

Eye Banking: An Overview

Divya Kesarwani*

Department of Ophthalmology, TS Misra Medical College & Hospital, Lucknow, Uttar Pradesh, India.

Abstract

About 25% of the total blindness in India is due to corneal blindness. Eye banks are the institutions responsible for collecting (harvesting) and processing donor corneas and for distributing them to trained corneal graft surgeons.³ It should be registered with the competent authority in the state under the Transplantation of Human Organs Act 1994. With the availability of MK medium and Optisol, eye banks should ideally switch over from enucleation to in situ corneal excision procedures. This will enable better viability of donated corneas during storage. Structurally, it has administrative and medical components. Functionally, *the administrative section* is responsible for public awareness programs, liaison with government, local voluntary and other health care agencies and fundraising. *The medical section* deals with the entire technical operation of the eye bank. Basically, the eye banking system has a *three-tier* approach. The different constituents are eye donation centers, eye banks and eye banking training centers. All of them have to be integrated. Networking of eye banks under the umbrella of a national organization allows better attempts at public education programs, an institution of newer eye banking procedures, and training programs. India needs 50 eye banks, five of which will also be eye banking training centers, 2000 eye donation centers, Cornea Retrieval Programmes in 500 hospitals and 1000 corneal specialists to make a real impact on the problem of this reversible form of corneal blindness. Let all of us involved in the fight against corneal blindness work together for a national goal.

Keywords: Eye bank, Cornea blindness.

INTRODUCTION

According to Indian Council of Medical Research (ICMR) study on blindness, about 25% of the total blind in India are blind due to corneal blindness. Out of these 2.5 million blind people, even if or so 1 million are blind by a curable corneal disease, we require really a large number of people to donate their eyes if we want to effectively take care of these patients.¹

Thus, the slogan for curing corneal blindness should be “*We must procure through donor’s eyes excellent corneas, and we must have adequately trained cornea surgeons*”. To motivate people for eye donations, a fortnight has been observed every year from 25th August to 8th September since 1986.

Of all the organ transplants, corneal transplantation is unique since it is easy to harvest from the donor, it can be done anywhere and does not require specialized facilities such as a sterile theatre, the equipment needed is minimal and an

MBBS doctor can be trained to harvest the donor material in a scientific way.

With the availability of advanced storage media, it is possible to store the cornea. Thus, transplantation need not be done anymore as an emergency procedure but can be elective. Advances in modern medicine, such as improved surgical techniques, operating with microscopes, improved sutures and advances in eye banking, have sparked a turnaround in the success rate of corneal transplants, making it among the most successful organ transplants.

Address for correspondence: Divya Kesarwani,

Department of Ophthalmology, TS Misra Medical College & Hospital, Lucknow, Uttar Pradesh, India.

E-mail: kesarwani.divya@gmail.com

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Magnitude of the Problem

- 1.3 million corneal blinds in India, mostly children and young adults.
- Current Collection: 22000
- Current Requirement: 100,000 corneas
- There is a vast gap between demand and supply.

History

Ever since the first “successful” human-to-human corneal transplant was done in 1903 in Czechoslovakia to visually rehabilitate a patient with alkali burn, the technique of corneal transplantation underwent various changes and transformed into clinically acceptable procedures for corneal blindness.

In 1935, Fillatov, a Russian ophthalmologist considered to be the father of keratoplasty, performed the surgery by utilizing a human donor cornea from an eyeball stored in a moist chamber at 4 deg.

In response to a demand for human corneal tissue by an increasing number of ophthalmologists, in 1944, the first eye bank was founded in New York City by two physicians, Dr. Townley Paton and Dr. John MacLean.² Since then eye banking movement has spread worldwide.

1945: The first eye bank in INDIA was established at RIO, Madras

1948: Dr. Mohan Lal established an eye bank in Gandhi Eye Hospital, Aligarh

1960: First successful corneal transplant was performed by Dr. R. P. Dhanda and Dr. Kalevar

1965: The first motivational work in Eye Banking was done by Mr G Mazumdar in Gujarat, Dholka.

1989: The Eye Bank Association of India (EBAI) was established.

