

Incidence of Bacteria in Conjunctival Infections and their Antibiotic susceptibility

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الخلاصة

شخصت 24 عزلة (44.4%) من مجموع 54 مسحة سريرية لأصابات ملتحمة العين وفحصت حساسيتها لـ 10 أنواع من المضادات الحيوية بواسطة اختبار الانتشار في الأكار. كذلك أجري اختبار انتاج أنزيم البيتا لكتام لعزلات العنقوديات الذهبية *Staphylococcus aureus* المقاومة للبنسلين. كانت أكثر الممرضات انتشاراً في هذه الأصابات هي *S. aureus* (33.3%) و *S. epidermidis* (29.1%) و *Pseudomonas aeruginosa* (16.6%) و *Streptococcus pneumoniae* (12.5%) و *Haemophilus influenzae* (8.3%). أظهرت (20) عزلة (83.3%) مقاومة للبنسلين من مجموع العزلات المشخصة باختبار الانتشار بالأكار. ولوحظ اختبار انتاج انزيم البيتا لكتام موجبا لكل عزلات *S. aureus* المقاومة للبنسلين. كانت جميع عزلات *S. epidermidis* و *S. aureus* حساسة لمضاد الفانكوماسين (100%). كان المضاد الحيوي السايبروفلوكساسين هو الأكثر فاعلية ثم الجنتاميسين وبعدها الكلورامفينيكول والترايميثوبريم سلفاميثوكزازول بينما كانت المضادات الحيوية الأرترومايسين والأموكسيسيلين والتتراسايكلين والبنسلين اقل فاعلية. لوحظ وجود عزلات متعددة المقاومة في هذه الدراسة حيث أظهرت عزلتان مقاومة لـ 9 أنواع و 4 عزلات مقاومة لـ 8 أنواع و 3 مقاومة لـ 7 أنواع و عزلتان مقاومة لـ 6 أنواع و 4 مقاومة لـ 5 أنواع و عزلتان مقاومة لـ 4 أنواع من المضادات الحيوية. مفاتيح الكلمات: اصابات ملتحمة العين, بكتريا, مضادات حيوية.

Abstract

Out of 54 clinical swabs of conjunctivital infections, 24 isolates (44.4%) were identified and tested for their susceptibility to 10 Kinds of antibiotics by disk diffusion method. Beta-lactamase production was done for pencillin resistant *Staphylococcus aureus* (PRSA).

The most frequent pathogens were *Staphylococcus aureus* (33.3 %), *Staphylococcus epidermidis* (29.1%), *Pseudomonas aeruginosa* (16.6%), *Streptococcus pneumoniae* (12.5) & *Haemophilus influenzae* (8.3%).

20 isolates (83.3 %) showed resistance to penicillin by the disk diffusion method, beta-lactamase production was positive in all (PRSA) isolates. All isolates of *S.aureus* & *S.epidermidis* were sensitive to vancomycin (100%).

Ciprofloxacin, was the most active antibiotic then gentamycin, chloramphenicol, trimethoprim-sulphamethoxazole, whereas erythromycin, amoxicillin, tetracyclin and penicillin were the lowest activity.

Multiple antibiotic resistance was seen in this study: 2 isolates were resistant to 9 Kinds; 4 isolate was resistant to 8 Kinds; 3 isolates were resistant to 7 Kinds ;2 isolates were resistant to 6 Kinds;4 isolates to 5 kinds & 2 isolates to 4 kinds of antibiotics.

Key words: conjunctivitis,bacteria,antibiotic.

Introduction

The conjunctiva, is the mucous membrane that lines the eyelids and covers the outer surface of the eye ball. It is a transparent layer of living cells replacing the skin. Tears act as a defence mechanism by flushing away foreign material; in addition, they contain lysozyme, lactoferrin and immunoglobulin^[1,2].

A variety of microbial agents are responsible for eye infections, including bacteria, fungi, viruses and parasites. These infectious agents may be introduced by trauma, such as surgery, or by hematogenous spread from a focal site of infection^[3]. Conjunctivitis refers to any inflammatory condition of the membrane that lines the eyelids and covers the exposed surface of the sclera and it is commonly caused by bacteria and viruses^[4]. The most frequent pathogens were *S. epidermidis* (44%), *S.aureus* (18%) and *P. aeruginosa* (6%)^[5]. The predominant organisms of the conjunctiva are diphtheroids (*Corynebacterium* species). *S. epidermidis*, nonhemolytic *Streptococci*, *Neisseria*, *Haemophilus* and Gram-negative bacilli resembling *Haemophilus* (*Moraxella* species) are also frequently presented^[6].

Materials and Methods

Specimens: 54 swabs were taken from patients with conjunctivitis^[3] from outpatients in some Baghdad hospitals, from March –September 2006.

Examination: The isolates were identified by gram-stain, biochemical test (API 20 E system), coagulase (tube method), oxidase, catalase as described by^[7,8].

Media: Blood agar, chocolate agar, nutrient agar and Mueller-Hinton agar.

Antibiotic susceptibility: 10 disk of available antibiotics (amoxicillin, chloramphenicol, ciprofloxacin, erythromycin, gentamycin, penicillin, neomycin, tetracyclin, trimethoprim and vancomycin^[7, 8, 9], oxoid.

Beta-lactamase production: this test was done in pencillin resistant *S. aureus* by using Iodometric method (1%) soluble starch solution, iodine reagent (2.03g potassium iodide in 100 ml D.W) and sodium phosphate buffer at pH 7.3 containing pencillin at 6g/1 litre. An overnight bacterial culture was mixed with 1% starch solution, two drops of iodine reagent. The disappearance of the blue colour was considered as a positive result ^[8].

