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Editorial

Management of Cataract in Patients with Keratoconus

Ahmed Elmassry[1]* and Mohamed Elmassry[2]

[1]*Professor of Ophthalmology, Alexandria University, Egypt*
[2]*Assistant Lecturer of Ophthalmology, Port Saeed University, Egypt*

***Corresponding Author**: Ahmed Elmassry, Professor of Ophthalmology, Alexandria University, Egypt.

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Keratoconus is the most common ectatic condition affecting the cornea in the middle-aged population, which has been known for more than a century till now [1]. It is most commonly diagnosed in the late teens or early twenties, but may appear in children [2,3]. The widely used corneal topography and now tomography are the cornerstones for diagnosis and classification of corneal ectasia, specially Keratoconus, which gave ophthalmologists an opportunity to diagnose and manage these conditions earlier than before with better visual outcomes [4]. Keratoconic patients suffer progressive corneal thinning with progressive irregular astigmatism and myopia. Patients with early Keratoconus complain of progressive blurring of vision, manifested by frequent changes in their spectacles prescription. Moderate stages are characterized by loss of the best corrected visual acuity with characteristically high astigmatism. Late stages are characterized by severe corneal thinning, descemet membrane tears, corneal hydrops and corneal scarring [5].

A general -world wide-consensus was adopted in 2015 for early diagnosis and proper management of keratoconus [6], combining optimum diagnostic and treatment strategies, starting from defining the criteria for corneal ectasia as anterior and posterior steepening of the corneal curvature and corneal thinning, tackling risk factors for keratoconus as young age, occular allergy, eye rubbing, Asian-Arabian ethnic origin, Down syndrome and connective tissue disorders, and defining treatment goals for keratoconus which are halting the disease progression and visual rehabilitation.

Treatment of keratoconus involve prevention of eye rubbing. If corneal thickness is adequate, corneal cross linking is done. Vision can be corrected later by spectacles, soft or rigid contact lenses, or Intra Corneal Stromal Rings (ICRS) if the patient is a good candidate, other options include wave front guided photorefractive keratectomy or phototherapeutic keratectomy. Finally, Keratoplasty as Deep anterior lamellar keratoplasty or penetrating Keratoplasty are reserved for patients who do not fit the criteria for previous treatment options [6].

On the other hand, cataract surgery is the most frequent elective surgery performed, in 2010, the National Eye Institute, USA, estimated that cataracts will cause reversible blindness in more than 35 million individuals in the USA by 2030 [7].

Nowadays, ophthalmic surgeons more often encounter cataract cases with keratoconus, treated or not, which compose a serious refractive challenge when it comes to intraocular lens (IOL) type and power selection. To be specific, the widely-used regress formulas which are the mainstay for biometry nowadays may give inaccurate results when the high irregular keratometric readings of ectatic corneas with irregular astigmatism are used.

As to our experience, three crucial factors are considered which are: the age of the patient, the stage of keratoconus, and the stability of the condition. In young patients (< 35 years of age), with mild keratoconus and stable keratometric readings, optical and ultrasonic biometries are used in conjunction with the third-generation formulas Haigis L, Shammas, and Holladay 2 formulas, so as to obtain results within no more than 2 diopters of the Haigis-L formula. It is essential to use the keratometric readings obtained from both optical biometry and the corneal tomography, which may be more accurate.

However, if keratoconus is progressive manifested by corneal thinning more than ten microns per year, increase of the curvature of the cornea more than one diopter per year or increase the difference between the superior and inferior meridia more than one and half

diopters, cross linking is a must to obtain stable keratometric readings. High astigmatism in highly irregular corneas can be corrected by intracorneal stromal rings (ICRS) implantation which may be done in the same setting as corneal cross linking. IOL power calculation and cataract surgery can be done after that by 3 months.

Toric IOLs don't have good results in irregular Cornea.

In middle aged patients (40 - 55 years), with high keratometric readings (more than 52 diopters), and evident corneal irregularity as shown by corneal tomography, the cornea should be treated first by ICRS, followed by biometry and cataract surgery after 3 months. As what was previously mentioned, keratometric readings should be obtained from the corneal tomography, optical biometry is efficient, and the formulas used are Haigis-L, Masket, and Shammas formulas.

In patients with advanced stages of keratoconus and clear corneas, deep anterior lamellar keratoplasty (DALK) could be done in conjunction with phacoemulsification, in these cases, standard keratometric readings are used (43 diopters) with the patients axial length using the suitable formula according to the patient's axial length.

Opaque corneas with previous hydrops and scarring obviously require penetration keratoplasty with cataract extraction and IOL implantation.

Another solution in stable moderate stages of keratoconus, is to leave the patient aphakic, and to assess the need for IOL implantation 10 days later according to the patients refraction, a lot of patients do not need IOL implantation, and if needed, the adequate IOL power can be easily estimated using the refraction of the patient.

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