Original Article

Opthalmology Section

Utility of Donor Rim Culture: A Study in Tertiary Care Hospital Located in Rural Area

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ABSTRACT

Background: Contamination of the donor corneal button before transplantation may result in one of the most serious complications of corneal transplantation, post-operative ocular infection which may result in loss of the eye.

Purpose: Hence, the present study was undertaken to assess the utility of the donor corneoscleral rim culture.

Material and Method: We analysed 60 consecutive penetrating keratoplasties (PK) to determine the frequency of positive donor rim cultures and their relationship with post-operative endophthalmitis.

Result: In the present study, 13.4% corneoscleral rim cultures yielded microorganisms, mostly coagulase negative Staphylococcus (CONS).

Conclusion: To conclude, we must say that donor corneoscleral rim cultures must be done before corneal transplantation to prevent post-operative endophthalmitis, as per antibiotic sensitivity reports.

Key Words: Penetrating Keratoplasty (PK), Donor rim cultures, MK medium

INTRODUCTION

As a highly specialized tissue, the cornea is avascular, refractive and almost unique in its transparency which is greatly dependent on its degree of turgescense and the regularity of the arrangement of its fibrils. It is vulnerable to many potentially adverse influences like infections, inflammations, traumatic conditions and congenital, hereditary, nutritional and metabolic disorders. The exposed anatomical position of the cornea subjects it to exogenous insults and diseases may also attack it from endogenous sources or by spreading from the adjacent structures. According to the WHO definition of blindness, it is estimated that there are currently 45 million individuals worldwide, who are bilaterally blind; of which 6-8 million are blind due to corneal diseases [1]. Approximately 3 million eyes need cornea transplantation [2].

An eye that is blind due to corneal scaring visually remains blind throughout an individual's life. Once corneal opacification occurs, visual rehabilitation becomes possible only by corneal transplantation. In corneal transplantation, the abnormal host tissue is replaced by healthy donor corneal tissue. The technique of corneal grafting was first performed in 1817 by Reisinger in chickens and rabbits. In 1906, Zirm achieved the first successful penetrating corneal graft in humans. Corneal transplantation has become a frequently performed procedure which has been made successful by advances in eye banking, corneal surgery and postoperative treatment.

MATERIAL AND METHODS

This study was conducted at a tertiary referral medical centre. 60 corneal transplantations which were done in the Department of Ophthalmology were included in the study. All the calls for eye donation were attended to and eyes were collected by using all aseptic precautions.

The information about donors had been collected as follows: (a) Name of donor (b) Age / Sex (c) Time since death (d) Cause of death e) Whether the donor had undergone cataract surgery, etc.

The donor's blood was collected to do tests for the Hepatitis B virus, the Hepatitis C virus (HCV) and the Human Immunodeficiency virus (HIV). The eye balls were transported to the eye bank in cold chain and were examined by slit lamp bio microscopy for evaluation of the status of the cornea, the anterior segment evaluation and evaluation of the lens status and by specular microscopy for the endothelial cell count. By slit lamp biomicroscopy, the corneas were examined for any epithelial defects, stromal cloudiness, arcus senilis and folds in the descemet's membrane. On the basis of these examinations, the corneas were graded as excellent, very good, good, fair and unacceptable for transplantation [3]. Under all aseptic precautions, the corneal buttons were prepared and stored in McCarey's and Kaufman's (MK) medium. At the time of surgery (Penetrating Keratoplasty), the donor cornea was trephined and the corneoscleral rim was placed in a dry, sterile container and irrigated with sterile normal saline.

The corneoscleral rims of the donor corneal buttons were cultured on Blood agar and MacConkey's agar for the isolation of bacteria and on Sabouraud's Dextrose Agar (SDA) for the isolation of fungi. The growth on the culture media was identified as per the conventional methods [4]. The antibiotic sensitivity of the microbes was evaluated by the Kirby-Bauer disk diffusion

Organisms	No. of eye balls (%)
Sterile	52 (86.6%)
Coagulase Negative Staph	4 (6.7%)
Coagulase Positive Staph	2 (3.3%)
Pseudomonas aeruginosa	1 (1.7%)
Mixed (Coagulase Positive Staph & E. coli)	1 (1.7%)
Total	60 (100%)

