Original Research Article

Bacteriological flora of conjunctiva among pregnant women

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Abstract

Background: Normal microbial flora of eye constitutes organisms which are present on eyelids and conjunctiva without causing any disease. Various factors alter the conjunctival flora such as, seasonal variations, temperature, hostage, environmental exposure, ocular trauma, surgical procedures, dry eye, contact lens usage, immunocompromising diseases, and general hygienic conditions. The present study is aimed to determine the influence of hormonal changes on conjuctival flora in pregnant women. **Materials and methods:** This was a cross sectional observational study conducted at the departments of obstetrics gynecology and ophthalmology of Sambharam institute of medical sciences. A total of 60 pregnant women were enrolled in the study and another 60 non pregnant were included in control group. A specimen was taken from each participant for the study by rubbing a sterile cotton-tipped swab on the inferior palpebral conjunctiva of the right eye. Samples were incubated in blood agar and chocolate agar. All specimens were processed as per standard microbiological procedures. **Results:** Out of 60 swabs collected from study group, 33 yielded growth and accounted for 55%. Out of 60 swabs collected from control participants, 28 yielded growth and accounted for 46%. Coagulase negative staphylococci was commonly isolated in both study group (36.36%) and control group (35.71%). Majority of isolates were found to be susceptible to cefazolin and chloramphenical in both groups. **Conclusion:** In our study, hormonal changes in pregnant women did not affect the conjunctival flora in comparison to non pregnant healthy women of reproductive age group. Growth pattern of conjunctival flora in non pregnant women appeared to be heavy compared to pregnant women.

Key Word: Bacteriological flora.

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INTRODUCTION

Normal microbial flora of eye constitutes organisms which are present on eyelids and conjunctiva without causing any disease. These organisms are generally considered to be saprophytic but have the potential to become pathogenic when the normal defense mechanisms falter.1 The conjunctiva, which is exposed to the environment and connected to the skin of the eyelid, has different types of microbes. Conjunctival microbiota contributes to infectious and autoimmune diseases of the eye, such as conjunctivitis, keratitis, endophthalmitis, kera to conjunctivitis and dry eye.2 Various factors alter the conjunctival flora such as, seasonal variations, temperature, hostage, environmental exposure, ocular trauma, surgical procedures, dry eye, contact lens usage, immunocompromising diseases, and general hygienic conditions.3 Periodontal microbial flora is known to be affected by hormonal status in pregnant women.4 As pregnancy is accompanied by an increase in the production of estrogen and progesterone, changes in the composition of the subgingival microflora may be due to significantly higher estradiol concentrations in pregnant women compared to that of non-pregnant women.5 Persuading this an attempt was made to study the

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influence of hormonal changes on microbial flora of conjunctiva in pregnant. Antibiotic use is now prevalent, and sometimes, it is overused. Overuse of antibiotics can result in an increase of drug resistance or, even worse, alteration of normal flora. Hence, the present study was conducted to determine the bacteriological flora of conjunctiva in pregnant women and its susceptibility pattern.

MATERIALS AND METHODS

This is a cross sectional observational study conducted at the departments of obstetrics gynecology and ophthalmology of Sambharam institute of medical sciences. A total of 60 pregnant women attending obstetrics department for antenatal check ups were included in the study group.60 non pregnant women of reproductive age group were included in the control group. A complete ophthalmic examination was performed by the ophthalmologist in all patients in order to exclude clinical abnormality before sample collection. Before collecting swab from each patient, consent was obtained. All precautionary measures were taken to avoid contact with lid margin and eyelashes while taking the swab. Inclusion criteria: Pregnant women and non pregnant women of reproductive age group attending department of obstetrics and gynecology. Exclusion criteria: Contact lenses users, Participants with any medical history of systemic disease, ocular surface disease, uveitis, glaucoma, retinal disease or ocular trauma/transplantation; with the history of any eye drops usage (antibiotics, corticosteroids and nonsteroidal anti-inflammatory drugs) within 6 months were excluded. After completion of the ocular examination, samples were collected from the upper, lower palpebral conjunctiva, caruncle and fornix conjunctiva using disposable sterile dry absorbent cotton swabs. Swabs collected from subjects were transported to microbiology laboratory. Collected swabs were inoculated on bacteriological media such as blood agar and chocolate agar. Inoculated bacteriological media (37° C) were incubated for 48 hours and microbial colonies were identified after isolation as per standard microbiological procedures.

