

## Commentary: SLET - A paradigm shift in limbal transplantation

This issue of the journal carries a comprehensive review of simple limbal epithelial transplantation (SLET).<sup>[1]</sup> The authors have made a conscious effort to address potential questions that may arise in the minds of surgeons learning this novel surgical technique. A careful perusal of this review ought to leave the reader satiated with the knowledge that they know pretty much all there is to know about SLET, as of now. Starting with the basics of limbal stem cell deficiency (LSCD) and the history of limbal transplantation techniques, the review goes on to describe the indications, contraindications, surgical technique, mechanism of action, outcomes, complications, limitations, and impact of SLET.

Excellent descriptions of the surgical technique of SLET, as well as documentation of clinical outcomes are already available.<sup>[2-4]</sup> Despite this, there are quite a few compelling reasons to read this review. A classification of potential cases for SLET into different prognostic categories, based on clinical features in the recipient eye, has been described for the first time. This would greatly simplify clinical decision making and case selection for surgeons. Preoperative measures including patient counseling, steps of surgery, and postoperative management have been described in detail. This includes protocols for systemic immunomodulatory therapy in cases of allogeneic SLET. Common complications, their causes and measures for prevention and management have been lucidly summarized. Outcomes of allogeneic SLET in a relatively large case series—another first, would interest even experienced surgeons. Overall, one can unstintingly recommend this review as a single point of reference for residents, fellows, comprehensive ophthalmologists, and cornea specialists alike.

In the larger context, this review provides an opportunity for us to reflect on the impact that SLET has had on the field of LSCD and limbal transplantation. The understanding of the pathogenesis of LSCD evolved during the last few decades of the 20<sup>th</sup> century, leading to its eventual recognition as a distinct clinical entity. With this dawned the realization that transplantation of healthy limbal tissue was the key to

successful management of eyes with LSCD. Direct limbal transplantation had very good clinical outcomes, with the caveat that a large amount of limbal tissue was required, thereby placing the donor eye at a risk of iatrogenic LSCD.<sup>[5]</sup> This risk was mitigated by the sophisticated technique of cultivated limbal epithelial transplantation (CLET), which used a small amount of limbus to grow a sheet of corneal epithelium that could subsequently be transplanted onto the recipient eye.<sup>[6]</sup> Wherever appropriate laboratory facilities were available, CLET became the technique of choice for treating LSCD, providing excellent clinical results.<sup>[7]</sup> However, the requirement of facilities for *in vitro* expansion of cells and the associated costs restricted the availability of CLET to a few centers across the world.

The advent of SLET combined the simplicity, cost-effectiveness, and wide reach of direct limbal transplantation with the donor eye safety assured by CLET. In a single stroke, this brought down multiple barriers challenging patients and doctors when confronted with severe LSCD. Surgeons with the appropriate skills and training could now manage patients with LSCD regardless of their practice setting, with logistical requirements reduced to a bare minimum. Likewise, patients with this complex eye problem no longer needed to make the pilgrimage to distant tertiary care centers with sophisticated laboratory facilities; they could access this surgical therapy practically at their doorstep, without any compromise on clinical efficacy or safety. This fact alone is sufficient to assign SLET with the label of a paradigm shift—commonly defined as a fundamental change in the basic concepts and experimental practices of a scientific discipline.<sup>[8]</sup> Unlike incremental improvements to a therapeutic modality, the impact of SLET is more radical. SLET has revolutionized the field of limbal transplantation by making it accessible to everyone, everywhere. The efficacy, safety, consistency, reliability, and replicability of SLET have been demonstrated by groups across different countries.<sup>[3]</sup> In the few years since Sangwan *et al.* published the first description of SLET, it has become the technique of choice for limbal transplantation—not just in India, but across continents.

We must also consider the fact that SLET has opened up new vistas of thinking in the field of regenerative medicine for the eye, by shattering the dogma that cell-based therapy

requires expansion and growth of cells in a petri dish in a sophisticated laboratory environment. The concept of *in vivo* expansion and proliferation of cells from a stem cell source—conclusively demonstrated by SLET—may inspire clinicians and researchers to replicate this idea for solving other problems. The elegant science behind SLET, the democratizing effect it has had in taking limbal transplantation to the masses, and the overall impact on advancing the entire field of regenerative medicine should alleviate all doubt that what we have witnessed is not an evolutionary step but a revolution—a true paradigm shift. It is entirely appropriate that a high-quality review summarizing multiple aspects of SLET—a defining contribution of Indian ophthalmology to the world—is being published in the Indian Journal of Ophthalmology.

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