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IN-VITRO STUDY ON CLINICAL PREVALENCE AND ANTIMICROBIAL SUSCEPTIBILITY OF CONJUNCTIVA INFECTING STAPHYLOCOCCUS AUREUS IN HUMANS

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ABSTRACT

The present report deals with our preliminary experiments designed to evaluate the in-vitro effects of various antibiotics on conjunctiva infecting *Staphylococcus aureus* by employing antibiotic sensitivity test by disc diffusion method as described by (Cruickshank, 1968). This study was undertaken to investigate whether the antibiotic resistance of *Staphylococcus aureus* varies with sex or age of patients. A total of 50 isolates of Staph. aureus were obtained from pus of conjunctiva infection. *Staphylococcus aureus* isolates were isolated most frequently in adult and male children when compared with females. Antimicrobial resistance was commonly found for norfloxacin, pefloxacin, and cefazolin. The isolate showed sensitivity against Gatifloxacin, amicacin, ceprofloxin, and chloramphenicol. From this study we conclude that antimicrobial susceptibilities in Staph. aureus often differed with regard to sex and age of the humans.

Keywords: Antimicrobial susceptibility, conjunctiva, *Staph. aureus*, antibiotics

Number of References : 22 Number of Tables: 2

INTRODUCTION

Worldwide population constitute of about 28% of children and infants who are the most susceptible to diseases than adults which is mainly due to under development of immune system, hormonal imbalance, genetic factors, environmental change, water borne and food borne etc (Moorthi *et al.*, 2001). Eye is most interesting organ due to its drug disposition characteristics. For ailments of the eye, topical administration is usually preferred over systemic administration, before reaching the anatomical barrier of the cornea, any drug molecule administered by the ocular route has to cross the precorneal barriers (Patel *et al*., 2010). *Staphylococci* are routinely isolated from conjunctiva in clinical practice (Biberstein *et al.*, 984). Besides their role as commensals on mucosal surfaces and the skin, *Staphylococci* are often involved in a wide variety of diseases in humans (Kloos *et al*., 1975. Staphylococcal infections are frequently treated with antibiotics and, consequently, antibiotic resistance and⁄or acquired resistance have developed (Jorgensen *et al.*, 1999). *Staphylococcus aureus* is frequently associated with suppurative infections and is recognized as a resident member of the microflora of the skin of humans and dogs (Kloos, 1990). *Staph. aureus* has been isolated in very similar percentages from the skin and other sites (Biberstein *et al.*, 1984). Only a few preliminary studies have been conducted to determine whether the antibiotic susceptibility of a specific bacterium varies with (i) sex and (ii) age of the individual (Flournoy *et al.*, 1989; Flournoy *et al.*, 1979; Hoekstra and Paulton, 1996). The purpose of this study was to examine the isolate, *Staph. aureus* with particular reference to three factors: (i) the antimicrobial susceptibility of *Staph. aureus* isolated to determine whether the site of isolation influences antimicrobial susceptibility for a specific bacterium (Hoekstra and Paulton, 1996); (ii) the antimicrobial susceptibility of *Staph. aureus* isolated from male and female given the probable influence of sex in terms of virulence and antibiotic sensitivity (Picard and Goullet, 1989) and (iii) the effect of age to determine whether antibiotic resistance correlated with age of the human, as previously claimed.

