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Study the Prevalence of Bacterial Conjunctivitis in Iraq

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Abstract

The study was done in the Hospital of Ibn-AL-Hythem for eyes infections in Baghdad from July till October of 2014. 120 conjunctiva eyes swap samples were collected from patients with pinkness or redness of the conjunctiva, which include 59 male and 61 female. The diagnoses of specimens were done in the laboratories of the hospital by using the Analytical Profile Index System (API system). The results showed that 29(24.1%) samples were positive for bacterial infections while 91(75.9%) samples gave negative results, which mean conjunctivitis occurs by other causes. The study showed low in the percentage of bacterial infections that occurred in the eyes lid conjunctiva as well as in the per- orbital region. The predominant isolated species were *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Staphylococcus epidermides*, *Streptococcus spp*, respectively.

Keywords: Bacterial conjunctivitis, Conjunctivitis, Infections of the eyes.

دراسة سيادة البكتريا المسببة لالتهاب ملتحمة العين في العراق

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قسم علوم الحياة، كلية العلوم، جامعة بغداد، بغداد، العراق

الخلاصة

أعدت الدراسة في مستشفى ابن الهيثم للعيون في بغداد/العراق ابتداءً من شهر تموز حتى شهر تشرين الاول من عام 2014. جمعت 120 مسحة من مرضى مصابون بالتهاب ملتحمة العين الوردية او الحمراء بواقع 59 من ذكور و 61 من اناث. شخّصت جميع العينات في مختبرات المستشفى باستخدام (API system). اظهرت النتائج ان 29(24.1%) عينة كانت موجبة لاصابة بكتيرية، بينما 91(75.9%) عينة اعطت نتيجة سالبة بمعنى ان الاصابة تولدت نتيجة مسببات اخرى. اظهرت الدراسة انخفاض اصابات ملتحمة العين بالبكتريا بشكل كبير مقارنة بالاعراض المتولدة نتيجة مسببات اخرى. تدرجت الاصابة بالانواع البكتيرية حسب نسبتها الاكبر فكانت بكتريا *Pseudomonas aeruginosa* و *Staphylococcus aureus* و *Staphylococcus epidermidis* و *Streptococcus spp*. على التوالي .

Introduction

Eye infections can be caused by several agents such as bacterial, viral and fungal or parasites. In some cases allergic response can cause signs similar to infection, infection can involve the eye itself and /or the tissue surrounding the eye. Serious infections of the eyes that involved the deeper interior portions of the eye can result in loss of sight. Infection may be unilateral or bilateral, meaning involving one or both eyes, or if the infection began in one eye it may spread to the other eye. Some common eye infections are [1]:

1. **Conjunctivitis:** Also known as pink eye. Inflammations involving the conjunctiva membrane covering the eye whites and inner eye lid parts.
2. **Blepharitis:** Inflammation involving the eye lid, the bacteria from skin gets into the hair follicle of eye lash.

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3. **Keratitis:** Inflammation involving the cornea. An eye infections that can be caused by improper contact lens care. Keratitis can have bacterial, fungal or herpes origin.
4. **Uveitis:** Inflammation of the uveal tract of the eye can be originated by viruses, fungus or parasites and can associate with infections in the body.

Conjunctivitis is the term given to inflammation of the conjunctiva – the mucous membrane covering the white of the eyes and the inner side of the eyelids. Conjunctivitis is a common eye condition, which is not serious, but can be uncomfortable and irritating, usually affects both eyes at the same time – although it may start in one eye and spread to the other after a day or two. It can be asymmetrical, affecting one eye more than the other [2-4]. Bacterial conjunctivitis is an infection caused by bacteria, such as *Staphylococci*, *Streptococci* or *Haemophilus*. These organisms may come from the patient's own skin, upper respiratory tract or caught from another person with conjunctivitis. This type is more typical for children than for adults and it tends to last longer than the viral type [5]. Bacterial conjunctivitis affects both eyes. The eyes will usually feel gritty and irritated with a sticky discharge. The eyelids may be stuck together, particularly in the mornings, and there may be discharge or crusting on the eyelashes [6].

