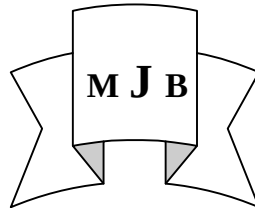


Subclinical Keratoconus among Patients Visiting Hilla Laser Unit in Iraq

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Abstract

Background: Subclinical Keratoconus is a term used to indicate a patient with inferior or central steepening of cornea on topography where the clinician suspects that it may progress to keratoconus.

Aim of the Study: Diagnosis of sub-clinical keratoconus among myopic patients seeking for correction of their refractive errors by excimer laser, to avoid surgery for those patients and consider them at risk of developing post operative corneal ectasia which is the most severe post operative complication in photorefractive surgery.

Patients and methods: One thousand and two hundred myopic patients who attended laser unit/ Hilla Teaching Hospital, during a 1.5 year duration, seeking for correction of their refractive errors. Many investigations were done including visual acuity, slit lamp examination, corneal topography, keratometry and pachymetry.

Results: Among those patients, 49 (4%) diagnosed as having subclinical keratoconus. Out of these (49) cases, (27) (55%) were males and (22) (45%) were females. Forty one (83.6%) of the patients were less than (25) years old.

Conclusion: Sub-clinical keratoconus is one of the challenging problems facing refractive surgeons and is one of the most important and preventable causes of corneal ectasia following photorefractive surgeries.

مخروطية القرنية الغير مشخصة عمليا بين المرضى المراجعين لوحدة ليزر العيون في الحلة
العراق

الخلاصة

الهدف من البحث : هو تشخيص مخروطية القرنية الغير ظاهرة عمليا بين المرضى الذين لديهم قصر النظر والذين راجعوا وحدة الليزر من اجل تصحيح هذا الخطأ الانكساري بواسطة الاكزامير ليزر وذلك لتجنبهم إجراء العملية وذلك لتجنب حدوث انبعاج القرنية بعد العملية والتي هي واحدة من المضاعفات الخطيرة التي تحدث بعد عملية التصحيح والتي يمكن تجنبها بالتشخيص الصحيح قبل العملية.

طريقة البحث : اشتمل البحث على فحص (1200) مريض الذين زاروا وحدة ليزر العيون في مستشفى الحلة التعليمي خلال مدة سنة ونصف وذلك لغرض تصحيح الأخطاء الانكسارية. عدد من الفحوصات أجريت لهم وشملت قياس حدة البصر ، الفحص الشامل لأجزاء العين ، فحص طبوغرافية القرنية ، درجة تحذب القرنية ، وقياس سمك القرنية.

النتائج : من بين (1200) مريض كان هناك 49 مريض (4%) شخضوا بإصابتهم بمخروطية القرنية الغير ظاهرة من بينهم 27 (55%) مريض كانوا ذكور و (22%) مريض كانوا إناثا وقد كان 41 مريض عمرهم يتراوح بين ستة عشر إلى خمسة وعشرين سنة.

الخلاصة : إن مخروطية القرنية الغير ظاهرة هي واحدة من التحديات التي تواجه عمليات معالجة الأخطاء الانكسارية بالليزر كما أنها واحدة من الأسباب المهمة والتي يمكن تجنبها لمنع حدوث انبعاج القرنية بعد إجراء عمليات التصحيح وذلك بالتشخيص الأولي لهذه الحالة وعدم إجراء عملية التصحيح للمرضى الذين يتم تشخيص هذه الحالة لديهم.

Introduction

Keratoconus is a progressive disorder in which the cornea assumes a conical shape secondary to stromal thinning and protrusion, [1] with an onset at puberty and progression over a period of (7 – 20) years [2, 3]. Keratoconus suspect, is a term used to indicate a patient with inferior or central corneal steepening on topography which may lead the clinician to suspect progression to keratoconus [4]. Early form of Keratoconus may go undetected unless anterior corneal topography is studied . Early disease is now best detected with videokeratography. Detecting early Keratoconus (sub clinical) in the absence of slit lamp findings has assumed increasing importance . In some instances , unpredictable results and patient dissatisfaction have been attributed to the existence of undiagnosed early Keratoconus in refractive surgery patients . Because these patients do not achieve high quality vision with either glasses or contact lenses, they tend to seek out refractive surgery. Recent reports suggest that patients with early Keratoconus or Keratoconus suspects comprise(2-5%)of patients presenting for refractive surgery for myopia. Videokeratography screening allows the clinician to rule out these early

ectasias and other topographic abnormalities before embarking on refractive surgery [4].

The incidence of keratoconus ranges from (1.4--600) cases/year/100000 population [5- 8]

Most reports have considered that Keratoconus occurs in all ethnic groups [4], while some studies suggesting an influence of ethnic origin on the incidence and age of onset. [9, 10]

Subjects and Methods

One thousand and two hundred myopic patients attending the laser unit/ Department of Ophthalmology/ Hilla Teaching Hospital between November 2007 to June 2009 seeking for correction of their refractive errors by photorefractive surgery, were included in the study.

The patients were referred from primary care centers and private clinics. Among them 49 patients (27males) and (22 females). Their age ranged between 18 – 34 years with a mean age (22.4) years were diagnosed as having subclinical keratoconus.

Full ophthalmological examination was performed including, visual acuity, refraction, keratometry, slit

lamp examination, corneal topography using OPD SCANN (NIDEK) and measuring of corneal thickness using pachymetry. In addition to medical history and associated ocular symptoms for patients with sub-clinical Keratoconus was documented.

Diagnosis of early or sub-clinical Keratoconus is made according to the following criteria:

Normal cornea on slit lamp biomicroscopic examination.

Scissoring of retinoscopic reflex or oil droplet sign.

Corneal topography findings: asymmetric bow tie with a skewed radial axis.

