

Commentary: Four in one: Four recipients with a single donor tissue – A novel concept for eye transplantation surgery post-COVID-19

Ever since the first by Zirm (1905), corneal transplantation has gracefully evolved into a safe and effective vision-restoring procedure. Better understanding of the unique lamellar arrangement, the metabolic milieu and an advantageous immune privilege have enabled keratoplasty to rank among the most successful of organ transplants.

If it ain't broke, don't fix it. Corneal conditions like dystrophies affect specific layers; the other layers remaining clear. In this context, it seems logical and pertinent to perform a customized keratoplasty, replacing only the diseased lamellae of the recipient cornea, rather than the entire thickness. Moreover, lamellar keratoplasty does away with the serious complications of open globe procedures inherent to penetrating keratoplasty. The common anterior lamellar procedures include deep anterior lamellar keratoplasty (DALK) and the posterior lamellar procedures include Descemet's membrane endothelial keratoplasty (DMEK) and Descemet's stripping endothelial keratoplasty.

Generally, one donor cornea is used for one procedure. However, planned and careful splitting of anterior and posterior lamellae has enabled one donor cornea to be utilized in two recipients enabling complete utilization of the corneal tissue.^[1,2]

The housing of the corneal stem cells at the limbus adds to the utilization potential of the donor corneoscleral button. Surgeons have reported successful use of one donor corneal button in three recipients by performing three customized component procedures: anterior and posterior lamellar keratoplasty as well as stem cell transplantation.^[3]

Working on the dictum "the more, the merrier," in the article "Four in one: four recipients with a single donor tissue – a novel concept for eye transplantation surgery post covid-19 'COVID-related challenges'," Siddharthan *et al.* report to have further maximized the utilization of one donor corneoscleral button for four recipients.^[4] The recipients were clustered on

the basis of indications, and customized procedures were performed to use the various components of the corneoscleral button. In addition to clustering DALK, DMEK, and limbal stem cells transplantation which has been reported previously, the authors report the utilization of the sclera of the same donor eye to treat a leaking trabeculectomy filtering bleb in the fourth beneficiary. This appears to have maximal utility of the donor tissue for the four clustered beneficiaries.

In addition, the authors report that they could adopt simple manual dissection techniques to achieve the same, indicating that optimal utilization of the donor corneoscleral button is possible in centers without sophisticated and expensive machines and is cost-effective. Given the imbalance between demand and supply in India, the importance of timely and optimal utilization of available resources in a cost-effective manner cannot be overemphasized.

However, successful clustered component surgeries on multiple recipients requires preparedness, logistics to initiate a well-coordinated rapid response on the arrival/receipt of the donor eye, listing, and mobilizing the waiting patients in clusters, based on component requirement, and dedicated surgical teams to perform the surgeries sequentially without losing time and with precision without losing the precious donor tissue.

The status of eye donation in India (pre-COVID-19) has been slow paced with a shortfall of donors. To add salt to the injury, not all donor eyes are suitable for transplantation. Therefore, eye banks have always been starved for cadaveric eyes.

In view of the current pandemic situation, the Ministry of Health and Family Welfare, Government of India in its "guidelines on safe ophthalmology practices in COVID-19 scenario" published on August 19, 2020 has imposed restriction on the retrieval of cadaveric eyes either from homes or hospitals, from COVID-19 suspects or confirmed cases.^[5] The Eye Bank Association of America has imposed restrictions on cadaveric eye donations and considers COVID-19 positive, suspects, close contacts, and untested cases as "not eligible" for eye donation.^[6] Several other viral infections like human immunodeficiency virus, cytomegalovirus, hepatitis B virus, hepatitis C virus, and rabies are considered contraindications for eye donations. It is not clear whether SARS CoV2 will be included in the list too and this will depend on the evidence gathered in due course of time. With the conservative approach of the advisory bodies, and in view of possible transmission of SARS-CoV2 to the corneal recipients or to individuals handling the tissues, eye

donations are likely to become less frequent, impacting the most vital resource for corneal transplantation – “the donor pool.”

Apportioning and optimal utilization of resources will play a critical role in bridging the gap between the needs and demands of the hour. The COVID-19 pandemic has forced agencies, at global and local level, to rethink strategies like sharing of critical resources including ventilators while treating large numbers of critically ill patients.^[7,8] Similarly, in a resource-starved setting, in a low- and middle-income country like India, especially in the COVID-19 scenario, applying utilitarian principles to maximize benefits through clustered component transplantation is always a welcome move. Innovations like these may help mitigate the demand–supply discord.

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