Threshold Criteria for Judging "Culture Positive" Specimens: Note: An ocular specimen is considered "Culture Positive" if colony count equals or exceeds the threshold values given below for any of the following groups of organisms.

Group I: Threshold=1CFU/100mL (i.e.any counts)1-10 (scanty): Streptococcus, Group A, Beta hemolytic (S. pyogenes) Streptococcus pneumonia Staphylococcus aureus Escherichia coli Klebsiella sps Proteus/Morganella Serratia marcescens Other Enterobacteriaceae Pseudomonas aeruginosa Other Pseudomonas sps

Group II: Threshold = 10 CFU/100 mL (Moderate) 10-50: Alpha hemolytic Streptococci.

Group III: Threshold = 100 CFU/100 mL (Heavy) 50-100: Staphylococcus epidermidis Other coagulase negative Staphylococci.

Group IV: Threshold = 100 and above CFU/100 ml – Corynebacterium sps (diphtheroids). Antibiotic susceptibility testing was performed by Kirby Bauer disc diffusion method.[6]

RESULTS

A total of 120 participants were included in the study. (Study group-60 and controls-60). Single swab was collected from each participant from conjunctiva. Out of 60 swabs collected from study group, 33 yielded growth and accounted for 55%. Out of 60 swabs collected from control participants, 28 yielded growth and accounted for 46%. All swabs yielded single bacteria. Gram positive cocci was found to be the most commonest bacteria. Among Gram positive cocci, Coagulase negative staphylococci was commonly isolated in both study group(36.36%) and control group(35.71%). (Table.1) In pregnant women, four swabs showed the growth of Gram negative bacilli which includes Klebsiella species-2, Proteus species-1, Escherichia coli-1. In non pregnant women, four Gram negative bcilli were isolated (Klebsiella species-1, Pseudomonas aeruginosa-1, Proteus species-2)

Table 1: Bacteria isolated from pregnant and non pregnant women

Bacteria	Pregnant women	Non pregnant women (Menopausal)
Coagulase negative staphylococci	12(36.36%)	10(35.71%)
α hemolytic streptococci	9(27.27%)	2(7.14%)
Staphylococcus aureus	5(15.15%)	3(10.71%)
Diphteroides	3(9.10%)	9(32.14%)
Gram negative bacilli	4(12.12%)	4(14.29%)
Total	33(100%)	28(100%)

All isolates were found to be susceptible to chloramphenicol, except two strains of coagulase negative staphylococci in control group. Decreased susceptibility pattern was observed in S.aureus against gentamycin (40%) and other fluoroquinolones tested (20%). Cefazolin and chloramphenicol were found to be most effective antibiotics against

S.aureus isolated in study group and control group.(Table 2 and Table 3) Overall, colony count was found to be higher in non pregnant women of reproductive age group than pregnant women.

