Cryptic and Non cryptic Bacterial Ophthalmitis

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Abstract:
The aim of the present work was to investigate; cryptic & non-cryptic bacterial eye infections. Three disease entities were tacked ; Conjunctivitis, Dacryocystitis & Lid infections. 101 eye’s swabs were collected from eyes of these patients who referred to AL-Hessan & AL-Hindiya hospitals. The results indicated that the rate of bacterial infections were 93% distributed as 73.2% in Conjunctivitis, 11.8% in Lid infections & 8.0% in Dacryocystitis. Each swab was cultured by seven methods, these methods lies in three techniques; serial culture technique, dilution technique & biphasic media to isolate & localize walled & cell wall deficient bacteria (CWDB). Culture results showed that the rate of mixed infections including walled bacteria & CWDB were 18.8% while single infections rates were 73.2% for walled bacteria &1% for CWDB. Staphylococcus aureus was found to be the common bacterial cause of eye infections. It was with a percentage of 14.8% in Conjunctivitis, Dacryocystitis & Lid infections. The antibiotic sensitivity was studied for CWDB clinical isolates, The CWDB isolates showed full resistant (100%) to pencillin, ampicillin but were sensitive to ciprofloxacin with a percentage of 70%.

Key words: Cell-Wall Defective Bacteria, Ophthalmitis ,Conjunctivitis , Dacryocystitis

الخلاصة

تم الكشف في هذا البحث عن المسببات المشتقة والغير مشتقة في إجمالع العين ولثلاثة حالات مرضية إجمالع متجل.keySetة العين (Dacryocystitis) أو إجمالع كيس الدموع (Lid infections). من خلال جمع 101 مسحة من عيون المصابين من مرضى قيء العين المبطن والعين المبطن من الكراباء. كانت نسبة الإصابة البكتيرية هي 93% توزعت بالشكل التالي (إجمالع متجلمة العين 78.2% ، إجمالع الأشجار 13.8% ، إجمالع كيس الدموع 7.9%). بعد ها جري زراعة المسحات بسبع طرق تدرج ضمن ثلاث تقنيات هي تقنية الزرع المتسلى ، تقنية الراشح المخفيف وتقنية المزروعة ثانية الطور ، وظهرت نتائج الزرع بأن نسبة البكتيريا ذات الجدار واقداء الجدار المشتركة معاً في إجمالع الحمض هي 18.8% بينما كانت نسبة الإجمالع المتجلة هي Staphylococcus aureus 73.2% للبكتيريا ذات الجدار و 0.99% للبكتيريا واقداء الجدار. وظهرت إن البكتيريا المتجلية في الدراسة كانت نسبة الحساسية البكتيرية واقداء الجدار المشتركة في إجمالع الحمض هي 84.8% لبيورولافاكاسين بنسبة 100% بينما كانت حساسية لسيبرولايفاكاسين بنسبة 70%.

مفتاح الكلمات: بكتيريا واقداء الجدار، التهاب متجد العين، التهاب كيس الدموع.

Introduction:
The eye is constantly exposed to a variety of pathogens, but the infections occur when the normal defenses of the eye are compromised. The source of the infection can be the result of, immune deficiencies, trauma, eye surgery, contact lens wear, or other disease resulting in bacterial or viral growth(Khosrav et. al., 2007). Bacteria are the most common causes of eye infections, but various human bacterial pathogens have been difficult to study & characterize because they have been difficult to culture such as cell-wall deficient bacteria(Wirostko et.al.,1993). CWDB or L-form are strains of bacteria that lack cell wall, can be developed from gram positive & gram negative bacteria. The lack of cell wall in L-form means the cell divisions, if they were diagnosed, they will give rise to a variety of cell sizes, from very tiny to very big(Leaver et.al.,2009 ). CWDB were first isolated by Emmy-Kleineberenger in 1935, who named them L-form after the Lister Institute in London where she was working (Joseleau-Petit et.al.,2007). CWDB first reported in eye infections in 1955 by
Amster, who demonstrated bacteria like structures in the intraocular fluids of many patients and in 1974 other researches reported that intraocular fluids containing these structures produce chronic uveitis in experimental animals (Wirostko et al., 1993). Thus due to this variety in published works on cryptic eye infections, the aim of this study were; to demonstrate the presence of CWDB in different eye infections and to study the sensitivity of these bacteria to some antibiotics.

**Material & Methods:**

1- **Samples collection:**
   A total 101 eye’s swabs were collected under aseptic conditions. Type & numbers of these clinical samples which collected were as follow; Conjunctivitis (79), Lid infections (14) & Dacryocytitis (8).

