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التوثيق الالكتروني والميكروفيلم

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بالرسالة صفحات

لم ترد بالأصل

CHALLENGES FACING AUTOMATED PERIMETRIC MEASUREMENTS IN DIAGNOSIS AND FOLLOW UP OF PRIMARY OPEN ANGLE GLAUCOMA

ESSAY

Submitted in partial fulfillment of master degree in ophthalmology

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بسم الله الرحمن الرحيم

قالوا سبحانك لا علم لنا إلا ما

علمتنا إنك أنت العليم الحكيم

صدق الله العظيم،

سورة البقرة آية ٣٢

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Introduction

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The objective of static threshold automated perimetry in glaucoma is the efficient detection of visual field defects and the accurate measurement of progressive field loss. Automated perimetry is a psychophysical test of visual function necessarily dependent upon the subjective response of the patient. Visual field progression can be evaluated for the field as a whole, for any region of the field, or for any stimulus location in terms of comparison with results from previous examination.

Automated perimetric measurements in glaucoma represent a real challenge by the fact that the outcome of any given examination is affected by a large number of factors including those specific to the patient and/or technician and those particular to the measurement technique. Such factors determine the absolute value of sensitivity at the given location and also the variability in the response at that location both within a single visual field examination (that is, the short term fluctuation) and between examinations (that is, the long term fluctuation) ***(Flammer et al., 1984),*** and can limit the usefulness of automated perimetry for the evaluation of visual field progression.

Some factors can be controlled by the clinician, such as the pupil size and the correction of refractive error, but other factors my be more difficult to eliminate as the coexistance of cataract or other media opacities. Probably the single most important factor influencing the quality of the visual field examination, is the interaction of the nature of the patient response with the demands of the examination procedure. Some evidence about the quality of the patient preformance is given by the reply to the catch trials. The initial lack of familiarity of the requirements of the test and the relatively long duration of the examination have been manifested in the learning and fatiguing effect respectively ***(Wild et al., 1991)***.

The mainstay of automated glaucoma testing has been the central 30-degree field programs. Some authors recorded that in 4% of the patients a normal central field was associated with glaucomatous peripheral defect ***(Ballon et al., 1992)***.

Subjectively clinical impression based on simple visual inspection of a series of automated perimetry gray scales, in the context of associated clinical features, probably is still the most widely used means of determining progression. Unfortunately, even experienced clinicians have been shown to demonstrate a high degree of disagreement when asked to determine progression by clinical impression in the same automated perimetry field series ***(Warner et al., 1988)***.

To date, attempts to enhance the quality of the patient response have largely centered on the development of methods for improving data acquisition, as the introduction of faster thresholding strategies to reduce the duration of the perimetric examination ***(O'Brein et al., 1994)***. Other approaches for improving data thresholding have included the use of larger stimuli or repeated thresholding of the given stimulus locations.

Aim of the Work:

The aim of this essay is to review the literatures about the difficulties in using the automated perimetric measurements in diagnosis and follow up of primary open angle glaucoma.

Review of Literature

The History of Instruments

The first practical instrument for perimetry was developed by Richard Forester in 1869. He developed a 180° circular arc pivoted on a stand. With the introduction of Forester's perimeter, there was a widespread abandonment of Von Graefe's methods and the perimeter became the instrument of choice for studying the visual field.

Jannik Peterson Bjerrum introduced the Bjerrum screen in 1889. This led to the large scale analysis of the central visual field and the concept of quantitative visual field testing. A two meter screen and a two meter test distance were used. Test objects of various sizes and as small as 1 mm were used. Because the testing distance was increased from about 30 cm to two meters and because test object size was decreased to as small as 1mm, test objects subtended very small visual angles increasing the sensitivity and accuracy of visual field testing.

Goldmann attempted to produce an instrument that would provide ideal condition for visual field testing and introduced his projection perimeter in 1945. The spherical shape allowed easier testing of the complete field. There was complete freedom of test object movement. Size, brightness, and color could be accurately controlled.

The first practical instrument for static perimetry was designed by H. Harms and E. Aulhorn of the University of Tubingen in Germany and