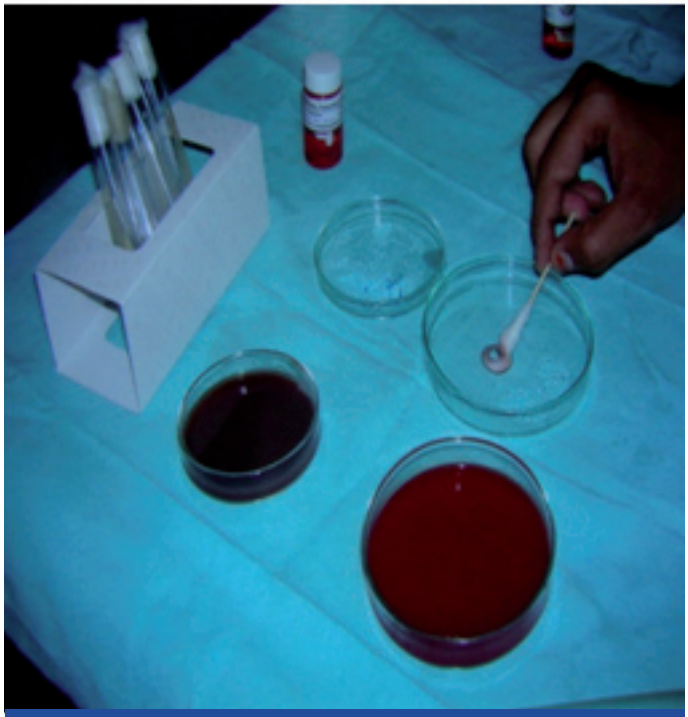
[Table/Fig-1]: Prevalence of microorganisms isolated from Donor Rim Culture (n= 60)

method as per the Clinical Laboratory Standard Institute (CLSI) guidelines on Mueller Hinton agar plates [5].

OBSERVATIONS AND RESULTS

Out of 60 donor rim cultures, 52 (86.6%) corneo-scleral buttons were sterile.

Cultures from the donor rim revealed the presence of microorganisms in 8 (13.4%) eye balls. Coagulase negative Staphylococcus (CONS) was noted in 4 (6.7%) donor rim cultures, coagulase positive Staphylococcus in 2 (3.3%), gram negative bacilli in 1 (1.7%) and mixed growth was noted in 1 (1.7%) donor rim culture. Antibiotics were given to the corneal transplant patients as per the antibiotic susceptibility testing report of the donor rim culture. No Methicillin Resistant Staphylococcus aureus (MRSA) strain was isolated. No fungus was isolated. Endophthalmitis did not develop among the positive donor rim culture isolates. However, endophthalmitis developed in one of the post-penetrating keratoplasty (PK) patients with Pseudomonas aeruginosa within a month, where the corneoscleral rim culture was negative. This Pseudomonas aeruginosa strain was sensitive to Imipenem, Amikacin and Ciprofloxacin but it was resistant to Ceftazidime, Gentamicin and Piperacillin. The patient was treated locally with Ciprofloxacin and Amikacin eye drops along with intravenous Ciprofloxacin and steroids and intravitreal Amikacin and dexamethasone. The patient recovered completely.



[Table/Fig-2]: Donor Rim Culture

[Table/Fig-3]: Corneal button in M.K. Medium

DISCUSSION

Endophthalmitis is a rare but catastrophic complication of any penetrating keratoplasty (PK). Several factors put patients who undergo PK at an increased theoretical risk for endophthalmitis especially large wounds with prolonged exposure to conjunctival flora and donor tissue that may harbour pathogens [3,4,5].

Wilhelmus et al [6] reported 14% positive donor rim cultures, 0.2% of which developed endophthalmitis. The findings of our study correlated well with his findings with 13.4% positive donor rim cultures. Endophthalmitis did not develop in any of the positive donor rim cultures.

Everts et al [7] reported 5.3% corneoscleral rim culture positivity and the organism which was commonly isolated was coagulase-negative Staphylococci (CONS). In our study, we also reported CONS as the commonest isolate (6.7%) amongst the 60 donor rim cultures. Kloess et al [8] reported the isolation of Candida albicans from donor rim cultures but no fungi was isolated in our study.

The isolation of Pseudomonas aeruginosa from patients of endophthalmitis may be due to suture abscess formation or it may have come due to the bacterial access to the anterior chamber which is associated with the loose sutures. Endophthalmitis following corneal transplantation may also be associated with the vitreous wick or it may be followed by the ulcerative process in the graft [9].

CONCLUSION

We hereby conclude that donor rim cultures should be done before undertaking any corneal transplant and that antibiotics should be given to the transplant recipient as per his/her antibiotic sensitivity report rather than giving antibiotics empirically.

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