# 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 tackeld ; Conjunctivitis, Dacryocystitis & Lid infections.101eye`s swabs were collected from eyes of these patients who referred to AL-Hessian & AL-Hindiya hospitalsThe results indicated that the rate of bacterial infections were 93% distributed as 73.2% in Conjuctivitis,11.8% in Lid infections& 8.0% in Dacryocytitis . 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 commonest bacterial cause of eye infections. It was with a percentage of 14.8% in Conjunctivitis,Dacryocystitis & Lidinfections The antibiotic sensitivity was studied for CWDB clinical isolates, The CWDB isolates showed full resistant(100%) to pencillin , ampicillin but were sensitive to ciprofloxacine with a percentage of 70% .

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

## الخلاصة

تم الكشف في هذا البحث عن المسببات المتخفية والغير متخفية في اخماج العيون ولثلاثة حالات مرضية اخماج ملتحمة العين ( Conjuctivitis) أخماج الأجفان (Lid infections) وأخماج كيس الدمع (Dacryocytitis ) . من خلال جمع 101 مسحة من عيون المصابين ممن راجعوا مستشفى الحسين العام ومستشفى الهندية في كربلاء. وكانت نسبة الإصابة البكتيرية هي 93 % توزعت بالشكل التالي (اخماج ملتحمة العين 78.2% ، أخماج الأجفان 13.8%، وأخماج كيس الدمع 7.9%). بعدها جرى زراعة المسحات بسبع طرق تتدرج ضمن ثلاث تقنيات هي تقنية الزرع المتسلسل ، تقنية الراشح المخفف وتقنية المزرعة ثنائية الطور، وأظهرت نتائج الزرع بان نسبة البكتريا ذات الجدار وفاقدة الجدار المشتركة معا في إحداث الخمج هي 18.8% بينما كانت نسبة الاخماج المنفردة هي 73.2% للبكتريا ذات الجدار و0.99 % للبكتريا فاقدة الجدار .وتبين إن بكتريا المكورات العنقودية *Staphylococcus aureus* هي المسبب الأكثر شيوعا في اخماج العيون وبنسبة 14.8% في كل من اخماج ملتحمة العين ، الجفن و كيس الدمع.جرى دراسة الحساسية الدوائية للبكتريا فاقدة الجدار المشاركة في إحداث الخمج ،حيث أظهرت البكتريا فاقدة الجدار مقاومة لكل من البنسلين ، الامبسلين بنسبة 100 % بينما كانت حساسة للسيبروفلاكساسين بنسبة 70 % .

**مفتاح الكللمات**:بكتريا فاقدة الجدار،التهاب ملتحمة العين والتهاب كيس الدمع .

## 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-Kleineberger 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; Conjuctivitis (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 &Antibiograms:**

Biochemical characterization of CWDB was made as in Mattman(1993)and antibiogram 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).

Table1:Distribution of ophthalmitis according to type of infections(Single& Mixed CWDB)

| Total | | Lid infection | | Dacryocystitis | | Conjunctivitis | | Infection type |
|---|---|---|---|---|---|---|---|---|
| % | NO. | % | NO. | % | NO. | % | NO. | |
| 73.2 | 74 | 9.9 | 10 | 4.9 | 5 | 58.4 | 59 | **Walled bacteria** |
| 18.8 | 19 | 1.9 | 2 | 2.9 | 3 | 13.8 | 14 | **Mixed(walled& CWDB)** |
| 0.99 | 1 | 0.0 | 0 | 0.0 | 0 | O.99 | 1 | **Single (CWDB)** |
| 6.9 | 7 | 1.9 | 2 | 0.0 | 0 | 4.9 | 5 | **Negative culture** |
| 100 | 101 | 13.8 | 14 | 7.9 | 8 | 78.2 | 79 | **Total** |

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).

**Table2:Number &percentage of CWDB isolated from eye infections**

| Total | | Lid infection | | Dacryocystitis | | Conjunctivitis | | Bacterial strains cause eye infection |
|---|---|---|---|---|---|---|---|---|
| % | NO. | % | NO. | % | NO. | % | NO. | |
| 14.8 | 15 | 1.98 | 2 | 0.99 | 1 | 11.8 | 12 | *S.aureus* |
| 1.98 | 2 | 0.0 | 0 | 0.99 | 1 | 0.99 | 1 | *Proteus* spp. |
| 0.99 | 1 | 0.0 | 0 | 0.0 | 0 | 0.99 | 1 | *S.feacalis* |
| 0.99 | 1 | 0.0 | 0 | 0.0 | 0 | 0.99 | 1 | *E.coli* |
| 0.99 | 1 | 0.0 | 0 | 0.99 | 1 | 0.0 | 0 | *P.aerugenosa* |
| 19.8 | 20 | 1.98 | 2 | 2.97 | 3 | 14.8 | 15 | Total NO. |

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(Figure1). 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 deoxyribonucleogyrase.

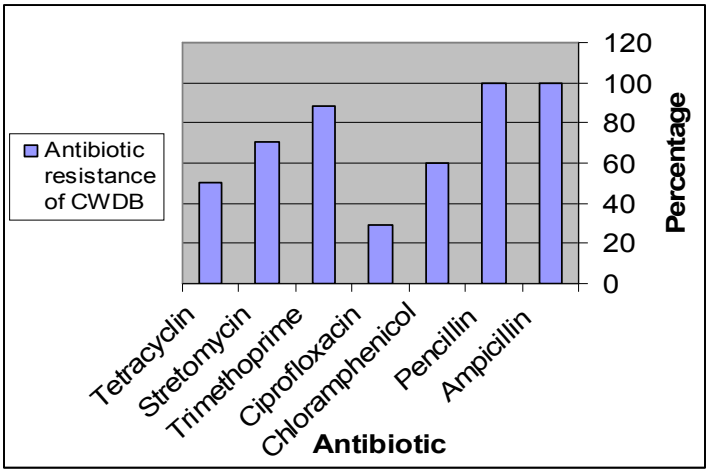


**Figure 1:Antibiotic resistance of CWDB**

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.

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