USES OF PENTACAM IN OPHTHALOMOLOGY

Essay

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in Ophthalmology

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List of Abbreviations

ACA	Anterior Chamber Angle.
ACD	Anterior Chamber Depth.
ACV	Anterior Chamber Volume.
AK	Astigmatic Keratotomy.
ANSI	American National Standard Institute
B	Broad.
BFS	Best Fit Sphere.
CAT scan	Computed Axial Tomography scan
CBDS	Capsular Bag Distension Syndrome
CCD	Charged Couple Device.
CCT	Central Corneal Thickness.
CT	Corneal thickness.
CTSP	Corneal Thickness Spatial Profile.
DSP	Digital Signal Processor
EKRs	Equivalent K-Readings
H	Hight.
ICL	Implantable Contact Lens.
ICRS	Intrastromal Corneal Ring segment.
ILFB	Intralenticular Foreign Body.
INTACS	Intra Corneal Ring segment
IOL	Intra Ocular Lens.
IOP	Intra Ocular Pressure.
Kg	Kilogram
K–value or readings.	Keratometry value or readings.

List of Abbreviations (Cont…)

L	Length.
LASEK	Laser Subepithelial Keratomilieusis.
LASIK	Laser Stromal In-Situ Keratomilieusis.
LED	Light Emition Diode.
LOCS.....	Lens Opacities Classification System.
LRI.....	Limbal Relaxing Incision
M.....	Meter.
max.	Maximum.
Min.....	Minimum.
Min.....	Minute.
MIO	Memory input output
Mm.....	Micrometer.
Mm.....	Millimeter.
Mmhg	Millimetermercury.
MRI	Magnetic Resonant Imaging.
nm	Nanometer.
OCT.....	Optical Coherense Tomography
PACD.....	Peripheral Anterior Chamber Depth
PACG	Primary Angle Closure Glaucoma
PC	Program Cordinator
PcIOL	Posterior Chamber Intra Ocular Lens.
PCO	Posterior Capsule Opacification
Pentacam HR.....	Pentacam High Resolution.
PI.....	Peripheral Iridotomy.

List of Abbreviations (Cont…)

pIOL	phakic Intra Ocular Lens.
PK	Penetrating Keratoplasty.
PMD.....	Pellucid Marginal Degeneration.
PRK	Photorefractive Keratectomy.
RK.....	Radial keratotomy.
SM.....	Specular Microscopy.
SPC	Scheimpflug photography of the Cornea.
UBM	Ultrasound Biomicroscopy.
UP	Ultrasound Pachymetry.
UV.....	Ultra Violet.
VHF	Very High Frequency.
VKC.....	Vernal Keratocojunctivitis.
3D.....	Three dimensional.

INTRODUCTION

Pentacam is considered one of comprehensive methods for investigating the anterior segment available to ophthalmologist today; the pentacam images the anterior segment of the eye by a rotating scheimpflug camera ***(Dick et al., 2005).***

The pentacam allows fast, non contact examination of the anterior eye segment while the patient is setting in front of the camera, thus providing good patient comfort and preventing application of local anaesthetics and corneal erosions, however, patients have to be able to fixate while the measurement is being made, which can be a problem for children, older patients or patients with nystagmus ***(Rufer et al., 2005).***

The pentacam / pentacam high resolution (HR) is a rotating scheimpflug camera. The rotational measuring procedure generates scheimpflug images in three dimensions, with the dot matrix fine-meshed in the center due to rotation. It takes a maximum of 2 seconds to generates a complete image of the anterior eye segment. Any eye movement is detected by a second camera and corrected for in a process to some extent. The pentacam calculates a 3- dimensional model of the anterior eye segment from as many as 25000 (HR 138000) true elevation points. ***(Mazen, 2009).***

Ocular application of the pentacam:

A series of 50 scheimpflug images in 2 seconds.The images are captured from the anterior corneal surface to the posterior surface of the crystalline lens ***(Dick el al., 2005).***

The pentacam provides a complete analysis of the anterior and posterior surface topography of the cornea including curvature, tangential, and sagital (axial) maps ***(Holladay et al., 2005).***

Pentacam is the only instrument that measures and analyses the center of the cornea precisely. This offers a significant advantage in acurrate corneal topography measurements prior to refractive surgery. ***(Grewal, 2008).***

Pachymetric colored map from limbus to limbus, the actual thickness can be evaluated at any location by clicking on the area or by using the numerical value. Important parameters like thickness in the pupil center, apical corneal thickness and the thinnest location are provided ***(Grewal, 2008).***

For calculating corneal thickness, the camera measures from the top of the epithelium to the anterior surface of the endothelium. Importantly, it does not measure the tear film. So Pentacam is indispensable pre and post refractive surgery ***(Grewal, 2008).***

The Pentacam features automatic keratoconus detection. Progression of keratoconus and following treatment with newer technologies like corneal collagen crosslinking and Intacs¨ can be monitored ***(Maus and Krober, 2007).***

Densitometry data for the cornea and the crystalline lens, including the subcapsular layer, shown both graphically and quantitatively. The quantitative data make it easy to identify a

developing cataract, categorize existing cataracts, and document their development ***(Neuhann, 2007).***

A "true net power map" that shows the refractive power of the cornea at any given point. (The instrument calculates the refractive power of both surfaces and adds them together) ***(Belin and Khachikian, 2007).***

Measurements of anterior chamber angle, chamber volume, chamber depth, pupil diameter and corneal characteristics such as eccentricity, central radius and astigmatism ***(Neuhann, 2007).***

It is highly recommended to use the Pentacam preoperatively in all patients as an indispensable examinatiom for refractive surgery as well as in eyes that will receive phakic IOLs or cataract surgery where we need to examine the relationship of the implants to the structures in the front part of the eye. It can also be used in postoperative controls of these patients to compare the results. For individuals with irregular astigmatism due to anterior basement membrane dystrophy, blepharitis, or dry eye, the Pentacam offers similar advantage to the Placido-based units in detecting the amount of irregular astigmatism from their disease. Its multipurpose use and highly developed tools for topographical analysis make the Pentacam a good all around unit for any kind of refractive surgical screening ***(Boyd and Vejarano, 2008).***

AIM OF THE WORK

Aim of the work is to spot light on uses of pentacam in ophthalmology.