

# Abstracts

Edited by Prof. Tahir Mahmood

## **Rapid Detection of Acanthamoeba Cysts in Frozen Sections of Corneal Scrapings with Fungiflora Y**

Shiraishi A; Kobayashi T, Hara Y, Yamaguchi M, Uno T, Ohashi Y  
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Acanthamoeba keratitis (AK) is an intractable, sight-threatening infection of the cornea and is frequently seen in contact lens wearers. The incidence of AK has increased with increasing numbers of contact lens wearers. The problems with AK include the difficulty in making a correct diagnosis at an early stage, and the lack of specific drugs to treat AK. The early clinical signs of AK are subepithelial infiltrates, pseudo-dendritic keratitis and radial neurokeratitis and these lesions often lead to AK being misdiagnosed as herpetic keratitis and or fungal keratitis, resulting in delays in initiating proper treatment. In addition, the ability to grow and identify acanthamoeba in culture is between 30% and 60%, and it requires a relatively long time to obtain the results from cultures.

Acanthamoeba cysts can be detected in corneal scraping, impression cytology or biopsies by a variety of staining methods including special stains such as Calcofluor White and Acridine Orange, and also by immunohistochemistry. Routine stains such as Haematoxylin and Eosin (H&E), Giemsa, Gram, Periodic Acid Schiff (PAS), and Lactophenol Cotton Blue can also provide a positive identification. However, some of the special stains are time-consuming and more complicated, and the routine stains require skilled and experienced examiners to identify the Acanthamoeba cysts or trophozoites.

Fungiflora Y (FFY) was originally developed to detect fungi; and it has a specific affinity for chitin and cellulose, which are components of the cell wall of fungi. However, it has been shown that FFY also stains Acanthamoeba cysts because cysts also contain cellulose. We present a simple and quick method to detect Acanthamoeba cysts in FFY stained frozen sections of corneal scrapings.

The purpose of this study was to evaluate the usefulness of serial frozen sections of corneal

scrapings stained with Fungiflora Y (FFY) to diagnose Acanthamoeba Keratitis (AK).

Eight patients with suspected AK were studied. Serial frozen sections were made from part of the corneal epithelial scrapings and stained with FFY. The remaining corneal epithelial scrapings were submitted for laboratory culture.

The FFY stained frozen sections were completed within an hour and Acanthamoeba cysts were detected under a fluorescence microscope in all eight patients. The same sections were examined with a light microscope, and Acanthamoeba cysts were confirmed to be present from their morphological characteristics. Five of the eight patients had positive laboratory cultures for Acanthamoeba.

Authors concluded with the remarks that FFY staining of frozen sections of corneal scrapings is a rapid and reliable technique which can be used to make an early diagnosis of AK.

## **One - year outcomes of a bilateral randomised prospective clinical trial comparing PRK with mitomycin C and LASIK**

Wallau AD, Campos M  
Br J Ophthalmol. 2009; 93: 1634-8.

Excimer laser photorefractive keratectomy (PRK) with adjunctive mitomycin C (MMC; MMC - PRK) has recently been used as an alternative to laser in situ keratomileusis (LASIK) for surgical correction of refractive errors.

Although surface ablation usually has a slower visual recovery and more early postoperative discomfort, it avoids LASIK flap complications and possibly results in less corneal biomechanical instability.

Mitomycin C is an alkylating agent that inhibits DNA and RNA replication and protein synthesis. It regulates fibroblast proliferation and differentiation. And subsequently blocks myofibroblast formation,

which is responsible for corneal haze after PRK in high myopic corrections. Recent studies have shown that low - dose MMC (0.002%) has a similar efficacy to standard MMC concentration (0.02%) in preventing postoperative myopia corrections, and also minimise potential side effects.

There are not many papers in the literature comparing MMC - PRK and LASIK. Randleman et al compared wave front - optimised PRK with standard dose MMC and wave front - optoin LASIK in 272 preoperative refraction matched eyes for moderate myopia corrections. They found a better uncorrected visual acuity (UCVA) and spherical equivalent (SE) in MMC - PRK eyes 3 months after surgeries.

The purpose of this study is to compare visual acuity (VA) outcomes (including satisfaction questionnaire, aberrometry, contrast sensitivity) and corneal biomechanical properties 1 year after wave front - guided PRK with 0.002% MMC and LASIK for myopic corrections. As a continuum of our early postoperative outcomes study, we are unaware of any randomised prospective study the literature comparing 1 - year results of PRK with MMC and LASIK consecutively performed in both eyes of the same patients at the same treatment sitting.

The purpose of this study was to compare 1 - year follow-up results of photorefractive keratectomy (PRK) with mitomycin C (MMC) and laser in situ keratomileusis (LASIK) for custom correction of myopia.

Eighty - eight eyes of 44 patients with moderate myopia were randomised to PRK with 0.002% MMC for 1 min to one eye and LASIK in the fellow eye. The 1 - year follow-up was evaluated.

There were no differences between LASIK and MMC - PRK eyes preoperatively. Forty - two patients completed the 1 - year follow-up. MMC - PRK eyes achieved better uncorrected visual acuity ( $p = 0.03$ ) and better best - spectacle - corrected visual acuity ( $p < 0.001$ ) 1 year after surgery. SE did not differ. In the two groups during follow-up ( $p = 0.12$ ). Clinically significant haze was not found in surface ablation eyes. LASIK eyes showed a greater higher - order aberration ( $p = 0.01$ ) and lower contrast sensitivity ( $p < 0.05$ ) than MMC - PRK eyes postoperatively.

