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ARVO Annual Meeting Abstract | June 2021

GLAUCOMA SCREENING IN 285,320 OPTIC DISC COLOR IMAGES USING LAGUNA ONhE HEMOGLOBIN DISTRIBUTION ANALYSIS

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Investigative Ophthalmology & Visual Science June 2021, Vol.62, 1010. doi:

Abstract

Purpose : To assess a mass screening in general population, mainly European, using the Laguna ONhE system to detect glaucoma.

Methods : 285,320 retinographies obtained in numerous locations with various fundus cameras were analyzed fully automatically and unsupervised via Internet, between January 2019 and December 2020. Deep Learning was used for identifying the eye (left or right), segmenting the disc and vessels, detecting image quality and generating a glaucoma classifier. A multi-factor index called Globin Distribution Factor (GDF) described in previous publications (1-9) was used. The amount of hemoglobin, the cup/disc ratios and the areas of the rim sectors were also estimated.

Results : 6.1% of cases were discarded because the system detected poor image quality, or absent or sectioned optic disc. 4.9% of the cases that could be analysed showed GDF below -15 (percentile 1% of the normal population) and 87.6% above 0 (percentile 5% of the normal population) (Figure). Cases with low GDF showed abnormal data in areas and indices associated with glaucoma (Table).

Conclusions : Although the data collection model did not allow individual diagnostic confirmation, GDF scores were consistent with the expected prevalence of glaucoma in the general population (10). Data and rates among such cases differ from normality as might be expected in glaucoma.

References:

1- Gonzalez de la Rosa M et al. IOVS 2013;54:482-489.
2- Pena-Betancor C et al. IOVS 2015;56:1562-1568.
3- Mendez-Hernandez C et al. Acta Ophthalmol 2016;94:697-704.
4- Mendez-Hernandez C et al. J Glaucoma 2016;25:348-354.
5- Medina-Mesa E et al. Current Eye Res 2016;41:798-805.
6- Perucho-Gonzalez L et al. J Pediatr Ophthalmol Strabismus 2017;54:387-394.
7- Gonzalez-Hernandez M et al. J Ophthalmol 2017;2340236.
8- Gonzalez-Hernandez D et al. J Clin Exp Opthamol. 2018;9:5 doi:10.4172/2155-9570.1000760.
9- Mendez-Hernandez C et al. Br J Ophthalmol 2020;doi:10.1136/bjophthalmol-2020-316455.
10- Tham et al. Ophthalmology 2014;121:2081-2090.

