرضة (424 عزلة هوائية و 26 عزلة لا هوائية) قد تم الحصول عليها من نتيجة زرع المسحات الاذنية . البكتريا الموجبة لصيغة غرام قد ظهرت في 271 (60,2 %) اما البكتريا الموجبة غرام والممرضات غير المشخصة فقد ظهرت في 166 (36,9 %) و 13 (2,9 %) على التوالي ، اما المزرعة او النمو السالب فقد ظهر في 14 (3 %) مزرعة من مجموع كل المسحات الاذنية (464) . هن بكتريا

تم عزلت في 58% من كل العزلات ان اعلى معدل للسيادة كان في الفئة العمرية من 1-10 سنوات الاطفال ، ثم تبدأ القصة والمعدل بالانخفاض الملحوظ عند التقدم في العمر .

ثم تبعت ب 18% (Staphylococcus aureus ، 14,2%) . Escherichia coli Proteus species . Klebsiella pneumonia (8,4) (%10) قليلة . اما البكتريا اللاهوائية والتي شمل 3,1% Bacteroides sp. و 22,7% Peptostreptococcus فقد شخصت وعزلت في 58% من كل العزلات ان اعلى معدل للسيادة كان في الفئة العمرية من 1-10 سنوات الاطفال ، ثم تبدأ القصة والمعدل بالانخفاض الملحوظ عند التقدم في العمر .

Material & methods

The study was carried out on 300 consecutive outpatients with CSOM during the period between December ,1999 to July ,2000 at ENT-Department in Saddam teaching Hospital in Najaf governorate, they included both sexes (152 females and 148 were males), with a different age groups , they had not received antimicrobial agents systemically or locally for at least one week before examination , with a history of ear disease more than three months . No dry ears were included in this study .All patients submitted to ENT-examination .the clinical diagnosis depended on the presence of perforation and discharge at least three months before examination.

Collection of specimens

After cleaning the external auditory canal(EAC)from cerumen and pus with a sterile swab moistened by 70% ethyl alcohol , 344 ear swab were obtained from 300 patients.

Laboratory diagnosis

According to the diagnosis procedures recommended by MacFaddin (1979)(4);Baron and Finegold (1990)(5)and Prescott *et al.* (1990)(6),the isolation and identification of common Gram – positive and Gram –Negative bacteria in the ears and nasopharynx of patients were performed .

Statistical analysis

The data were analyzed statistically using chi- square (χ^2) test at the 1% level (7).

Results&discussion

Bacterial isolates from CSOM

Out of 344 specimens (ear swabs) collected from 300 patient suffering from CSOM .330 (97%)specimens yielded microbial growth presented in 450 microbial isolates .while 14(3%)specimens yieded no growth .Gram-negative bacteria were the commonest bacterial isolates detected in 271 (60.2%).followed by Gram-positive bacteria in 166(36.9%)and unidentified pathogens in 13(2.9%)as shown in table (1).P.aeruginosa

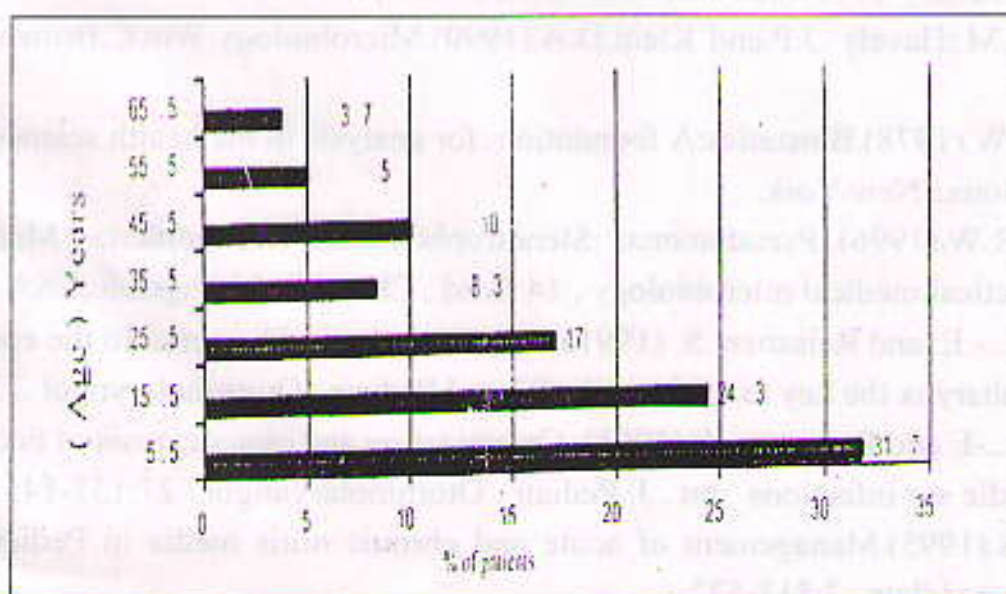
was the dominant microorganism among the Gram-negative bacteria (21.6%), followed by *Proteus species* (14.2%) *E.coli* (10%) and *K. pneumonia* (8.4%). Other Gram-negative bacteria showed low frequency of isolation ranged between 3.1 and 0.2% *S.epidermidis* (6.7%), *S.pneumoniae* microorganism among Gram-positive bacteria (18%) followed by *S.epidermidis* (6.7%) *S.pneumoniae* (4.7%), *Bacillus sp.* (4.2%) and the rest ranged between 2.7 and 0.7 % (table 1).