Excellent vision was reported in 64% of LASIK and 74% of MMC - PRK eyes 1 year after surgery. The corneal resistance factor and corneal hysteresis (ORA, Reichert) were higher in LASIK than in MMC - PRK eyes ( $p < 0.01$ ) at the last follow-up.

Authors concluded with the remarks that wave front - guided PRK with 0.002% MMC was more effective than wavefront - guided LASIK for correction of moderate myopia. Further research is necessary to determine the optimal concentration, exposure time and long - term corneal side effect of MMC.

### **Effect of Nd : YAG Capsulotomy on the Morphology of Surviving Elschnig Pearls**

Hirnschall N, Neumayer T, Georgopoulos M  
Br J Ophthalmol 2009; 93: 1643-7.

Improvements in intraocular lens (IOL) design and surgical technique diminished PCO (posterior capsule opacification, secondary cataract, after - cataract) rates, but PCO is still the most frequent long - term side effect and the main reason for a decrease in visual acuity and loss of contrast sensitivity after cataract surgery.

In recent studies highly dynamic morphological changes of Elschnig pearls were observed over short periods of time. Georgopoulos and co-authors observed a spontaneous regression of Elschnig pearls after YAC capsulotomy with disappearance of pearls on the remaining capsule in 45% of the cases in a long-term follow-up study. However, it remains unclear when and why the pearls outside the capsulotomy opening undergo these changes. Capsulotomy could be used as a model of mechanical destruction by the shock wave on surrounding pearls.

The aim of this study was to assess the morphological changes of Elschnig pearls immediately after capsulotomy. This knowledge may lead to a better understanding of the pathogenesis of PCO and so may help to develop new strategies for controlling PCO. This is of special interest, since PCO remains the main problem in lens refilling (Phakoersatz) for restoration of accommodation.

The purpose of this study was to observe the short - term changes in morphology of Elschnig pearls induced by Nd : YAG capsulotomy. Setting Department of Ophthalmology, Medical University of Vienna, Austria.

Twenty eyes of 19 pseudophakic patients with regenerative posterior capsule opacification (PCO) that were scheduled for YAG capsulotomy were included in this prospective study. High - resolution

digital retroillumination images were taken 2 weeks, 1 week and shortly before and immediately, 1 week and 2 weeks after Nd : YAG capsulotomy. The series of images were analysed using a dedicated image analysing software (Pearl Tracer).

In total, 2431 Elschnig pearls were observed over the time – course of 4 weeks in this study. Of these, 535 pearls (30.6%) disappeared, and 503 pearls (27.6%) survived on the remaining capsule peripheral to the capsulotomy opening. The surviving pearls showed a significant decrease in size (20%) from immediately before to 10 min after capsulotomy. Within the first weeks after capsulotomy, there was a high number of newly appearance pearls, with 26% of all pearls being new between 1 and 2 weeks indicating high pearl turnover.

Authors concluded with the remark that capsulotomy had an immediate impact on the morphology of PCO outside the capsulotomy opening probably due to the direct mechanical impact of the laser shock wave.

### **Robotic Microsurgery : Corneal Transplantation**

Bourges JL, Hubschman JP, Burt B, Culjat M, Schwartz SD  
Br J Ophthalmol. 2009; 93: 1672-5.

The da Vinci system (Intuitive surgical, Sunnyvale, California) is a commercially available teleoperative surgical system currently used for minimally invasive surgery in numerous surgical fields such as urology, cardiology, gynaecology, and thoracic and abdominal surgery.

In ocular surgery, robotic assistance or complete robotic surgical systems have several interesting potential advantages such as improved instrument dexterity, reduced tremor and decreased tissue damage. In other words, the potential for increased precision and efficiency exists. Further, the ability to perform remote teleoperative procedures exists. Dedicated experimental robots capable of delicate ocular micromanipulations such as the cannulation of retinal blood vessels have been reported.

We have previously demonstrated that the da Vinci system possesses the necessary dexterity for intraocular procedures. In our laboratory, Tsirbas et al also successfully repaired corneal lacerations using the da Vinci Surgical System, taking a first step toward robotic anterior segment surgery.

We aimed to further test the da Vinci surgical system's ability to perform a more delicate, time – consuming corneal surgical procedure. We therefore performed a penetrating keratoplasty (PK) procedure, which is a complex anterior segment surgery where delicate tissue manipulation and 360 suturing are required under excellent visualisation. We used porcine eyes first to test the feasibility of the procedure. We then tested the ability of da Vinci surgical instruments to move freely in real human anatomical environment during the PK procedure.

Robotic ocular microsurgery including corneal suturing has been proven to be “feasible in porcine eyes”.

The purpose of this study was to determine whether or not bimanual teleoperated robotic penetrating keratoplasty (PK) can be performed in porcine and human eyes.

Three arms of the da Vinci surgical robot were loaded with a dual – channel video and two, 360 – rotating, 8 mm, wristed – end effector instruments and placed over porcine eyes or over a human cadaver head. The surgeon remotely performed mechanical trephination, cardinal sutures, continuous 10.0 nylon sutures and suture adjustments on both eyes. The procedures were documented with still and video photography.

Using the da Vinci robot, penetrating keratoplasty procedures were successfully performed on both porcine eyes and human eyes in natural anatomical conditions. The precise placement of continuous sutures was facilitated by the wristed – end forceps. Orbital rims and nose did not limit surgical motions.

Teleoperated robotic penetrating keratoplasty is technically feasible in humans. Further studies are pending to implement the procedure with femtosecond laser and other automated steps.