

Emerging frontiers in corneal transplantation and keratoplasty

Corneal transplantation is not a mere academic firmament exclusive to finesse and deftness of a few ophthalmologists the world over. It has in fact wide humanistic implications touching upon a host of issues, enmeshed into the mire of invaluable eye donation, though the latter is quite disproportionate to the required quantum.

At a time when fetching even a single donor eye is extremely difficult, the graft failures due to reasons beyond the surgeon's control could worse confound the whole critical exercise. In fact corneal transplantation failures are often alarming to reckon with considering the complexity of issues it harbours. Some of these issues were hotly debated at a recent National Workshop on Corneal Transplantation held under the auspices of the L. V. Prasad Eye Institute (LVPEI), a premier eye research institute in Hyderabad (on 25 and 26 September 1993).

Some of the problems swathing the surgeons, the Workshop pointed out, were mind-boggling and baffling, and suitable strategies concerning the donor eye preservation, donor selection, corneal grafting in case of children where both eyes are infected, pre- and post-operative eye care, preservation of donor tissues and graft failures were, chiefly among others, deliberated upon for arriving at a consensus.

Donor selection and eye preservation

Donor selection is of immense significance in eye bank operations and corneal surgeries. Unless the donor is subjected to a series of tests for transplant worthiness, one's eyes are of no consequence to corneal grafting. The upper age limit for a donor could be around

75 years, pointed out Vinay Agarwal one of the speakers at the conference. In fact the upper and lower age limits of the donor for eye donation are yet matters of controversy for quite some time among eye surgeons. Similarly some screening tests employed to know the transplant worthiness must invariably include microbiological, hepatic and HIV testing; more so in the light of current breakout of AIDS on extensive measure in India and for that matter in the entire South East Asia. Besides, obtaining healthy eye tissues from donor should inevitably follow rigorous screening processes, negating which will result in rejection of graft causing unnecessary suffering to the recipient and fatigue to the doctor.

G. N. Rao the Director of LVPEI told the attending community of doctors that in many instances graft failures even abroad were largely due to infections and unsuitable donor tissues. The speakers at the conference expressed dismay over the existing inadequate screening procedures followed at many eye bank centres across the country, as it also entailed the majority of rejections and failures of corneal transplantation. Some of the eye banks or eye surgery centres do not even employ advanced methods like slit lamp examinations, or specular biomicroscopy, both of which are important in scrupulous elimination of unmatching donor eyes or tissues, the Workshop observed.

The preservation of donor eyes has a critical role in translating the very idea of eliminating blindness on which the pillars of corneal transplantation have been erected. The optisol medium, presently used in some of the reputed institutes like LVPEI is not accessible to many for the eye preservation in India compared to Viaspan or the UW-CSS (University of Wisconsin Cold Storage System). Also the Pentastarch medium

available abroad has proved to be not only expensive but does not provide a fool-proof protection from contamination. Similarly the existing methods of eye preservation such as moist chamber and MK medium applied by the eye banks across the country are not commensurate with the low donation process and staggering corneal eye transplantations. Both the cryopreservation method, in which eyes could be preserved indefinitely at -160°C and Doughman's media—in which eyes could be preserved at 37°C for 34 days—are beset with their own laboratory and experimental problems, the surgeons participating in the workshop expressed concern. Apparently the media problem for a long lasting preservation on donor's eyes free from contamination proved a far outcry with no solution in sight immediately, said Mallika, a fellow doctor from AIIMS, New Delhi. However, G. N. Rao of LVPEI assured the surgeons about making MK media available to all eye bank centres in India from January 1994 on a commercial basis. Several eye centres in India at present import the MK medium against heavy constraints of foreign exchange.

Despite best efforts by the doctors and staff involved in this delicate exercise having wide humanistic overtones, the process of screening and preservation of donor eyes often attracts contaminations, frustrating the whole effort of successful corneal transplantation. Out of 40 eyes collected by the Arvind Eye Hospital, Madurai, about 13% were reported to be fungal contaminated, reported M. Srinivasan. Similarly J. S. Saini elaborated the contamination levels of various donations at PGI Chandigarh.

The elimination of infection from donor eyes could not be more than 50–60% and contamination level after subjecting the donor eyes to various screening

process is still as high as 10–20%, reported J. S. Saini. The distressing scenario of donor eye infections, in the pre- and post-operative care and the attending imponderable course of treatment methods, have really confounded a majority of graft failures, doctors attending the Workshop added. Further the post-operative eye infection was traced to donor eye rim infections in certain instances, though some doctors were of the view that donor tissue or donor rim infections did not actually have any telling effect on post-operative infections. However Madhukar Reddy from LVPEI categorically subscribed to the idea that the donor eye rim infection had indeed a critical role in the post-operative eye infection.

