Prevalence of Keratoconus in Egyptian Astigmatic Patients

Thesis

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List of Abbreviations

Abb.	Full term
AC	*Anterior Chamber*
AST	*the degree of the regular corneal astigmatism*
BB	*Big bubble*
BFS	*Best Fit Sphere*
BFTA	*best-fit toric and aspheric*
CKI	*Center Keratoconus-Index*
CLEK	*Collaborative longitudinal evaluation of keratoconus*
CXL	*Cross Linking*
D	*Diopter*
DALK	*Deep anterior lamellar keratoplasty*
EBFS	*Enhanced Best Fit Sphere*
ECC	*Eccentricity value in 30 degree*
EDS	*Ehlers Danlos syndrome*
FES	*Floppy Eyelid syndrome*
FHI	*Fuchs' heterochromic iridocyclitis*
ICRS	*intracorneal ring segments*
IgA	*Immunoglobulin A*
IgE	*Immunoglobulin E*
IgG	*Immunoglobulin G*
IgM	*Immunoglobulin M*
IHA	*Index of Height Asymmetry*
IL	*Interleukin*
IOP	*Intraocular Pressure*
IS	*inferior–superior dioptric asymmetry*
ISV	*Index of Surface Variance*
IVA	*Index of Vertical Asymmetry*
KC	*Keratoconus*
Kd	*Kilo Dalton*
KI	*Keratoconus-Index*
KISA	*KC percentage index*
Km	*Mean keratometery*
KPD	*Keratometric power difference*

List of Abbreviations Cont…

Abb.	Full term
KSS	*Keratoconus Severity Score*
MMPS	*Matrix metalloproteinases*
OCT	*Optical coherence tomography*
PIOL	*Phakic Intraocular Lens*
PKP	*Penetrating Keratoplasty*
PRK	*Photorefractive keratectomy*
QS	*Quality specification of examination*
Rm	*Radius of curvature in 3.0 mm zone*
RMin	*Radii minimum*
Rper	*Mean radius of curvature of 7.0-9.0 ring area*
SRAX	*Irregular astigmatism occurring in KC*
TIMP	*Tissue inhibitor of metalloproteinase*
TNF	*Tumor necrosis factor*

Abstract

Purpose: Screening of Egyptian patients with corneal astigmatism for early diagnosis and study the prevalence of keratoconus by using Scheimpflug imaging device (pentacam).

Methods: One hundred and sixty eyes of 87 subjects with astigmatism ≥1.5D were included in the study. All subjects underwent a complete ophthalmic examination which included refraction, visual acuity measurement, slit lamp biomicroscopy, retinoscopy, fundus examination, conventional corneal topography and elevation-based topography with Pentacam.

Results: Mean age of the study population was 30±10 (range 20-40) years which included 53 (56.4%) female and 41 (43.6%) male subjects. Maximum corneal power and keratometeric astigmatism values were significantly higher and pachymetry was significantly thinner in eyes with clinical KC than normal astigmatic eyes.

Conclusion: The current study showed that subjects with 1.5D or more of astigmatism who present to outpatient clinics should undergo corneal topography screening for early diagnosis of KC even if visual acuity is not affected. Pentacam may provide more accurate information about anterior and posterior corneal anatomy especially in suspect eyes.

Keywords: Keratoconus – Pentacam – Myopic astigmatism

INTRODUCTION

Keratoconus is the most common primary corneal ectaticdisease ***(Rabinowitz, 1998; Romero-Jimenez et al., 2010).*** It is non-inflammatory and localized paraxial stromal thinning of the cornea, which often results in bilateral and asymmetrical corneal distortion and anterior corneal protrusion. Patients with corneal protrusion often develop high myopia and irregular astigmatism resulting in significant impairment of visual acuity ***(Rabinowitz, 1998).*** Keratoconus usually appears during puberty or the second decade of the life and, normally progresses for the following two decades until it stabilizes. In severe cases, corneal scarring further contributes to vision loss ***(Matalia, 2013).***

A genetic predisposition to keratoconus is well documented with increased incidence in some familial groups, and numerous reports of correspondence between monozygotic twins ***(Karimian et al., 2008).*** Approximately 6% - 23.5% of patients with keratoconushave a positive family history ***(Hughes et al., 2003; Rabinowitz et al., 2003; Karimian et al., 2008).*** Similar to other ocular genetic disorders, studies have indicated that relatives of keratoconus patients have an elevated risk compared to those with unaffected relatives ***(Rabinowitz et al., 1998; Rabinowitz et al., 2003).*** The majority of familial keratoconus is inherited through an autosomal dominant pattern ***(Stabuc-Silih et al., 2010; Romero-Jimenez et al., 2010).*** Other

models of inheritance such as autosomal recessive pattern have been suggested, especially in populations of high consanguinity ***(Stabuc-Silih et al., 2010; Abu-Amero et al., 2011).***

Diagnosis of keratoconus has greatly improved from simple clinical diagnosis with the advent of modern imaging modalities. These diagnostic devices have allowed us to diagnose the disease much earlier, and newer treatment modalities have been used. There are variety of diagnostic imaging tools to diagnose subtle abnormalities in corneal curvature, thickness, and tissue architecture like photographic placido disk studies, keratometry, photokeratoscopy and finally computer assisted videokeratoscopy ***(Matalia, 2013).***

One of the most important diagnostic imaging tools for keratoconus, has evolved through placido disk based devices to slit scanning and Scheimpflug imaging devices. Although placido disc based devices are still a highly sensitive tool to diagnose curvature changes on the anterior corneal surface, they might miss signs of early posterior corneal ectasia. Newer devices such as Scheimpflug imaging and optical coherence tomography(OCT) are useful adjuncts in imaging these early indicators of keratectasia ***(Matalia, 2013).***

Over the last decade, outcome data have accumulated for new interventions in keratoconus which promise to reduce transplantation rates significantly, arrest disease progression and save many patients from long-term reliance on rigid contact

lens wear. These interventions include corneal collagen crosslinking (CXL), intracorneal ring segments (ICRS), topographic photorefractive keratectomy (topoPRK), and phakic intraocular lens implantation (pIOL). None of these recent treatment modalities are applicable to advanced (stage IV) disease with corneal scarring, in this case corneal transplantation is indicated by deep anterior lamellar keratoplasty (DALK) up to peneterating keratoplasty (PKP) ***(Shortt et al., 2013).***

The overall prevalence of keratoconus in the general population has been estimated to be between 5 and 23 per 10,000, respectively with both sexes equally affected ***(Espandar, 2010)***. However, it would not be surprising to expect an increase in the incidence and prevalence rates of this disease nowadays with the current wide spread use of newer diagnostic devices leading to early diagnosis ***(Matalia, 2013).***