Table (1) Bacterial isolates and their frequency from 300 patients with CSOM

Types of isolate	No. of isolate	%
Gram –negative bacteria (n=271)		
Aerobic & facultative bacteria (n=257)		
<i>Pseudomonas aeruginosa</i>	97	21.6
<i>Proteus sp.</i>	64	14.2
<i>Escherichia coli</i>	45	10
<i>Klebsiella pneumoniae</i>	38	8.4
<i>Enterobacter sp.</i>	7	1.6
<i>Moraxella catarrhalis</i>	5	1.1
<i>Citrobacter sp.</i>	1	0.2
Anaerobic bacteria (n=14)	14	3.1
<i>Bacteroides sp.</i>		
Gram – positive bacteria (n=166)		
Aerobic & facultative bacteria (n=154)		
<i>Staphylococcus aureus</i>	81	18
<i>Streptococcus epidermidis</i>	30	6.7
<i>Streptococcus pneumoniae</i>	21	4.7
<i>Bacillus sp.</i>	19	4.2
<i>Diphtheroid bacilli</i>	3	0.7
Anaerobic bacteria (n=12)		
<i>Peptostreptococcus sp.</i>	12	2.7
Unidentified pathogens	13	2.9
Total	450	100

The present study confirms that Gram – negative bacteria are an important component of the bacterial flora in chronic otitis media. *P. aeruginosa* is the most common organism isolated from chronic ear disease. It was isolated in 21.6% followed by *S.aureus* (18%) and *proteus species* (14.2%) as shown in table (1). This result was expected for this organism (*P. aeruginosa*) due to many reasons firstly *P.aeruginosa* is the most secondary invaders when the resistance of the middle ear is lower (8). Secondly it easily spreads to the compromised patients via EAC from healthy carriers (by nurses of physicians hands) and / or environmental sites (9), thirdly the high incidence of

P.aeruginosa indicates more general antibiotic resistance than in the case with Gram-Positive strains (10) , and fourthly , it is resistance for phagocytosis and opsonization by producing a large number of extracellular products such as, alkaline protease , elastases and exotoxin A which can cleave both IgG and complement which then lead to inhibit the function of the cells of the immune system(11,12) the results presented in this study regarding *P.aeruginosa* was found to be in agreement with some studies (13,14)who stated that *P.aeruginosa* was the commonest pathogen of CSOM, while our results disagree with that of karma *et al* ,(1978)(15) and AL-Faris *et al* ,(1998)(16) in which Gram-positive bacteria , particularly *S. aureus* were the predominant pathogen in CSOM .these disagreements may be due to the geographical differences , different cultural practices and nutrition and socio - economic factors .In this study *S.aureus* presented in 18% , and it was the second organism follow *P.aeruginosa* in its incidence (Table 1) there is disagreement concerning the role of *S. aureus* in CSOM .Homenway and smith (1970)(17) declared that the frequency isolated of *S.aureus* is appreciably reduced when middle ear exudate obtained carefully , and with used needle aspiration rather than swab to avoid gross contamination from external canal , however , Chhagani and Goyal (1976)(8)reveald that *S.aureus* is accepted as the primary invader of AOM, has been frequently observed in CSOM , because of its inherent nature of developing resistant strains Our results are in agreement with other studies (20,21) who reported that *S.aureus* was the second frequency organism isolated from CSOM .This frequency may be due to , firstly *S.aureus* is inherent nature of developing resistance strains secondary , when the tympanic membrane was non intact , it may enter the middle ear by two routes , from external canal as a normal flora and by reflux OM(22).Proteus species were predominantly secondary invaders from EAC and when the resistance of the ME is lowered (8).the age distribution of the patients with CSOM in a different age groups .as they indicated clinically , are shown in figure 1.these results showed that the peak of incidence was on the age group 1 - 10 year old then it shown a general decline with the advancement of age .



Fig(1) :ages Distribution of 300 patients with CSOM

the highest incidence of CSOM on the age group 1-10 years old may be attributed to be immature immune system with insufficient antibody formation against infecting bacteria (23) and to the shorter, wider and horizontal Eustachian tube (ET) in children than in adults, offering a greater opportunity for pathogens to ascend from nasopharynx to the sterile MEC (24). Hypertrophy of adenoid occurring during childhood age make child prone to OM than adult by obstruction of ET as well as it is acting as reservoir of pathogenic bacteria (18). In another view, the higher incidence of OM in children may be secondary to URTI with bacteria such as AOM or sinusitis, which may follow a viral infection that may destroy the mucociliary barrier and thus permits a secondary invasion by pathogenic bacteria (13). For this reason one can conclude that the peak of CSOM infection occurs at the childhood age (1-10 years) rather than adult age as reported by Khalil (1980) (26). Our finding is in agreement with the results of AL-Mola *et al* (1998) (27), who confirmed that although the incidence of CSOM was spread through all age groups, the CSOM is mainly based on an early childhood disease and the higher incidence was found in younger age.

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