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Limbal Stem Cells Restore Sight After Ocular Burns

NEW YORK (Reuters Health) Jun 23 - In 112 patients with burn-related corneal destruction, Italian researchers report a success rate over 75% in restoring transparent epithelium with autologous limbal stem cell transplants.

Twenty-seven patients eventually recovered visual acuity of at least 0.6 (roughly 20/35); most of the others recovered at least some vision.

In 1995, Dr. Graziella Pellegrini and Dr. Michele De Luca pioneered this procedure, in which a 1-2 mm2 specimen is taken from the limbus (the narrow zone between the cornea and the bulbar conjunctiva) and cultured on fibrin and feeder cells.

The two researchers, both at the Center for Regenerative Medicine Stefano Ferrari in Modena, and colleagues now report on 112 patients (ages 14 to 80) who received 125 stem cell transplants in 113 eyes between 1998 and 2007. In 88.5% of the eyes, the best corrected visual acuity at baseline was no better than counting fingers. The mean time since the original injury was 18.3 years, and most of the eyes (84%) had failed previous surgical treatment.

They report their results online June 23 in the New England Journal of Medicine.

Outcomes for 82 of 107 eyes in the final analysis (76.6%) were deemed a success, defined as absence of symptoms (including burning, pain, and photophobia) and restoration of a transparent, avascular, and stable cornea surface. All these grafts remained stable during a mean follow-up of 2.91 years (maximum 10 years).

Results in 14 eyes (13.1%) were partially successful, with recurrent superficial neovascularization. Eleven eyes remained symptomatic and had recurrent epithelial defects, pannus, and inflammation at one year and were classified as failures. But during follow-up, the eyes that were failures did not become any worse than they were at baseline.

On multivariate analysis, treatment failure was significantly associated with the original degree of damage, and with culturing, graft-transport and postoperative complications.

The authors note that only patients with undamaged corneal stroma regained normal vision. So a year or two after stem-cell grafting, they performed corneal transplant or laser surgery in 46 patients, all of whom had at least partial vision recovery.

"Cultures of limbal stem cells thus represent a source of cells for transplantation in the treatment of burn-induced destruction of the human cornea," they conclude.

Eye burns, one of the most common eye emergencies worldwide, represent 7-18% of eye trauma cases in U.S. emergency departments, with 84% caused by chemicals and 16% by heat.

Limbal stem-cell transplants are approved in the U.S., Japan, Italy and South Korea.

http://content.nejm.org/cgi/content/full/NEJMoa0905955

N Engl J Med 2010.