1999: Medical Standards of Eye Banking in India

Concept

An eye bank is not for profit community organization governed by a Board of Directors or Trustees constituted by community representatives, which deals with the collection, storage and distribution of the donor’s eye for the purpose of corneal grafting and research and supply of eye tissues for other ophthalmic purposes. It also deals with activities related to community awareness and motivation for eye donation.

Organisation and Setup of an Ideal Eye Bank

Eye banks are the institutions responsible for collecting (harvesting) and processing donor corneas and for distributing them to trained corneal graft surgeons.³

It should be registered with the competent authority in the state under the “Transplantation of Human Organs Act 1994 (THOA)” and strictly adhered to related notifications and guidelines on health institutions issued by regulatory and civic agencies. It should ideally be located within or near a hospital complex and for long-term sustainability, should be attached to 4-5 eye donation centers.

Structurally, it has administrative and medical components. The entire operation is supervised by a Medical Director,

who is usually a well-qualified corneal surgeon assisted by an Administrator and other staff on the administrative aspects and trained technicians on the medical issues. Functionally, *the administrative section* is responsible for public awareness programs, liaison with government, local voluntary and other health care agencies and fundraising. *The medical section* deals with the entire technical operation of the eye bank. Tissue harvesting, tissue evaluation, tissue preservation and tissue distribution represent these activities. Each of these should be carried out following medical standards of the highest quality. Any deviation from accepted medical standards can result in devastating complications. By definition, only organizations with the above structure and functions are “Eye Banks,” and all others are mere “Cornea Collection Centres”.³

Basically, the eye banking system has a *three-tier* approach. The different constituents are eye donation centers, eye banks and eye banking training centers. All of them have to be integrated. They will not be effective alone.⁴

Eye Donation Centers

should

- Be affiliated with a registered eye bank
- Conducts public awareness programs
- Coordinates between donor families & hospitals
- Retrieves corneal tissue and blood for serology
- Safe transportation of the tissues to the parent eye bank.

An eye bank should have

- 24 x7 service
- Public awareness and education
- The link between donor family & hospital
- Retrieval, evaluation, and processing of corneal tissue
- Distribution, safe transport, and documentation.

Eye Bank Training Centers

- All activities of an eye bank and
- Training of eye bank personnel at all levels
- Hospital cornea retrieval programs, of late, have yielded very good results. Under this program, the eye bank has to select hospitals with ICU/ICCU, solicit their involvement, give them orientation and motivate their key staff and grief counselors.

Eye Bank Support System

All eye banks should be part of a nationwide network to facilitate optimal utilization of all corneas found suitable for corneal transplantation. Networking of eye banks under the umbrella of a national organization allows better attempts at public education programs, an institution of newer eye banking procedures and training programs and the development of uniform medical standards at significant cost savings for individual eye banks.

- Ministry of Health, Government of India.
- State government
- Rotary/Lions organizations
- EBAI

- Orbis
- NGO, others.

Eye Bank Legal Implications

- Consent is mandatory
- Transplantation of Human Organs Act (1994)
- Required Request Law
- Presumed Consent Law

Eye Bank Preservative Medium

- Short Term (48 hours) → moist chamber
- Intermediate-Term (4 day) → McCarey Kaufman medium-
K- sol medium
Dexsol medium
- 7 days → Optisol medium
- Long-term storage → Organ Culture and Cryopreservation.

The sclera should be preserved in glycerine. With the availability of MK medium and Optisol, eye banks should ideally switch over from enucleation to in situ corneal excision procedures. This will enable better viability of donated corneas during storage. With increased resistance to the antibiotics used in preservation media, the inclusion of alternative antibiotics must be considered.⁵

Role Model of Eye Bank India

Though there are 171 eye banks spread over 17 States and Union Territories, only 51 are actually functional.

- 5 Training Centers
- 50 Eye Banks

- 4000 corneas per eye bank per year
- 40 Eye Collection Centers per eye bank (2000)
- 1000 trained Cornea Specialists⁶

Science and modern technology have made vision restoration after corneal transplantation an absolute reality. Our eye surgeons and technicians are fast acquiring the skills. If this technological advancement is ably supported by committed campaigners in different parts of the country, eye banking will soon become a success story in every state of our country. Soon, there will be a day when the common man says, “Do not bury; Do not burn; Donate Eyes” – Those immortal eyes.

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