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ARVO Annual Meeting Abstract | June 2021

NEW GIP INDEX FOR PROGRESSION ANALYSIS, USSING THE LAGUNA OHnE METHOD FOR THE OPTIC NERVE HEAD HEMOGLOBIN EVALUATION

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Investigative Ophthalmology & Visual Science June 2021, Vol.62, 1828. doi:

Abstract

Purpose : Laguna ONhE automatically analyzes hemoglobin distribution in optic disc retinographies (1-9). Its main index, called GDF (Globin Distribution Factor) involves a classifier based on Deep Learning that tends to produce extreme values: (1=normal, 0=glaucoma). The consequence is a good detection performance, outweighed by certain variability in the limit range between normality and glaucoma. Therefore, its influence has been reduced in a new index, called Globin Individual Pointer (GIP). It may be useful in the follow-up of cases.

Methods : Two retinographies of 78 normal eyes and 59 confirmed or suspected glaucomas were obtained using a simple manual fundus camera (DEC-200, MiiS, Taiwan). The reproducibility and diagnostic capability of both indices were compared.

Results : Analyzing the average of both GDF series, a ROC area of 0.937 (CI=0.882-0.971) and a sensitivity of 67.8%% for 99% specificity were obtained. Its intra-class correlation coefficient was 0.970 (CI 0.958-0.978). GIP achieved a smaller ROC area (0.902, CI=839-0.946, $p<0.01$), sensitivity of 50.85% for 99% specificity, and a higher intra-class correlation coefficient (0.990, CI=0.985-0.993, $p<0.0001$).

Conclusions : Both indices are complementary: GDF useful for diagnostic classification, especially considering that not all glaucomas were confirmed cases but only with signs of suspicion, and GIP for individual progression assessment.

Figures: Test-retest scatter plots of GDF (Fig1) and GIP (Fig2) indexes. The 0 and -15 value are at 5% and 1% percentile of the normal population.

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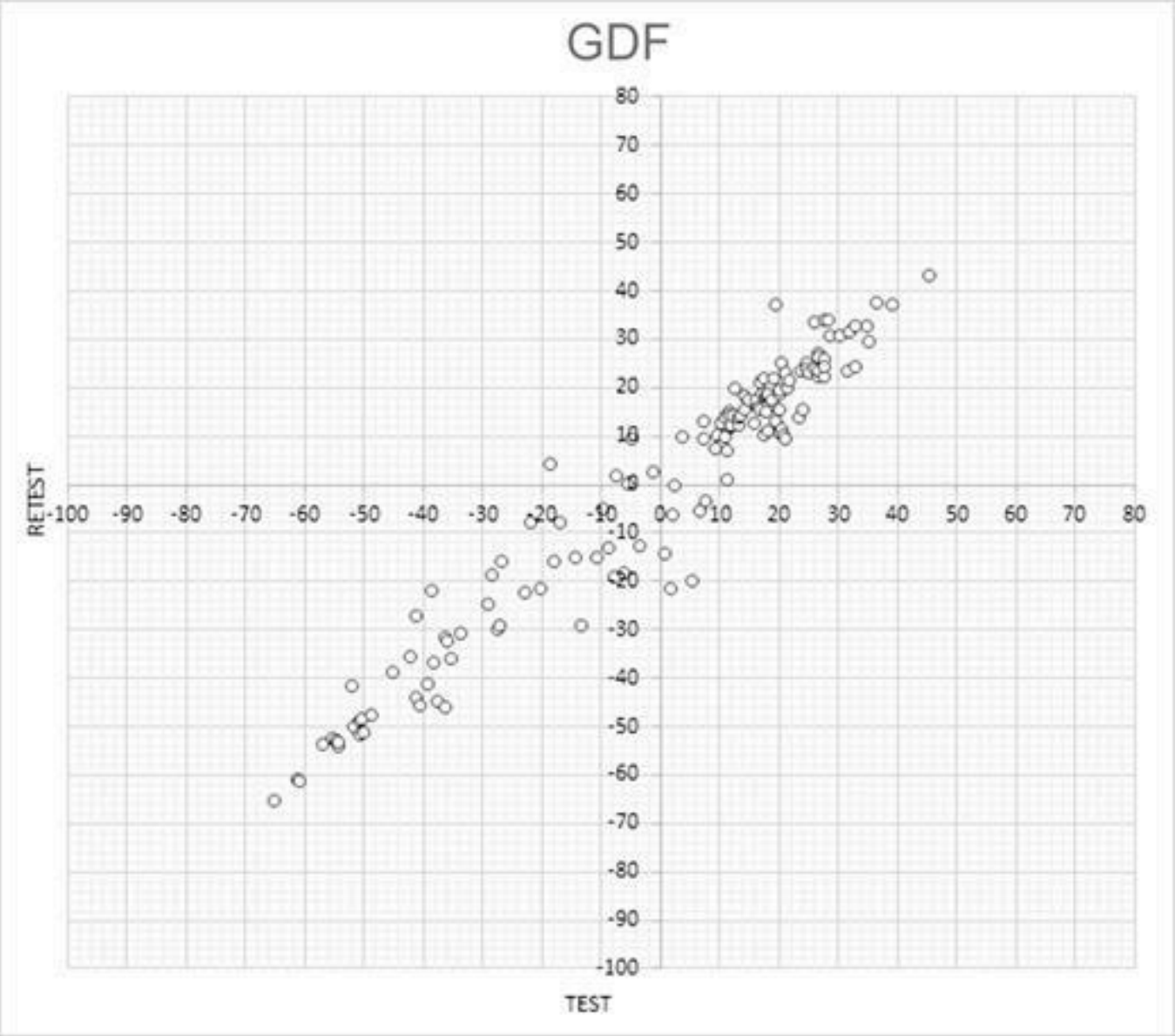

