

Monday, 8 April 2013

SYDNEY EYE HOSPITAL AND LIONS NSW EYE BANK DEVELOP NEW CORNEAL STORAGE TECHNIQUE - ELIMINATING WAITING LIST FOR CORNEAL TRANSPLANTATION

Sydney/Sydney Eye Hospital and the Lions NSW Eye Bank have introduced a corneal storage technique - Organ Culture Storage - which significantly increases the potential donor pool and the storage time for donated corneas to be used for transplantation for up to 28 days - compared to six days with traditional cold storage.

Stored in an incubator at 34 degrees Celsius, organ culture corneas can be stored at a temperature close to the physiological temperature of the human body, and have resulted in a 47% increase in corneal transplants - effectively eliminating the waiting list for corneal transplantation.

Professor Gerard Sutton, Corneal and Refractive Surgery Specialist, Sydney/Sydney Eye Hospital and Acting Medical Director of the Lions NSW Eye Bank, said the advantages of using organ culture are significant and manifold.

"In 2005, the waiting time for a corneal transplant in NSW was two years. With the introduction of this technology we can now schedule patients for corneal transplantation within three months," Professor Sutton said.

"Through the higher temperature used in organ culture, metabolism of the cells are maintained and provide the corneal tissue with a complex mixture of amino acids and growth factor which enables it to repair damaged cells and maintain its normal function.

"In cold storage, low temperatures and the presence of antibiotics can make it difficult to detect any bacteria that may be present in the tissue, as most bacteria will not grow under these conditions. However, the 34 degree Celsius storage and additional microbiological testing of the Organ Culture Storage increases the safety of the donated corneas through improved sensitivity to detect bacterial and fungal contaminants," he said.

Donated eyes are examined as soon as possible to determine suitability for transplantation. The density of the endothelium within the donated eye is an index of the quality of the cornea and is key to the decision of suitable recipient selection.

Professor Sutton said, in cold storage, endothelial density assessment is performed within 12 hours from death, as after this period the endothelium becomes excessively folded. In Organ Culture Storage, this can be extended to within 24 hours, as the endothelial assessment is done at a later stage.

"As a result of the increased ability to detect microbial contaminants and extending the time from death to storage, Organ Culture Storage offers a larger donor pool from which donated corneas can be used for transplantation," Professor Sutton said.

BACKGROUND:

The cornea is the front clear cap of the eye which has three main layers. Light is transmitted into the eye through the cornea onto the light sensitive retina which sends nerve impulses to the brain that are then perceived as sight.

Corneal dystrophies, traumatic injury, severe infections, subsequent scarring and many diseases of the eye can lead to the cornea losing its ability to transmit light, causing impaired vision or blindness.

Corneal blindness can also be caused by Keratoconus, a genetic and degenerative condition, resulting in the cornea changing shape and blurring vision. Keratoconus can be treated, however if severe, can be repaired by transplanting a healthy cornea from a donor.

Keratoconus affects 1:2000 of the population, with 1:500 requiring surgery through a corneal transplant. In Australia it is estimated that at least 10,000 people suffer with this condition. Both men and women can develop Keratoconus. The onset of Keratoconus can be anywhere between the ages of 8 and 45. In the majority of cases, Keratoconus presents between the ages of 16 and 30 years.

The cornea is privileged when compared to other organs and tissues of the body in that it does not have any blood supply. This isolation from the immune system allows corneas to be transplanted without the routine need for tissue matching with the recipient and the high risk of rejection as seen in other organ transplants.

The first corneal transplant was performed in 1906, and it was only after the widespread availability of antibiotics in the 1950s which saw the establishment of eye banks.

Until the 1960s, donated corneas were stored in moist chambers for up to two days. In the 1970s eye banks were able to store corneas for longer periods by keeping them in a liquid media, which contained basic nutrients and antibiotics and stored in a fridge at four degrees Celsius.

The Lions NSW Eye Bank at Sydney Sydney Eye Hospital has been operating since 1974 and has helped restore eye sight to over 17,000 patients across NSW and the ACT, and commenced using the Organ Culture Storage method in September 2011, through the generosity of corneal donors and their families via the Lions NSW Eye Bank.

Since this time, over 630 transplants have thus far directly benefited from the Organ Culture Storage method, which also contributed to the busiest year ever in 2012, with 740 successful corneal transplants performed across NSW and ACT.

NSW corneal transplant waiting list: 2010-2012

Year*	Number awaiting corneal transplants	Waiting period for corneal transplants
2011**	407	18 months
2012***	497	12 months
2013	263	< 3 months

** Organ Culture commenced September 2011

*** Increase in no. recipients listed for Transplant Dec '11

Source: Lions NSW Eye Bank