Amniotic membrane transplantation has many advantages

by Dermot McGrath in Crete

The use of amniotic membrane can enhance the outcomes of pterygium, conjunctivochalasis and other ocular surface surgical procedures, according to Christos Kalogeropoulos MD.

"Amniotic membrane transplantation has many advantages. It enhances the re-epithelialisation of the ocular surface, thanks to its anti-inflammatory, anti-scarring and anti-neovascular properties. It increases the apoptotic death rate of inflammatory cells, acts as a tectum of the underlying tissues and facilitates the migration and differentiation of epithelial cells. Furthermore, amniotic membrane rejection is extremely rare," Dr Kalogeropoulos told delegates attending the Aegean Cornea X meeting.

Prior to amniotic membrane transplantation, chronic ocular surface disorders were often deemed untreatable.

Dr Kalogeropoulos’ study set out to evaluate the contribution of amniotic membrane transplantation in terms of the anatomic integrity and function of the eye in pathological conditions of the ocular surface.

The procedure was performed on 66 eyes of 63 patients ranging from 35 to 82 years for the treatment of ocular surface disorders, including corneal ulcers/perforation, persistent defects of the corneal epithelium, bullous keratopathy, chemical burns, conjunctivochalasis, pterygium surgery, and ocular surface tumours.

In the first 35 eyes a “homemade” amniotic graft was used, following which custom-made delivery systems for the amniotic membrane such as Ambiodry, Amniograft “F” version and ProKera were used.

The results showed a success rate of 97 per cent, said Dr Kalogeropoulos, who said that the procedure is a very effective and safe technique for treating debilitating ocular surface disorders.

In a separate presentation, Marie-Jose Tassignon MD, PhD, FEOB described how a team at Antwerp University Hospital has developed a standardised, xenogenic-free protocol for the manufacture of limbal epithelial stem cell grafts and a “no touch” surgical technique for its standardised transplantation.

Discussing the aetiology of limbal stem cell deficiency (LSCD), Prof Tassignon said that conditions with abnormalities of ocular surface repair include pterygium, limbal tumours, aniridia, severe scarring following burns, cicatricial pemphigoid and Stevens-Johnson Syndrome, contact lens induced keratopathy, ultraviolet and ionising radiation, multiple surgeries, anti-metabolites and extensive microbial infections.

In terms of diagnosis, Prof Tassignon said that clinical signs to look for included epithelial haze, persistent epithelial defects, superficial subepithelial vascularisation, epithelial and stromal inflammation, late fluorescein staining, and loss of limbal palisades of Vogt. The clinical diagnosis also involves impression cytology of the corneal cells, with CK19-positive cells considered an expression of limbal cell deficiency.

Prof Tassignon explained that the limbo-amnion composite graft is generated by cultivating limbal epithelial stem cells onto a standardised amniotic membrane stretched within an interlockable amnion ring. The cells are cultured in CnT-20 medium with the addition of one per cent human AB serum for a period of two weeks, which is usually adequate time for sufficient outgrowth of the cells to permit transplantation.

To place the amniotic membrane graft, the surgeon first performs a 360-degree conjunctival peritomy and carefully prepares the recipient bed, removing all proliferative tissue. Fibrin glue is applied to the surgically prepared recipient’s cornea and in one fluid motion the composite graft within the amnion ring construct is transferred from culture and positioned onto the graft bed.

The required size is cut out at the level of the limbus by means of a trephine or microsurgical scissors. A protective layer of Healon and a second amniotic membrane patch is then positioned in order to protect the primary graft. To finish the procedure, the second membrane is tucked under the conjunctiva, sutured at four cardinal points and then covered with a bandage contact lens.

Prof Tassignon said that specialist computer software has enabled the research team to confirm the reduction in corneal vascularisation after the amniotic membrane transplantation. “We can see over time if the eye remains quiet with no recurrence of vascularisation we may then consider the eye ready for penetrating keratoplasty,” she said.