2- **Isolation of CWDB:**
   Each eye’s swab was proceeded for CWDB using direct culture, biphasic culture, inflammatory cell lysate and diluted culture on variant media (AL-Nassery, 2002).

3- **Biochemic identification & Antiograms:**
   Biochemical characterization of CWDB was made as in Mattman (1993) and antiogram studies were done as in Domingue (1982).

**Result & Discussion:**
   The culturing results revealed that bacterial eye infection with a rate of 92.9% which included both CWDB&walled bacteria as shown in table (1).

<table>
<thead>
<tr>
<th>Infection type</th>
<th>Total</th>
<th>Lid infection</th>
<th>Daeryocystitis</th>
<th>Conjunctivitis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>NO.</td>
<td>%</td>
<td>NO.</td>
</tr>
<tr>
<td>Walled bacteria</td>
<td>73.2</td>
<td>74</td>
<td>9.9</td>
<td>10</td>
</tr>
<tr>
<td>Mixed(walled&amp; CWDB)</td>
<td>18.8</td>
<td>19</td>
<td>1.9</td>
<td>2</td>
</tr>
<tr>
<td>Single (CWDB)</td>
<td>0.99</td>
<td>1</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Negative culture</td>
<td>6.9</td>
<td>7</td>
<td>1.9</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>101</td>
<td>13.8</td>
<td>14</td>
</tr>
</tbody>
</table>

Table (2) reveals the CWDB strains isolated from eye infections. *Staphylococcus aureus* represented about 14.8% from all bacterial infections in this study, the results indicated for high incidence of *S. aureus* in eye infections. Vandenbergh & Verbrugh (1999) have been pointed out that *S. aureus* eye infections are due to their colonization of nasal epithelium. There are many factors cause *S. aureus* to loss their cell wall such as prolonged using of some antibiotic, which inhibits peptidoglycan synthesis (Fuller et al., 2005). The CWDB percentage was 19.8% (table 2). This result was in accordance with that results being reported by Jacob & Golden (Jacob &Golden, 1976), in which the researchers isolate this bacteria from different eye infections with a percentage 13.2% , while result of current study was lower than result being reported by Thewaini & Omran (2009). Differences in the rates of CWDB isolation may be due to differences in performance quality of identification criteria (Domingue, 1995).
Table 2: Number & percentage of CWDB isolated from eye infections

<table>
<thead>
<tr>
<th>Total</th>
<th>Lid infection</th>
<th>Dacryocystitis</th>
<th>Conjunctivitis</th>
<th>Bacterial strains cause eye infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>% NO.</td>
<td>% NO.</td>
<td>% NO.</td>
<td>% NO.</td>
</tr>
<tr>
<td>14.8</td>
<td>15</td>
<td>1.98</td>
<td>2</td>
<td>0.99</td>
</tr>
<tr>
<td>1.98</td>
<td>2</td>
<td>0.0</td>
<td>0</td>
<td>1</td>
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<tr>
<td>0.99</td>
<td>1</td>
<td>0.0</td>
<td>0</td>
<td>0.99</td>
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<tr>
<td>0.99</td>
<td>1</td>
<td>0.0</td>
<td>0</td>
<td>0.99</td>
</tr>
<tr>
<td>19.8</td>
<td>20</td>
<td>1.98</td>
<td>2</td>
<td>2.97</td>
</tr>
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</table>

All isolates of CWDB (100%) were found to be resistant to cell wall inhibition antibiotics (Pencillin & Ampicillin), while they were highly sensitive (70%) to protein synthesis inhibiting antibiotics like Ciprofloxacin(Figure 1). This results agreed with other studies (Domingue & Woody 1997 ; Von-Eiff 2008) which showed that all strains of CWDB resistant of Pencillin and Cephalosporin due to losing their cell wall. Other study showed that the formation strains of bacteria lacking cell wall have been proposed to be important in acquisition of bacteria antibiotic resistance (Fuller,2005). CWDB showed highly sensitivity to Ciprofloxacin, this results agreed with Marlin (2003) who suggested using Ciprofloxacin in the treatment of bacterial eye infections due to its action on bacterial growth through inhibition their deoxyribonucleoyrse.

Figure 1: Antibiotic resistance of CWDB

Thus cryptic bacterial ophthalmitis can be:

i-Persistent, recurrent.

ii-Routine culture negative.

iii-Associated with CWDB gram-positive & gram negative.

iv-CWDB associated with multiple resistant.

v-Sensitive to protein inhibitory antibiotics.

References:


