

ORIGINAL ARTICLE

SEROPREVALENCE OF HIV, HBV AND HCV IN THE DONOR EYES IN THE WESTERN REGIONAL INSTITUTE OF OPHTHALMOLOGY

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ABSTRACT

Introduction: The number of donor corneas procured by eye banks is steadily increasing all over the world. Proper evaluation of donor cornea is critical to the success of cornea transplantation.

Objectives: To study the screening tests required before release of corneal tissue for transplantation.

Methods: Blood samples were collected at the time of enucleation of the eye from 607 consecutive eye donors. The samples were tested for seromarkers of Human Immunodeficiency virus I & II (HIV), Hepatitis C virus (HCV), and Hepatitis B virus (HBV).

Results: In our study seroprevalence of HIV, HBV & HCV viruses in eye donors are 1.31%, 0.49% and 0.49% respectively.

Conclusion: The study proves that it is mandatory to screen the potential cornea donors for HIV, HBV, HCV.

Key words: Eye donors, serology, antibodies to HIV 1&2, HBV and HCV

INTRODUCTION

Organ donation is regulated zealously but when it comes to tissue donation, there is a little oversight. Lack of proper oversight and mandatory guidelines is harmful as human tissue including the cornea can transmit diseases. Keeping this in mind in 1990, Food and Drug Administration (FDA) provided an overall regulatory regime.^{1,2} The number of donor corneas procured by eye banks is steadily increasing all over the world. Safety and validity of donor cornea is an essential prerequisite for successful outcome of cornea transplant procedure.

Though documented evidence of transmission of HIV and HCV infection from sero-positive donor cornea to the recipient does not exist, Hepatitis B virus is known to have been transmitted via corneal tissue. But there is always a risk of transmission of HIV and HCV infection from the infected eye donor. Some also believe that positive syphilis serology correlates with the risk behavior and therefore the syphilis test is a surrogate for the sexually transmitted diseases. It is not mandatory to perform Venereal Disease Research Laboratory (VDRL) for donors of avascular eye tissue.³

We did a retrospective study of the serological tests performed before corneal transplantation at M. & J. Institute of Ophthalmology, western regional tertiary care center, Ahmedabad.

The study covered the period from Nov 2007 to Aug 2011. A total of 607 samples were evaluated.

METHODS

About 3-4 ml of blood was collected by subclavian or internal jugular vein puncture at the time of enucleation of the eye from 607 consecutive eye donors received during the period Nov 2007 to Aug 2011 at M. & J. Institute of Ophthalmology, western regional tertiary care centre, Ahmedabad. Of these donors, 394(65%) were males and 213(35%) were females ranging in all the age groups. The cadaveric blood samples were stored at 2-8 °C and were tested and reported within 12 hours of collection of the eyes. Antibodies to HIV I (against gp120 and gp41) and HIV II (against gp36) were screened by any of the rapid test (immunocomb and tridot), HBV was screened by one step HBV strip test and antibodies to HCV by HCV serum card.

Positive samples were further confirmed by Enzyme Linked Immunosorbent Assay (ELISA).

All the tests were carried out according to the manufacturer's instructions.

RESULTS:

Among the 607 samples, antibodies to HIV were detected in 8 donors (1.31%), HBV was detected in 3 donors (0.49%) , Antibodies to HCV were detected in only 3 donor (0.49%).

All the positive sera were positive for only one virus HIV/HBV/HCV. None of the eye donors appeared to belong to the high risk group based on the history elicited when the eyes were collected. Among the total 1214 eyes from 607 donors in the study period, 28 eyes (2.31%) were rejected due to positive serology for HIV/HBV/HCV.

The rejection due to positive serology amounts to 2.31% (28 corneas from 14 donors)

DISCUSSION:

In our study seroprevalence of HIV, HBV & HCV viruses in eye donors is 1.31% ,0.49% and 0.49% respectively. All the positive sera were positive for only one of the three viruses HIV/HBV/HCV. In a study done at Shankar Netralaya, Chennai the seroprevalence of HIV, HBV & HCV was 0.62%, 3.52% and 1.45%⁷. In another study done by EBAANZ (Eye Bank Association of Australia and New Zealand) the seroprevalence of HIV, HBV & HCV was 0.054%, 0.49% and 0.38%¹, comparable to our study. The seroprevalence of HIV, HBV & HCV viruses in eye donors in the western literature is 0.3-3%, 1.3-2% and 0.22-2.1% respectively.^{4,5,6} These figures are not too different from those obtained in this study. Comparative results are tabulated below.

Table 1: Comparative analysis of seroprevalence of HIV, HBV & HCV

Virus	Shankar Netralaya ⁷ (2004)	EBAANZ ¹ (2009)	Present Study
HIV	0.62%	0.054%	1.31%
HBV	3.52%	0.49%	0.49%
HCV	1.45%	0.38%	0.49%

Although HIV transmission is not reported following corneal transplantation from HIV infected donors, there is enough evidence about its occurrence following transplantation of other organs. We are unable to screen donors who have been recently infected and may not have developed detectable levels of antibody response. Testing for P²⁴ antigen of HIV may detect early HIV infection in the seronegative window, however falsely reactive results may occur in cadaver specimens⁵. Neither the Food and Drug Administration (FDA) nor the Eye Bank Association

of America requires p²⁴ testing of cornea donors. The use of p²⁴ assay in the screening of cornea donors may result in excessive wastage of donor tissue.

HIV positive donors did not seroconvert during a follow up of 3 to 6 years^{5, 8}. HIV has been detected in tears, conjunctiva and cornea of AIDS patients. HIV proviral DNA has been detected in about 86-95% of cornea from HIV I seropositive donors⁹. Hence there is a potential for transmission of HIV through corneal transplantation.

Hepatitis B virus is known to have been transmitted via corneal tissue. HBVc DNA was detected in 6.6% of corneal epithelium and 14.8% of stromal epithelium of seropositive eye donors^{10,11}.

There is a significant risk of transmission of Hepatitis B virus to the enucleator and special precautions are required to be taken to handle Hepatitis virus infected tissue.

HCV RNA has been detected in 34.5% in cornea as well as in the tears and aqueous humor of seropositive patients, hence it is essential to determine the infectious status of the eye donor with the virus^{12,13}. Since Hepatitis C is life threatening, it is mandatory to screen potential cornea donors for HCV prior to transplantation.

Although no reports of transmission of Cytomegalovirus (CMV) from corneal transplantation are known, in one prospective study 9% of corneal transplant recipients demonstrated seroconversion. There is also potential for transmitting Herpes simplex virus, Epstein Barr Virus (EBV), Adeno virus and Rubella virus¹⁰. However at present the risk of transmitting any of these viruses is not considered sufficient to warrant routine screening or contraindication to donor eye procurement. It is not mandatory to perform VDRL for avascular eye tissue.

While standard serological tests are highly sensitive and specific, there can be a potential for viral and antibodies levels to be very low and therefore elude detection.

CONCLUSION

Proper evaluation of donor cornea is critical to the success of cornea transplantation.

Attention must be paid to the cause of death and ocular conditions as several general and ocular diseases constitute contraindication for donor cornea usage.

Negative screening tests are required for HIV (1, 2), HBV and HCV before release of corneal tissue for transplantation by at least two different screening methods.

The western blot to confirm HIV positivity is not a necessity for cadaveric blood^{1, 7}.

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