Pachymetric measurements.

These are extremely useful clinical signs to confirm the diagnosis of Keratoconus suspects as shown in the following photos.

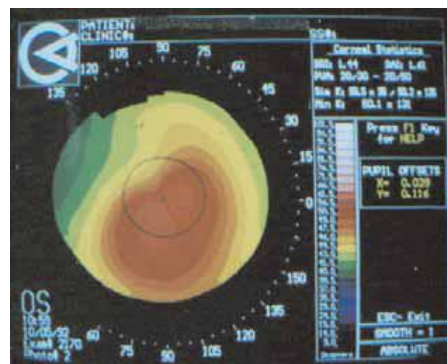


Figure 1 A keratoconic eye exhibits the typical topographic pattern of an asymmetric bow tie with a skewed radial axis. [19]



Figure 2 The same topographic pattern seen in Figure (1) is evident in another case with early Keratoconus. [19]

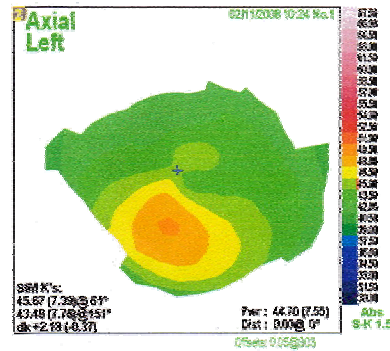


Figure 3 An eye with sub clinical Keratoconus exhibits the same topographic pattern as the eyes shown in Figure (1). OPD SCANII (Nidek)

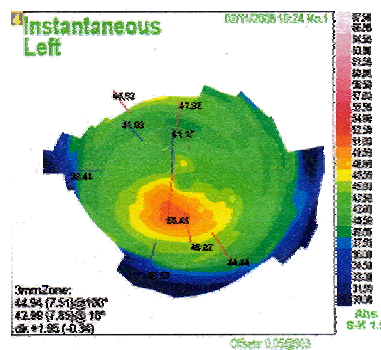


Figure 4 Inferior or central steepening on topography which may progress to Keratoconus. OPD SCANII (Nidek)

Quantitative data of distribution of patients according to sex and associated symptoms were evaluated by chi-square analysis. A p value of 0.05 was considered the upper limit of statistical significance.

Results

Results of this study shows that (49) patients had sub clinical Keratoconus {27, (55%) were males and 22, (45%) were females}. Chi square $p = 0.835$ (not significant). Forty one (83.6%) patients were less than 25 years old. (table I)

Table I Distribution of patients according to age and sex

16 – 20		21 – 25		26 – 30		> 30		P
M	F	M	F	M	F	M	F	0.835
8	7	14	12	4	3	1	0	
15 (30.6%)		26 (53%)		7 (14.3%)		1 (2%)		

Keratometric study shows that 20 (40.8%) patients are presented with keratometry readings below 47

diopeters and (24) (49%) between (47 - 50) diopeters and 5 (10.2%) with

keratometry readings more than 50.(table II)

Table II Distribution of patients according to keratometry readings

< 47 diopters	47 - 50 diopters	> 50 diopters
20 (40.8%)	24 (49%)	5 (10.2%)

History and clinical examination reveals that (28) (57.1%) of patients presented with impairment of vision without associated symptoms and 10 (20.4%) presented with frequent eye

rubbing and 11 (22.4%) presented with history of vernal kerato-conjunctivitis, eczema. and asthma. Chi square $p = 0.105$ (not significant)(table III)

Table III Distribution of patients according to associated symptoms

No complaint	Frequent eye rubbing	Vernal kerato conjunctivitis	History of atopy (eczema + asthma)	p
28 (57.1%)	10 (20.4%)	4 (8.1%)	7 (14.3%)	0.105

Discussion

Sub clinical Keratoconus or Keratoconus suspect present with no slit lamp findings, but the typical topography (asymmetric bowtie with a skewed radial axis) is present, with the aid of pachymetry, surgeons can detect the vast majority of keratoconic subtypes preoperatively and thus prevent ectasia. [4]

Our study showed that among 1200 myopic patients, 49 (4%) were diagnosed with early or subclinical Keratoconus and excluded from doing refractive surgery, the results are comparable with the results of other studies that showed patients with early or subclinical or Keratoconus suspect comprise (2% - 5%) of patients presenting for refractive surgery. [11]

The mean age of patients with subclinical Keratoconus was (22.4) years which is comparable with the results of other studies in Asia that varies between (20) and (23) years.

[13, 8, 9] While other investigations on white population have reported higher mean age 27 years, suggesting later disease onset. [4, 8, 9] We found no significant differences among patients according to sex distribution as shown in table I, $p = 0.835$.

A considerable number of patients presented with subclinical Keratoconus (57.1%) had no history of allergy or associated symptoms, while (22.4%) of patients presented with either history of atopy (asthma, atopic dermatitis) or presented with vernal kerato-conjunctivitis, while other previous studies had shown that 35% (15, 16) of those patients, and in Saudia Arabia only 16% of patients reported to have any form of atopy. [17]

So, there is no obvious relation between atopy and the occurrence of Keratoconus. (16, 18) $p = 0.105$ (not significant).

Conclusions

Subclinical Keratoconus is one of the challenging problem for refractive surgeons and it is one of the most important and preventable cause of corneal ectasia following photorefractive surgeries.

Therefore, with the aid of corneal topography, pachymetry, ocular examination and family history, early or subclinical Keratoconus can be diagnosed to avoid unpredictable results and patients dissatisfaction following refractive surgery, by excluding patients at risk for developing corneal ectasia post operatively.

Acknowledgement

Great thanks and gratitude to all people working in Laser Unit / Hilla Teaching Hospital for their help to do this study.

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