Table 2: Susceptibility pattern of isolated bacteria from pregnant women

Bacteria	Gentamycin	moxifloxacin	ofloxacin	Gatifloxacin	cefazolin	chloramphenicol
CONS (12)	8(66.6%)	10(83.3%)	7(58.3%)	9(75%)	11(91.6%)	12(100%)
α hemolytic streptococci (9)	9(100%)	9(100%)	7(77.7%)	9(100%)	9(100%)	9(100%)
Staphylococcus aureus(5)	2(40%)	1(20%)	1(20%)	1(20%)	4(80%)	5(100%)
Diphteroides (3)	3(100%)	3(100%)	3(100%)	3(100%)	3(100%)	3(100%)
Gram negative bacilli (4)	3(75%)	2(50%)	2(50%)	4(100%)	2(50%)	4(100%)

Table 3: Susceptibility pattern of isolated bacteria from non pregnant women

Bacteria	Gentamycin	moxifloxacin	ofloxacin	Gatifloxacin	cefazolin	chloramphenicol
CONS (10)	7(70%)	7(70%)	5(50%)	8(80%)	10(100%)	8(80%)
α hemolytic streptococci (2)	2(100%)	2(100%)	2(100%)	2(100%)	2(100%)	2(100%)
Staphylococcus aureus(3)	2(66.6%)	2(66.6%)	1(33.3%)	1(33.3%)	2(66.6%)	3(100%)
Diphteroides (9)	8(88.8%)	8(88.8%)	5(55.5%)	8(88.8%)	9(100%)	9(100%)
Gram negative bacilli (4)	2(50%)	2(50%)	4(50%)	2(50%)	4(100%)	4(100%)

DISCUSSION

In this study, the conjunctival flora of pregnant women and non pregnant women were compared. Growth rate of bacteriological flora from conjunctiva of pregnant women was found to be 55% and bacteriological flora from conjunctiva of non pregnant women was comparatively less and accounted for 46%. This is similar to the study conducted previously by Balikoglu *et al*.[3] In their study, there was no statistical difference in the percentage of aerobic culture-positive eyes of reproductive aged (49.1%), pregnant (56.9%) and postmenopausal women (57.7%). Higher rates of bacterial colonization are expected in situations that weaken the immune system such as diabetes, advanced age, and corticosteroid use.[7] The growth rate of conjunctival flora in various immunocompromised conditions was high in studies conducted by previous researchers. Sahin *et al* found 85% positive cultures in immunocompromised patients hospitalized in an intensive care unit.8 Martin *et al* showed that the frequency of positive conjunctival cultures (94%) in patients with diabetes was significantly higher than non-diabetic subjects.9 In our study, Coagulase negative staphylococci was found to the common bacteriological flora in pregnant and non pregnant women. This is in agreement with the study conducted by Balikoglu *et al*.[3]. According to the study conducted by Adam *et al*, Staphylococcus aureus was most common. Coagulase negative staphylococci was the second most common microorganism in the non-diabetic group and the third most common in the diabetic group.10 The pregnant group showed significant difference in frequency of alpha hemolytic streptococci and diptheroides compared to the control group, but the frequency of other isolates were found to be the same in both groups. In the present study, Staphylococcus aureus was found to be the most resistant bacteria. Least susceptibility was noticed against tested fluoroquinolones followed by tested aminoglycoside (gentamycin). No methicillin resistant Staphylococcal strains were reported in the present study. As per the study conducted by Coşkun *et al*, conjunctival isolates of Staphylococcus aureus, 91.1% were sensitive to ofloxacin and 86.6% to ciprofloxacin, while only 8.8% were sensitive to penicillin G; 28.8% of the isolates were methicillin-resistant Staphylococcus aureus and among these cultures, 38.5% showed sensitivity to ofloxacin or ciprofloxacin.11. Another study by Suno *et al*, found a higher prevalence of methicillin-resistant coagulase negative staphylococci in diabetic patients.12. Our study results with respect to susceptibility pattern of bacterial isolates against chloramphenicol were similar to the study conducted by Keshav and Basu.[13]

CONCLUSION

In our study, hormonal changes in pregnant women did not affect the conjunctival flora in comparison to non pregnant women of reproductive age group. Coagulase negative staphylococci was found to be the common bacteria in both groups. Growth pattern of conjunctival flora in non pregnant women appeared to be heavy compared to pregnant women.

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