MATERIALS AND METHODS

Pus samples were obtained from Bejansingh eye hospital, Nagercoil, Kanyakumari, Tamil Nadu, India . Adult and Children of both sexes were chosen for identification and susceptibility testing over a 6 month period (2011 Jan-June). Patients selected for this study had no known history of prior antibiotic therapy. The bacterial isolates were identified and labelled as to source, male or female, adult or Children. After growth, S*taphylococcal* isolates were identified according to their characteristics as outlined in Bergey's Manual of Determinative Bacteriology (Euzeby, 1997; Holt *et al.*, 1994) and the Manual of Clinical Microbiology (Murray and Kloos, 1980). Only isolates identified as *Staph. aureus* was selected for this study. After growth on sheep blood agar, *Staph. aureus* was identified on the basis of colony characteristics, Gram stain, pigment production, acid production on D-mannitol, free coagulase and the slide test for detection of clumping factor. Once samples were identified, the staphylococcal strains were tested for susceptibility to antibiotics by disc agar diffusion as previously described (Hoekstra and Paulton, 1996). Discs of antibiotics commonly used in clinical medicine for infective diseases were tested: Gatifloxacin, Amicacin, Norfloxacin, Pefloxacin, cefazolin, Ceprofloxin,

Chloromphenicol, Tobramycin, and Moxifloxacin. After measuring the zones of inhibition, the strains were classified as sensitive, intermediate or resistant to the drug according to the literature (Jorgensen *et al.*, 1999).

RESULTS AND DISSCUSSION

A total of 50 isolates of *Staph. aureus* was obtained from male and female, adult and children from January-June 2011 . Table 1 shows the frequency of isolation of these staphylococcal isolates according to the sex and age of the patients. The study included more male (37) than female (23). The antimicrobial susceptibility of *Staph. aureus* isolates from male and female and adult and children is shown in Table 2. Antimicrobial resistance was commonly found for norfloxacin, pefloxacin, and cefazolin. The isolate showed sensitivity against Gatifloxacin, amicacin, ceprofloxin, and chloramphenicol. It is found that the isolates showed moderately sensitive to topramycin and moxifloxacin.

Table 1: *Frequency and distribution of Staphylococcus aureus isolated from 50 patients (Jan-Nov 2010)*

Sample	Male Adult	Male children	Female adult	Female children
Pus from conjunctiva	28	09	10	13

Table 2: *Percentage susceptibilities of Staphylococcus aureus isolated from the pus of conjunctiva against various antibiotics.*

S.no	Antibiotics	Male Adult	Male children	Female adult	Female children
1	Gatifloxacin	S	S	S	S
2	Amicacin	S	S	R	S
3	Norfloxacin	R	R	S	R
4	Pefloxacin	R	R	R	R
5	cefazolin	R	R	MS	R
6	Ceprofloxin	S	S	S	S
7	Chloramphenicol	S	S	S	S
8	Tobramycin	MS	MS	MS	MS
9	Moxifloxacin	MS	MS	MS	MS

From this study we conclude that antimicrobial susceptibilities in *Staph. aureus* often differed with regard to sex and age of the humans. The prevalence and degree of antimicrobial resistance in suppurative infections are increasing worldwide (Werckenthin *et al.*, 2001). *Staphylococci* have shown a frequent and rapid development and spread of antimicrobial resistance. Unfortunately, this development has not been sources (Seguin *et al.*, 1999; Aarestrup and Jensen, 1998) where methicillin resistance is a growing problem (Witte, 1999). However, newer broad-spectrum antibiotics, such as enrofloxin, are increasingly being used for the treatment and resistance rates may also increase in staphylococci with their frequent use Surprisingly, tetracycline and chloramphenicol is still an effective

antimicrobial in reproductive and abscess sites (Schreiner, 1984). Our findings showed increased resistance to norfloxacin, pefloxacin, and cefazolin. The sex and age of individuals have been suggested as predisposing factors for the development of certain bacterial infections (Picard and Goullet, 1989). Such data might provide useful insights into dynamic aspects of age- and sex related processes involved in the development of antibiotic resistance. Although chloramphenicol and tetracycline resistance is commonly reported in S*taphylococci* (Schwarz and Wang, 1993; Schwarz et al., 1998; Alekshun and Levy, 2000), our findings showed sensitive to chloramphenicol. It has even been reported that these antimicrobial agents may be more effective in adults since clinical use in Children is limited due to age associated toxicity (Lewis and Reeves, 1994).

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