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Plus Disease in Retinopathy of Prematurity: Diagnostic Trends in 2016 vs. 2007

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Abstract

Purpose: To identify any temporal trends in the diagnosis of plus disease in retinopathy of prematurity (ROP) by experts.

Design: Reliability analysis

Methods: ROP experts were recruited in 2007 and 2016 to classify 34 wide-field fundus images of ROP as plus, pre-plus, or normal, coded as “3,” “2,” and “1” respectively in the database. The main outcome was the average calculated score for each image in each cohort. Secondary outcomes included correlation on the relative ordering of the images in 2016 versus 2007, inter-expert agreement, and intra-expert agreement

Results: The average score for each image was higher for 30/34 (88%) images in 2016 compared to 2007, influenced by fewer images classified as normal ($P<0.01$), a similar number of pre-plus ($P=0.52$), and more classified as plus ($P<0.01$). The mean weighted kappa values in 2006 were 0.36 (range 0.21 – 0.60) compared to 0.22 (range 0 – 0.40) in 2016. There was good correlation between rankings of disease severity between the two cohorts (Spearman’s rank correlation $\rho=0.94$) indicating near-perfect agreement on relative disease severity.

Conclusions: Despite good agreement between cohorts on relative disease severity ranking, the higher average score and classifications for each image demonstrate that experts are diagnosing pre-plus and plus disease at earlier stages of disease severity in 2016, compared with 2007. This has implications for patient care, research, and teaching, and additional studies are needed to better understand this temporal trend in image-based plus disease diagnosis.

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