Results and discussion

24 isolates (44.4%) of bacteria were identified from 54 cultures of conjunctivital infections table-1; (8) isolates of *S.aureus*, (7) isolates of *S.epidermidis*, (4) isolates of *p.aeruginosa*, (3) isolates of *S.pneumoniae* and (2) isolates of *H.influenzae*. These bacteria are the most pathogenic bacteria which always isolated from conjunctivitis and complications as mentioned by most of the studies ^[5,10,11,12, 13, 14]. Most of bacterial isolates commonly associated with the eye usually originate from the skin and upper respiratory tract. The infections with no obvious bacterial growth may be referred to infections with trachoma and viruses or allergy ^[4].

Bacteria	Number of isolates	%
<i>S. aureus</i>	8	33.3
<i>S. epidermidis</i>	7	29.1
<i>P. aeruginosa</i>	4	16.6
<i>S. pneumoniae</i>	3	12.5
<i>H. influenzae</i>	2	8.3
Total	24	

Table-1: Incidence of conjunctivital Bacterial isolates

The isolates showed reduced susceptibility to pencillin especially *S.aureus* and beta-lactamase was positive among all of the (PRSA) ^[14,15,16,17].

All (PRSA) were sensitive to vancomycin which recommended as drug of choice for treatment of Staphylococci infections ^[18, 19].

All *S.pneumoniae* isolates were resistant to pencillin. As for in vitro activity of antibiotics, ciprofloxacin, was the most active because it was the lowest percentage of resistance (29.1%), gentamycin (45.8%), chloramphenicol and trimethoprim-methoxazole were (50%). Most of the isolates to penicillin (83.3%), ampicillin and erythromycin (70.8%), tetracyclin (58.3%).

The results of the resistant isolates in table-2 were: (7) isolates to ciprofloxacin, (11) to gentamycin, (12) to chloramphenicol & trimethoprim-sulphamethoxazole, (13) to amoxicillin, (14) to tetracyclin, (17) to ampicillin

and erythromycin, and (20) to penicillin, these results were agreed with many studies on this subject ^[20,21,22].

Multiple antibiotic resistance was seen in this study: 2 isolates were resistant to 9 Kinds; 4 isolate was resistant to 8 Kinds; 3 isolates were resistant to 7 Kinds ,2 isolates to 6 kinds,4 isolates to 5 kinds, & 2 isolates to 4 Kinds of antibiotics as in table-3.

Bacteria	P	Amx	Te	Tr	E	Cf	C	Gm	Am
<i>S.aureus</i> 1	R	R	S	R	S	S	R	S	R
2	R	R	R	S	R	S	S	S	R
3	R	R	S	S	R	S	R	R	S
4	R	S	R	R	S	R	R	S	R
5	R	R	R	R	R	S	S	S	R
6	R	R	R	R	R	R	R	R	R
7	R	R	S	S	R	R	S	R	S
8	R	R	R	R	R	R	R	R	R
<i>S.epidermidis</i> 1	R	S	S	S	R	S	S	S	R
2	R	R	S	R	R	R	R	S	R
3	R	S	R	S	S	S	R	R	R
4	R	S	R	S	R	S	S	R	S
5	R	R	S	R	R	S	S	S	S
6	R	S	R	R	S	R	R	R	R
7	R	S	R	R	S	R	R	R	R
<i>P.aeruginosa</i> 1	R	R	R	R	R	R	R	S	R
2	R	R	R	R	R	R	R	S	R
3	R	R	R	R	R	R	R	S	R
4	R	R	R	R	R	R	R	R	R
<i>S.pneumoniae</i> 1	S	S	S	S	S	S	S	S	R
2	S	R	S	S	S	S	S	S	S
3	S	S	R	R	S	S	S	S	R
<i>H influenzae</i> 1	S	S	R	S	S	S	S	S	S
2	R	S	S	S	R	S	S	S	R

Table-2:Antimicrobial susceptibility of conjunctival isolates

P = penicillin Ax = amoxicillin Te = tetracyclin C = chloramphenicol
 E=erythromycin Cf = ciprofloxacin Tr = trimethoprim-methoxazole
 Gm=gentamycin Am=ampicillin

Multiple antibiotic resistance was seen in this study: 2 isolates were resistant to 9 Kinds; 4 isolate was resistant to 8 Kinds; 3 isolates were resistant

to 7 Kinds , 2 isolates to 6 kinds, 4 isolates to 5 kinds, & 2 isolates to 4 Kinds of antibiotics as in table-3.

No. of resistant isolates	No. of antibiotics
2	9
4	8
3	7
2	6
4	5
2	4

Table-3: Number of multiple resistant isolates

Concomitant with the extensive use of antibiotics, and drug concentrations at the site of infection are not always sufficient to rapidly kill infective organisms.

The number of multiple antibiotic- resistant strains has been increasing since resistance is mainly mediated by R plasmids which determined beta-lactamase in Gram-negative bacilli ^[20]. All the R plasmid carried the markers of resistance to chloramphenicol, tetracycline, ampicillin, gentamycin, kanamycin and streptomycin^[21].

In case of ciprofloxacin, few isolates were resistant to it because ciprofloxacin is a fluoroquinolone antibiotic with broad spectrum bacterial activity. The analysis of possible resistance mechanisms showed that resistance of *P.aeruginosa* to ciprofloxacin involves changes in DNA gyrase and is associated with pleiotropic changes in outer membrane proteins and lipopolysaccharide^[22].

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