

Standard Cross-linking versus Accelerated Photoactivated Chromophore Cross-linking (PACK-CXL) for Treatment of Infectious Keratitis: A Comparative Study

PROTOCOL STUDY

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INTRODUCTION

Keratoconus is a progressive non-inflammatory corneal disorder which is characterized by irregular apical conical protrusion with corneal stromal thinning characterized by progressive diminution of vision due to myopia and astigmatic components of KC. Many parameters were used to define the progression of KC mainly the anterior and posterior K readings, central corneal thickness at the thinnest location and the back surface elevations. The continuation of the The treatment of advance corneal melting came back into clinical perspective 8 years later with a clinical trial from Iseli and colleagues where therapy-resistant cases of melting corneas were treated with CXL. This time, every case was of infectious origin [7]. In this small cohort study, five patients with advanced corneal melt of infectious origin were selected. Two patients presented a fungal keratitis, whereas the other three were infected with *Mycobacterium* spp. pathogen. Each patient presented a disease unresponsive to full topical and systemic microbicidal therapy. They received CXL with the standard Dresden protocol technique: 3 mW/cm² CXL for 30 min [2, 7]. After surgery, the melting process was halted in four out of five patients. The last patient showed a persistent corneal melt caused by an immune reaction without any remaining active pathogen. This study not only confirmed the previous results from Seiler and colleagues from the year 2000, but also introduced the concept that CXL might be efficient when treating corneal melts from an infectious origin. Subsequently, further clinical trials on advanced melting corneas, one meta-analysis, and multiple animal experiments confirmed those initial results [20, 26–53]. Nowadays, it has been settled that corneal collagen cross-linking (CXL) is the only true therapeutic treatment for KC due to its ability to halt the pathological progression of the disease. Furthermore, many authors reported the advantage of epithelium-off CXL in flattening of the keratoconic cornea thus reducing the myopic component of KC and helping in correcting the refractive status of KC hence the idea of both therapeutic and refractive CXL.5,6

Corneal collagen cross-linking (CXL) is the actual and main treatment to keratoconus and has the advantage of halting the progression of the pathology of the disease. The progression of keratoconus can be defined by continuous change in 2 or more of special parameters. These special parameters included steepening of the posterior K readings, steepening of the anterior K readings, thinning of the central pachymetry readings and high back surface elevations. 5 Cross-linking PLUS (CXL PLUS) is defined as the simultaneous combination of CXL and a refractive procedure to flatten the cornea and improve vision as ICRS implantation.⁶

Recently, CXL PLUS has become more popular among surgeons as it has the advantages of both halting KC progression and improving the visual outcome. CXL is the main mandatory procedure that stabilizes the cornea and halts the disease progression, hence the name CXL PLUS as plus means adjuvant refractive procedure to improve vision which could be ICRS implantation, topography-guided PRK, Toric Implantable Collamer Lens (TICL), Phakic intraocular lens (IOL) or even refractive lens surgery (clear lens extraction) with Toric IOL implantation. Patient selection for the suitable refractive procedure is essential as not all previously mentioned refractive procedures are suitable for all patients as every keratoconic eye has its suitable refractive procedure. CXL PLUS is the most beneficial modality of treatment as the use of the combination therapy depends on many factors mainly the degree of myopia and astigmatism, the corneal pachymetry and keratometry readings.⁹

PURPOSE

To compare the results regarding safety and efficacy of Standard 30 minutes epithelium-off CXL versus accelerated PAK-CXL for treatment of keratoconus.

PATIENTS AND METHODS

Design: A prospective multicenter comparative clinical study.

The author will obtain the approval of the ethical committee in faculty of medicine in Sohag University Hospital and informed consent will be obtained from all patients.

This study will be conducted on 75 eyes of 75 patients with infectious keratitis. The eyes included in this study will be divided into 3 groups. Group A included 25 eyes and they will be subjected to one procedure only which was the standard 30 minutes epithelium-off CXL. Group B included 25 eyes they will be subjected to accelerated PAK-CXL. Group C is the control group with medical treatment only.

All patients were subjected to complete ophthalmologic examinations that included measurement of the uncorrected visual acuity (UCVA), best spectacle-corrected visual acuity (BSCVA), manifest refraction, slit lamp examination of anterior segment, intraocular pressure measurement and a detailed fundus examination.

patients were subjected to preoperative and postoperative UCVA, BCVA, refraction, Pentacam pachymetry and keratometry examinations at 1, 3, and 6 months follow up period.

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