Journal Article Review

Sensitivity and specificity of MultiColor imaging in detecting proliferative diabetic retinopathy

Based on:
Vaz-Pereira S, Morais-Sarmento T, De Salvo G. Int Ophthalmol 2021; 1-13.

Background and Purpose

Proliferative diabetic retinopathy (PDR) is an important cause of visual loss in diabetic individuals, characterized by the presence of neovascular complexes on the optic disc or elsewhere in the retina. Although fluorescein angiography (FA) is considered the gold standard to classify disease activity, guide laser therapy and evaluate treatment response, it is time-consuming and invasive, and cannot be performed at every visit.

Confocal MultiColor imaging available on the SPECTRALIS® multimodal imaging platform simultaneously scans with three distinct wavelengths for different tissue depth penetration, highlighting different retinal features. MultiColor imaging may be advantageous to visualize retinal neovascular complexes (NVC) undetected by color photos or fundoscopy and could complement FA in patients with media opacities or with contraindications for FA. The authors evaluated the diagnostic performance of MultiColor and FA for PDR and for associated DR features.

Methods

In this retrospective case series, a selection was made based on a database search and chart review of patients managed by a medical retina clinic. Other etiologies of proliferative retinopathy or reduced imaging quality due to significant media opacity were excluded. Same-day FA and MultiColor images (both 55º) were graded by two masked trained medical retina specialists, based on ETDRS grading for FA and a selection of DR imaging features. These included retinal neovascularization of the disc (within 1 disc diameter from its margin; NVD) and elsewhere (NVE), round imaging artifact, microaneurysm, intraretinal hemorrhage, vitreous hemorrhage, preretinal hemorrhage, fibrosis, hard exudates, diabetic macular edema, epiretinal membrane, ischemia, and laser spots.

Results

- 59 eyes of 38 patients with PDR were evaluated.
- Of the total number of NVC, MultiColor detected 69.5% compared to 86.4% with the gold standard (FA).
- MultiColor had a high sensitivity to detect NVC, NVD and NVE (95.1%, 88.9% and 78.0%), while its specificity was lower except for NVD (40.0%, 76.9% and 63.6%, resp.).
- MultiColor also had high positive predictive values (PPV) with 92.9%, 90.0% and 88.9% for NVC, NVD and NVE resp., with lower negative predictive values (NPV) with 50.0%, 87.0% and 43.8% resp.
- MultiColor showed an ‘excellent’ or better discrimination for other DR features, including NVD, all three types of hemorrhage, ERM (albeit borderline significant) and laser spots (AUC ≥0.81). It showed ‘acceptable’ discrimination for the remaining features (AUC 0.7-0.8) except hard exudates (AUC 0.58).

Conclusions

- Based on their findings, the authors argue that MultiColor is a useful and noninvasive complimentary test for the diagnosis and follow-up of PDR.
- The data indicates that MultiColor is an excellent standalone modality to diagnose NVC’s as the hallmark signs of PDR, although less suited for screening these features.
- MultiColor is excellent at discriminating NVD, laser spots, as well as hemorrhagic complications of NVC which determine high risk PDR, and can do so more accurately than FA.

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