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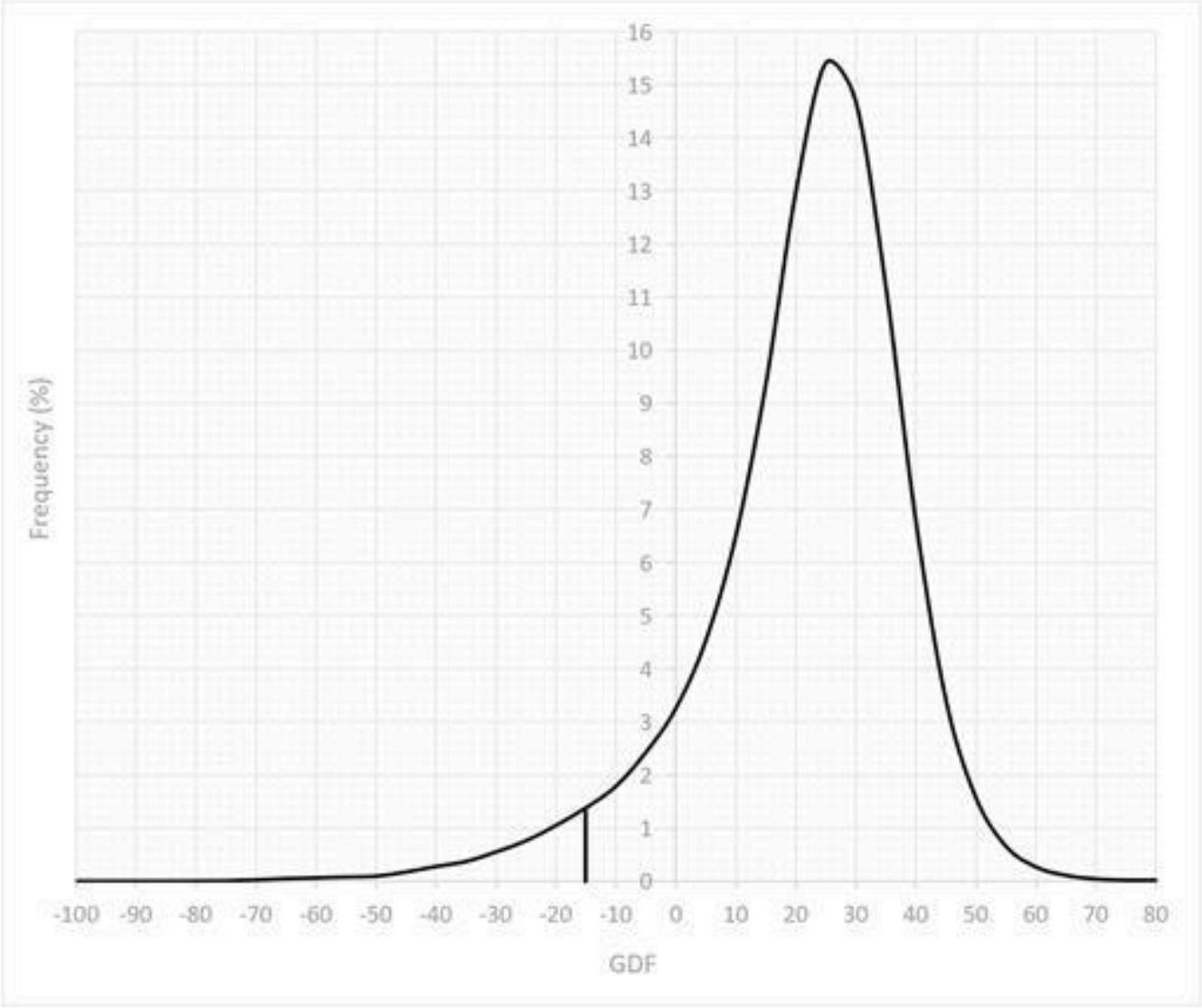

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Frequency distribution of the GDF index in the studied population.

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P < 0.0001 in all comparisons	GDF>0	0>GDF>-15	GDF<-15
Depp Learning clasification	0.88 ± 0.18	0.39 ± 0.27	0.12 ± 0.16
Vertical Cup/Disc estimation	0.48 ± 0.1	0.61 ± 0.07	0.67 ± 0.08
Cup/Disc Area estimation	0.29 ± 0.09	0.43 ± 0.08	0.5 ± 0.09
Total Hemoglobin (%)	69.66 ± 3.34	65.79 ± 4.08	64.21 ± 4.24
% Cup Area	29.54 ± 9.18	43.57 ± 8.45	50.59 ± 9.22
% Rim Area 311-40° (T)	17.27 ± 2.67	14.27 ± 2.82	12.95 ± 2.93
% Rim Area 41-80° (ST)	7.92 ± 1.19	6.4 ± 1.29	5.73 ± 1.43
% Rim Area 81-120° (SN)	8.56 ± 1.31	6.8 ± 1.37	5.96 ± 1.63
% Rim Area 121-230° (N)	20.1 ± 3.19	15.65 ± 3.24	12.98 ± 3.85
% Rim Area 231-270° (IN)	8.01 ± 1.3	6.33 ± 1.36	5.51 ± 1.67
% Rim Area 271-310° (IT)	8.59 ± 1.35	6.96 ± 1.4	6.25 ± 1.59

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Table

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