Bilateral eye surgeries in children and graft failures

Several problems relating to the need and timing of second transplantation in a child with bilateral corneal disease (both eyes infected to a dangerous degree) have remained by and large unresolved as of now, pointed out Satish Gupta of LVPEI. In respect of children below 3 years having both eyes infected by corneal disease, the surgeons are not yet sure about which eye they have to begin with for surgery. For, if surgery is performed in both eyes simultaneously, the graft failure in one eye may entail the failure on the other eye, thus rendering the whole exercise futile. On the other hand, if the other eye is ignored it might develop amblyopia and permanently drift to condemnation. Thus the crux of the problem that now remains is how soon should a surgeon operate upon the second eye after the first eye operation in a child. This is indeed a problem with wide implication

staking the vision of the child about which an eye surgeon is as much helpless as is the child. In fact the annual graft failures in children are around 60% despite doctors' best efforts to do justice to every child. Besides, there are several other problems concerning the rapport that should exist between the doctor and the child where the latter is below 3 years.

There was an attempt to define the graft failures in children taking various age levels of child into consideration and by setting a clearcut definition of a child (in respect of a non-cooperative child). Satish Gupta and J. S. Saini highlighted the problems encountered in eye transplantation in children.

The Workshop conceded that the therapeutic treatment of penetrating keratoplasty includes keratoplasty done for corneal infections and recommended steroid administration to patients with post-operative eye infection on a careful observation for a couple of weeks. Besides, several important dimensions of keratoplasty, both therapeutic and surgical, have been subject to hot debate during the Workshop with a consensus still eluding.

On the whole, the Workshop is seen as an attempt to resolve some of the existing controversies shrouding corneal eye transplantation, sharing of some of the expertise available among surgeons from different parts of the country and evolving new strategies to combat the problems confronting eye surgeons.

Automated lamellar keratoplasty: A new technique to curtail myopia

Today myopia could be curtailed and corrected up to 25 diopters with an innovative surgical method, developed by

J. Charles Casebeer of the Refractive Surgery Centre of Arizona, USA, who came to India to conduct a course on 'Refractive Surgery' under the aegis of LVPEI. This was another Workshop held on 10 and 11 October 1993, immediately after the earlier Workshop.

Refractive surgery is employed to reduce the refractive error of eye and radial keratotomy achieves this by laying incisions over the cornea. J. Charles Casebeer, an authority on this sub-speciality of ophthalmology, personally demonstrated his novel technique to a hundred and odd eminent eye surgeons, who had come to attend a two-day Workshop from different parts of the country. In addition to displaying radial keratotomy with the aid of audio-visuals, he had also deftly performed live surgeries to the benefit of deserving patients. He exhibited at the Workshop a diamond knife designed by him for radial keratotomy and assured its application as more effective and viable than the existing instruments in theatre operations. The surgical technique that Casebeer applied is called 'automated lamellar keratoplasty' and he claimed that it would correct myopia up to 25 diopters, while radial keratotomy successfully improved the vision only up to 8 diopters. He also said that these techniques could be supplanted to correct hyper-metropia. The two-day Workshop was earlier inaugurated by Gullpalli N. Rao, Director of LVPEI, and the other prominent surgeons who joined Charles Casebeer in conducting the Workshop and deliberations included Stephen G. Phillips, Robert L. Mohanty, Aashish K Bansal, Surender Basti and Vinay Agarwal.

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CORRESPONDENCE

Kalinga awardees — An analysis

The Kalinga Prize for the popularization of science is a national initiative of global character for international cause. Established by UNESCO in 1951, it is an annual award of £ 1000 based on a grant to UNESCO from B. Patnaik, of the state of Orissa, India, the founder and President

of the Kalinga Foundation Trust.

During the period 1952–93, 48 personalities from 18 countries received this honour (Table 1). UK, USA and France accounted for almost half the share (Table 2) with UK topping the tally with ten awardces (20.83%). On two occasions

(1973 and 1975), this Prize was *not* awarded and two awardees shared this honour on eight occasions.

Five countries including India have won this acclaim twice. After a gap of 28 years, an Indian scientist Narender K. Sehgal, Joint-Adviser, National Council