KERATOPROSTHESIS
Current options bring success and help identify areas for further research
by Cheryl Guttman-Krader in Vienna

Cornea specialists contemplating the current state of keratoprosthesis (KP) surgery are encouraged by recent progress and optimistic about the future. However, they are realistic in recognizing that multiple challenges must be overcome before KP surgery successfully fills the gap left by cadaveric keratoplasty in alleviating the worldwide burden of corneal blindness.

Speaking at the 2nd Eucornea Congress, Donald Tan MD, medical director, Singapore National Eye Centre, and professor of ophthalmology, National University of Singapore, said there are now two options that have shown good success in different indications representing the least and most challenging KP candidates. The first is the Type I Boston KPro (Massachusetts Eye and Ear Infirmary, Boston, MA) for eyes with failed or high risk grafts without chemical burns or autoimmune disease. The second is the osteo-odontal KPro (OOKP) for those with end-stage ocular surface disease.

"While essentially yesterday's designs, these two most successful KPs continue to surprise us with results that are encouraging and even improving," said Dr Tan. However, moving forward in the field will depend on success in solving the complications occurring with today's devices, the development of new options, and promoting interest in KP surgery among cornea specialists and within industry.

Providing his perspectives on the future of KP surgery, Dr Tan noted that while the Boston Type I KPro was once relegated to last resort status for patients with multiple failed grafts, it is now being considered as a reasonable first-line treatment in some situations, and with growing international interest in this device and broadening of its indications, especially in developing countries, there is a great push to improve outcomes, simplify and improve postoperative management, and discover ways to increase cost effectiveness.

Ongoing studies investigating immunomodulators and inflammation pathways may help expand the indications for the Type I Boston KPro. However, in terms of increasing its global use, challenges remain in replicating the successes being achieved in the US, particularly in developing countries where need for KPs is greatest but where conditions of poor hygiene and sanitation compromise success.

Dr Tan noted that modifications in topical antibiotic prophylaxis protocols have reduced the risk of infectious endophthalmitis in eyes with the Type I Boston KPro. However, there is concern over lifelong antimicrobial use coupled with bandage contact lens wear, especially in pediatric patients. In addition, the development of secondary fungal infections is an emerging issue and a risk that is particularly high in certain Asian countries.

Discussing the OOKP, Dr Tan said that the bizarre and complex nature of the procedure poses hurdles to its growth. "The OOKP optical cylinder costs no more than a non-premium IOL, and manpower and surgical time, which account for the greatest cost of this procedure, are cheap in developing countries. Still, failure for the greatest cost of this procedure, are cheap in developing countries. Still, failure with OOKP is unforgiving," Dr Tan said.

In addition to the need for research to develop new KPs, evidence is needed that can help guide understanding of the relative roles of corneal transplantation, ocular surface transplantation, and KP surgery, as well as how these techniques might be used in combination. This research should aim to collect long-term follow-up data and while heretofore unheard of, perhaps even involve randomised controlled trials, said Dr Tan.

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The AlphaCor (Addition Technology) is probably indicated, according to Dr Grabner.

If the patient’s disease is unilateral and the eye is dry, there is currently no good option, but fortunately this is a very rare situation. PK with immunosuppression is again the best choice if there is bilateral disease with sufficient wetting and stem cells. In a bilateral case with sufficient surface transplantation, and KP surgery, as well as how these techniques might be used in combination. This research should aim to collect long-term follow-up data and while heretofore unheard of, perhaps even involve randomised controlled trials, said Dr Tan.

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