Methods Eighteen (n=18) donor corneas recovered in standard hypothermic medium (FBOV) were transferred to the MCC medium (n=14) or in standard corneal culture medium (Storagix, FBOV, n=4) as controls, at 31°C for up to 25 days. Endothelial cell density (ECD), Central corneal thickness (CCT) and transparency, using light microscopy, optical coherence tomography and a luxmeter were measured at 0, 14, 21 and 25 days of storage. Additionally, ECD, hexagonality (HEX%) and coefficient of variation (CV%) were evaluated by specular microscopy at the same time intervals.
Results Similar ECD trend was observed in corneas stored in both media over time. The remaining critical corneal quality parameters in MCC group resulted also stable during the whole incubation with following final values at day 25: CV% 41 ± 8, HEX% 48 ± 6, with a final central corneal thickness (CCT) measurements corresponding to 568 ± 31 µm after 25 days at 31°C. CV% and HEX% could not be evaluated for controls due to the increase in corneal thickness, which showed an approximately doubled CCT value as compared to the MCC group corneas. The storage in MCC allowed better preservation of endothelial morphology and corneal transparency during 25-days period preservation.
Conclusions MCC medium formulation shows is a safe and effective option for corneal culture allowing the maintenance of a corneal quality and physiological corneal thickness for 25 days of storage at 31°C

7 BOVINE CORNEA EX VIVO MODEL FOR EYE BANKING AND EYE SURGERY APPLICATIONS

[1]Rodella, [1]Giurgola, [1]Gatto, [2]Piaia, [1]D'Amato Tothova. *[1]AL.CHI.MI.A. Srl Ponte San Nicolò (PD) Italy; [2]Veneto Eye Bank Foundation, Zelarino (VE) Italy*

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Purpose Due to the shortage of human corneas for research purposes, our aim was to develop and optimize a bovine *ex vivo* model for the simulation of corneal storage and ophthalmic surgeries.
Methods Adult (>1 year) bovine eye bulbs were obtained from local slaughterhouses. Bovine corneas were excised within 4 hours from recovery and were preserved in hypothermic corneal storage (2-8°C, n=4) and corneal culture (31-35°C, n=4) conditions up to 14 days. The following corneal quality parameters were monitored at days 0 (before storage), 3, 7 and 14 of storage: endothelial cell (EC) density (ECD), EC mortality, EC morphology, corneal transparency and central corneal thickness (CCT) were evaluated with standard eye banks evaluation methods. EC and nuclear morphologies were also inspected after Alizarin Red + Trypan Blue stainings and light microscopy analysis. In addition, bovine eye bulbs underwent to cataract surgery simulation and to an open-bulb vitrectomy, followed by inner limiting membrane (ILM) removal, within 24 hours after recovery.
Results ECD and EC morphology parameters of calf corneas were comparable to human tissues, with bovine endothelium showing regular mosaic of hexagonal-shaped cells. Endothelial folds progressively appeared and became visible with a storage time-dependent manner. Folds overlapped with EC mortality areas. CCT was significantly higher in bovine corneas then in human corneas and, consequently, corneal transparency was significantly lower in bovine corneas then in human corneas. Alizarin Red+Trypan blue staining of calf endothelia revealed oval-shaped nuclei and binucleate cells were also detected.The bovine iris covers a significant portion of the anterior chamber area, resulting in a narrow rectangular pupil that limits the visualization of the posterior chamber. Therefore, the bovine anterior chamber was excised and removed, and a complete vitrectomy was performed in an open bovine eye bulb, followed by ILM peeling.Additionally, cataract surgery, from capsulorhexis to phacoemulsification could be performed in adult bovine eye bulbs.
Conclusions The presented bovine corneal and eye bulb model presented here represents a reliable alternative of human donor tissues and other *ex vivo* models in preliminary investigations related to the impact of various media, drugs, substances, and treatments during corneal preservation and ophthalmic surgical procedures.

8 RETROSPECTIVE CLINICAL OUTCOMES OF KERATOPLASTY USING HUMAN DONOR CORNEAS PRESERVED IN EUSOL-C HYPOTHERMIC STORAGE MEDIUM

[1,2]Pocobelli, [3]Colabelli Gisoldi, [4]Giurgola, [3]Scarinci, [3]Lodato, [4]Rodella, [4]Gatto, [4]D'Amato Tothova, [3]Pocobelli. *[1]Ophthalmology Unit. Department of Experimental Medicine. University of Rome "Tor Rome Italy; [2]Moorfields Eye Hospital NHS Foundation Trust London UK; [3]San Giovanni Addolorata Hospital. Ophthalmology Unit – Eye Bank of Rome Rome Italy; [4]AL.CHI.MI.A. Srl Ponte San Nicolò (PD) Italy*

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Purpose To evaluate the clinical outcomes of keratoplasties using donor corneas stored in the hypothermic storage medium Eusol-C (AL.CHI.MI.A. Srl).
Methods We retrospectively investigated the outcomes of 92 patients who underwent corneal transplantation using human donor corneas stored in Eusol-C medium at 2-8°C for up to 14 days. Donor age, sex, death-to-preservation time, and corneal storage time were also recorded. Endothelial cell (EC) density (ECD), EC mortality, and EC morphology scores were evaluated during storage in Eusol-C. The rate of complications 24 h after surgery and visual outcomes 3 and 6 months after surgery were evaluated. Corneal transparency was observed 24 hours, 3 months, and 6 months after surgery.
Results The mean Eusol-C storage time was 7.7 ± 2.5 days. ECD was measured at 2398 ± 354 cells/mm², and the average EC morphology score was 3.4 ± 0.7/4. Approximately 28% of corneas lacked EC mortality, while other tissues exhibited mortality mainly on the folds and periphery. Rebubbling rates in Descemet Membrane Endothelial Keratoplasty and Descemet Stripping Automated Endothelial Keratoplasty surgeries were 0%. A total of 81.3% of the patients had transparent corneas the day after surgery, and no complications occurred. Mean visual acuity at 3 and 6 months, respectively, was 0.4 ± 0.4 logMar and 0.3 ± 0.5 logMar. No cases of graft failure were observed for up to 3 months, and no graft rejection occurred at the months follow-up.
Conclusion Satisfactory surgical outcomes were achieved by utilizing donor corneas stored in eusol-C medium at 2-8°C for up to 14 days.