Materials and Methods

The study was done in the diagnostic laboratories of Ibn-AL-Hythem Hospital for eyes infections in Baghdad from July till October of 2014. From the eyelid (conjunctiva), 120 swap specimens gathered from 120 patients which include 59 male and 61 female with pinkness or redness of the conjunctiva. All swap specimens were cultivated by using macconkey agar, blood agar, mannitol salt agar, kings medium A base, kings medium B base and brain heart infusion broth. The examinations of colonies were taken depending on morphological and microscopical characteristics, while diagnoses of species were done by using Analytical profile index system (API) [7].

Results and discussion

Results showed that among 120 swap specimen, 29(24.16%) specimen were given positive results for bacterial infections, while 91(75.83%) specimen were given negative results, which mean the infection caused by other agents. *Pseudomonas aeruginosa* represented the highest among the isolates which reached to 10(34.4%) isolates, *Staphylococcus aureus* came at a second stage in about 9(31.03%) isolates, *Staphylococcus epidermides* 7(24.1%) isolates, at last streptococcus spp. represented 3(10.34%) isolates. Figure 1 and 2 showed the distribution of conjunctivitis infections.

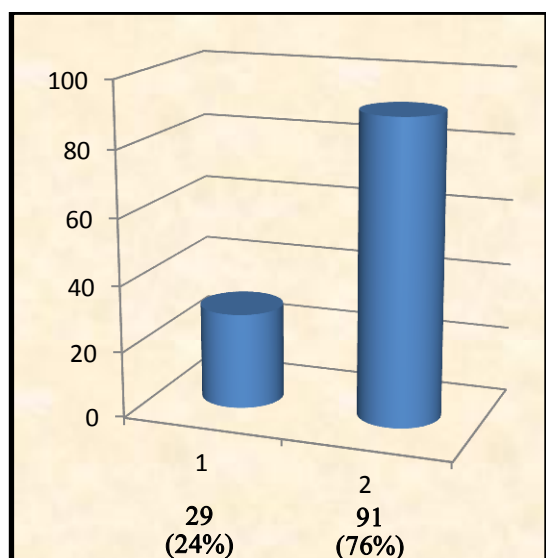


Figure 1-Percentage of conjunctivitis among causative agents; 29(24%) Bacterial agents; 91(76%) other agents

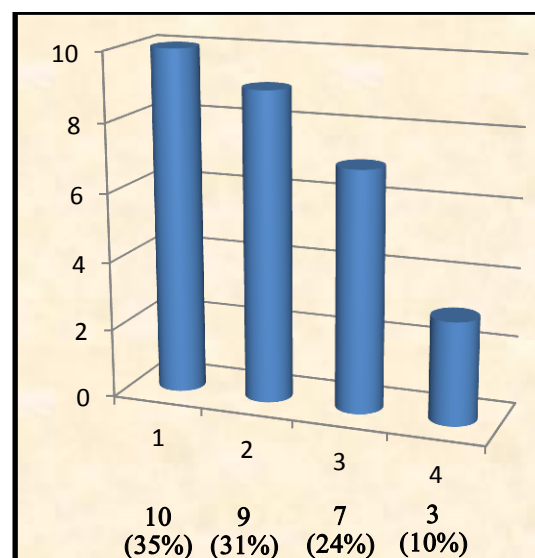


Figure 2- percentage of conjunctivitis among bacterial species; 10(35%) *P. aeruginosa*; 9(31%) *Staphylococcus aureus*; 7(24%) *Staphylococcus epidermides*; 3(10%) streptococcus spp

The bacterium *Pseudomonas aeruginosa* is a Gram negative rod that is commonly isolated from aquatic and terrestrial environments. It is an established nosocomial pathogen in the field of hospital infection control [8-10]. The routes of transmission are well investigated epidemiologically, because it is responsible for severe infections in immunocompromised patients. However, in clinical ophthalmology, the transmission route of *Pseudomonas aeruginosa* is not well investigated, even it is known to be able to cause keratitis, some strains produce biofilms on contact lenses [11,12], and endophthalmitis caused by *P. aeruginosa* contracted from surgical equipment has been reported as a devastating complication after ocular surgery. With regard to bacterial conjunctivitis in adults, it is most often caused by pathogens derived from the indigenous bacterial flora of the ocular surface. Therefore, *P. aeruginosa*, which is not a resident bacterium of the ocular surface, is rarely isolated from conjunctivitis cases except those of patients who have some sort of artificial devices in the eye. *P. aeruginosa* isolated from the ocular surface was acquired from the patient's home environment. This suggests that the bacteria colonising in humid home environments such as the bathroom can infect ocular surfaces in association with biomaterials. Biomaterials such as sutures, punctal plugs, intraocular lenses, and contact lenses can serve as hotbeds for bacterial infections. Therefore, all clinical cases involving the use of biomaterials require regular follow-up [13-16].

