

Hidden False Positives in the Visual Field

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PRESENTATION

A 78 year old patient presented to the glaucoma clinic due to the detection of narrow angles and elevated IOP. The corrected visual acuity and intraocular pressure were 20/25 and 18 mm Hg in both eyes with two anti-glaucoma eye drops, respectively. The laser iridotomies were patent OU. Funduscopy showed a cup/disc ratio of 0.5 OU and her baseline optical coherence tomography was within normal limits in both eyes. The left eye visual field reliability indices were within normal limits, however her pattern deviation plot illustrated greater defects than her total deviation plot [Figure 1]. Closer evaluation of the raw data showed exceptionally high peripheral sensitivities compared to her central thresholds. Her visual field defects did not correspond with the exam and optical coherence tomography.

DISCUSSION

High false positive (FP) catch trials impact the visual field more than false negatives and fixation losses.^[1] Findings related to excessive high FPs (a trigger happy patient) include white patches on the gray scale map, the

presence of more “defects” on the pattern deviation plot as compared to total deviation, a positive mean deviation value, abnormal pattern standard deviation, and an “abnormal high sensitivity” message in the glaucoma hemifield test.^[2]

In a condition herein called hidden false positive, the only finding in a field with high false positives is merely the presence of more defects on the pattern deviation plot as compared to the total deviation probability plot. Normally, more defects are present on the total deviation probability plot because the pattern deviation removes the effect of an associated generalized depression from the total deviation plot and highlights areas of more severe depression, thereby showing less severe defects. In a visual field with apparently normal reliability indices but more severe defects on the pattern deviation plot as compared to the total deviation plot, hidden false positives is the causative factor.

In a normal visual field, central points have the highest sensitivity and threshold values decrease gradually toward the periphery. With hidden FPs, some peripheral points have threshold values similar to or higher than central points which is obviously not physiologic in a patient with normal macular function [Figure 1]. The reason for the presence of more defects on the pattern deviation plot is the way the visual field instrument calculates and displays the pattern deviation plot. The machine ranks the threshold of all points, and adjusts the sensitivity of the 7th best point according to the patient’s age matched normative database. In other words, the difference between the patient’s 7th best retinal sensitivity

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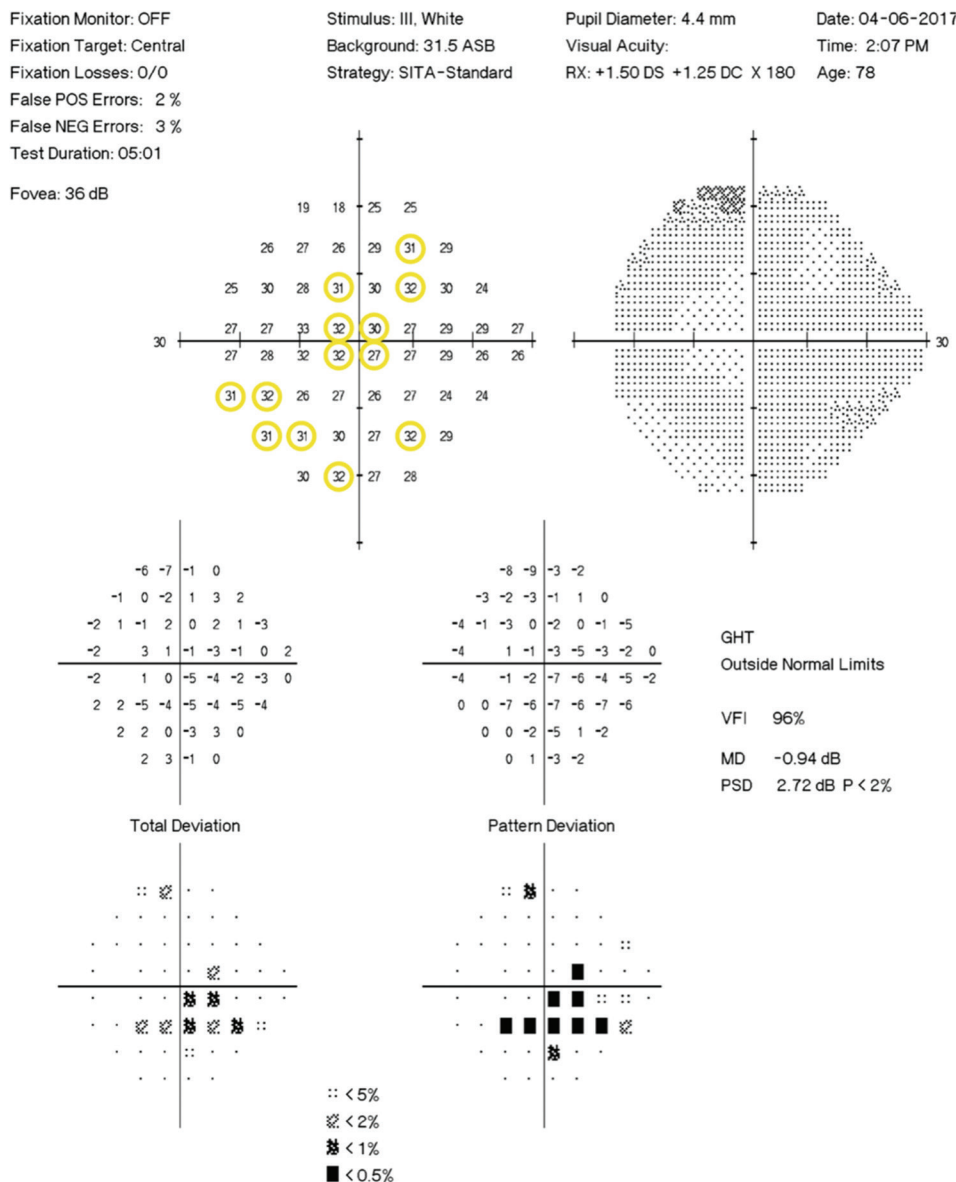


Figure 1. A visual field with “hidden false positives”: note the normal reliability indices, presence of more defects on the pattern deviation plot as compared to the total deviation plot, and the fact that some peripheral points in the numeric map have higher sensitivity than central points (circled).

point and the age matched database is “added” to the total deviation value to calculate the pattern deviation. For example, if the 7th best point threshold is 6.00 dB less (worse) than the normative database, 6.00 dB is added to the threshold value of all test locations, and if it is 7.00 dB higher (better), 7.00 dB is reduced from the threshold values of all points of the total deviation. In fields with high FPs, because of the positive difference of the abnormally high 7th sensitive point with the database, threshold values are deducted from all test points on the total deviation, rendering them as “abnormal” on the pattern deviation plot.

In summary, when there are more defects on the pattern deviation plot as compared to the total

deviation plot but the reliability indices are within normal limits, the numeric map must be checked. If some peripheral points have threshold values similar or higher than central points, the cause of the abnormality is the hidden false positive phenomenon.

Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will

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be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of Interest

There are no conflicts of interest.

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