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Test-retest scatter plots of GDF

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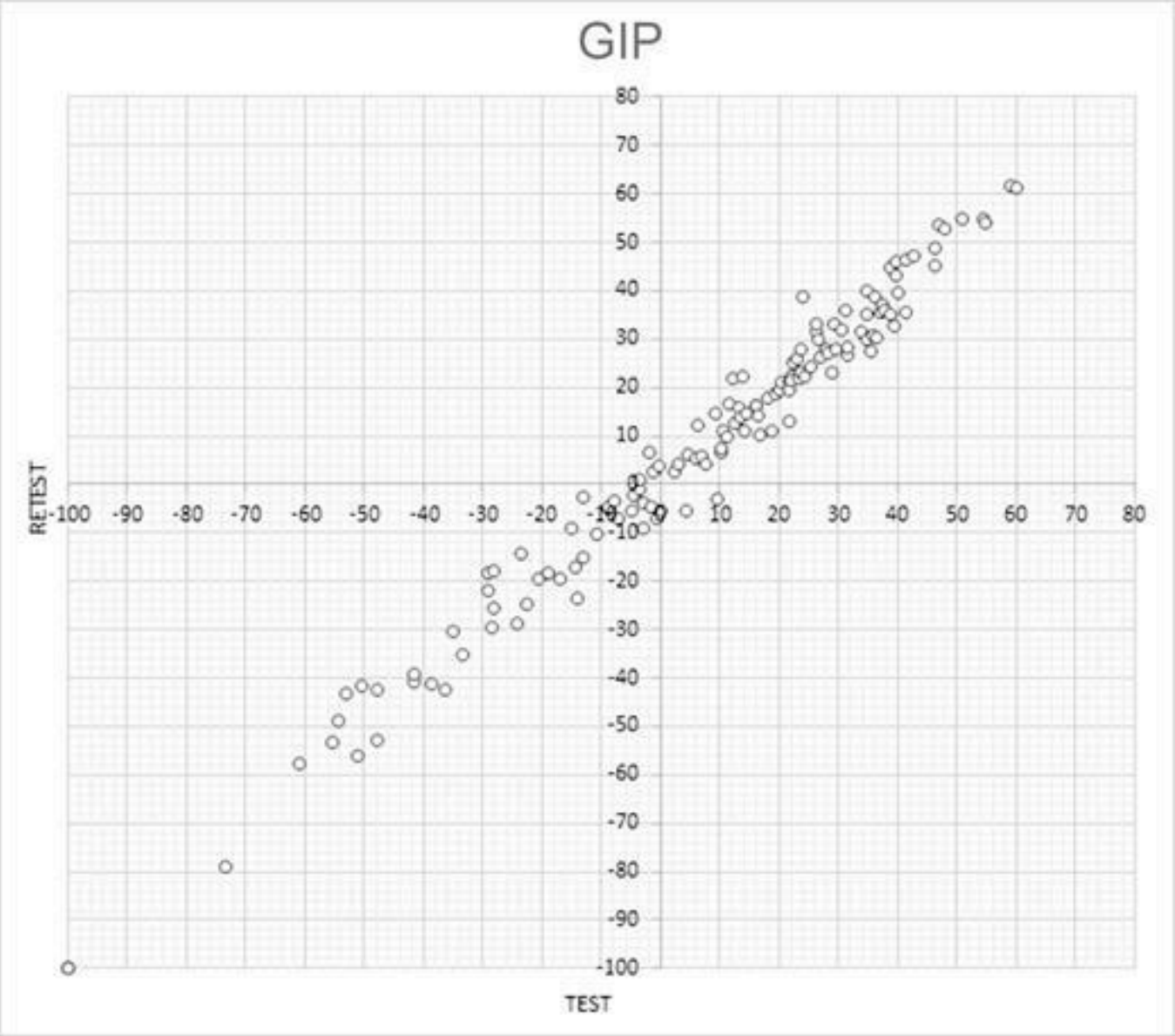

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Test-retest scatter plots of GIP