The shower environment has been described as a source of opportunistic pathogens [17]; presume that these infections were likely to have been caused by strains of *P. aeruginosa* present in humid indoor areas in the home or hospital to which the patient was exposed. Considering that contaminated rooms may lead to hospital- and community-acquired infections, and also considering that *P. aeruginosa* is strongly associated with environmental contamination [8], disinfection or cleaning of humid home environments may help decrease the risk for infection by *P. aeruginosa*.

The most common infectious agents were *Staphylococcus* spp. Some strains produce an extracellular polysaccharidic slime that can cause severe infections. Both *S. epidermidis* and *S. aureus* slime-producing strains exhibited more surface hydrophobicity than non-producing slime strains [18].

Conjunctivitis caused by *S. aureus* is often recurrent and associated with chronic blepharconjunctivitis (inflammation of the eyelid and conjunctiva). The conjunctivae are colonized by *S. aureus* in 3.8% to 6.3% of healthy adults [19-21]. In addition, about 20% of people normally harbor *S. aureus* continually in the nasal passages, and another 60% harbor it intermittently; in both cases, the bacteria may be a reservoir for recurrent ocular infection [22].

Staphylococcus epidermidis is widely distributed over the body surface [23]. *S. epidermidis* Bacterial flora is normal in the conjunctival sac and eyelid edge, on skin, and in mucosal tissues. *S. epidermidis* is representative of the normal bacterial flora on the ocular surface and is most frequently isolated from the microflora of the human ocular surface [24, 25].

The types of bacteria were almost similar in all age groups. *Staph. epidermidis* was the most common organism followed by *Staph. aureus* and *Strep. pneumoniae*. Thiel and Schumacher studied ocular flora of 135 persons of various age groups (3-90 years). They found characteristic changes in the flora at different stages of life, which suggested that with increasing age, aerobic cocci were found less frequently and the proportion of anaerobic cocci increased [26].

Staph epidermidis was the most common organism detected from normal individuals. It was also found in patients with external ocular infection. The role of *Staph. epidermidis* as a commensal of the cul-de-sac is highly suggestive and that it can cause infection of the conjunctiva and cornea. The second most common organism in healthy individuals and in patients with keratitis was *Staph. aureus*. It was the most common organism causing conjunctivitis. They are probably not pathogens since they are found with equal or greater frequency in normal eyes [27, 28].

Streptococcus pneumoniae, an inhabitant of the upper respiratory mucosa, causes respiratory and invasive infections as well as conjunctivitis. Strains that lack the capsule, a main virulence factor and the target of current vaccines, are often isolated from conjunctivitis cases. The vast majority of conjunctivitis strains are members of a distinct cluster of closely related unencapsulated strains. These strains possess divergent forms of pneumococcal virulence factors (such as CbpA and neuraminidases) that are not shared with other unencapsulated nasopharyngeal *S. pneumoniae*. They also possess putative adhesins that have not been described in encapsulated pneumococci. These findings suggest that the unencapsulated strains capable of causing conjunctivitis utilize a pathogenesis strategy substantially different from that described for *S. pneumoniae* at other infection sites [29].

Results of the study revealed the low percentage of bacteria to cause inflamed eye and conjunctivitis (pink eye), compare with other causes which may be infectious include viruses and fungi or Non-infectious causes include allergies, foreign bodies and chemicals [30 - 33].

Conclusions

1. The phrase "pink eye" is commonly used to refer to conjunctivitis, because pinkness or redness of the conjunctiva is one of the most noticeable symptoms.
2. The responsibility of bacteria to cause conjunctivitis is 24% compare with the other agents which reach the limit of 76%.

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