RETINA ROUNDUP

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Investigation of incidence and causes of acute vision loss during anti-vascular endothelial growth factor therapy for neovascular age-related macular degeneration during a 4-year follow-up

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Purpose:
To investigate the incidence, risk factors, and outcomes of patients with age-related macular degeneration (AMD) who experienced acute vision loss despite periodic injections of anti-vascular endothelial growth factor (VEGF) treatment for 4 years.

Methods:
This retrospective cohort study included patients who were diagnosed with treatment-naïve neovascular AMD and completed a 4-year follow-up. The incidence and risk factors for the occurrence of three or more lines of visual loss at every check-up were investigated.

Results:
The analysis included 76 eyes of 76 patients. Acute vision loss occurred in 30 eyes (39.5%) over 4 years. Lower baseline best collected visual acuity (BCVA) and disrupted ellipsoid zone were independent predictors of vision loss occurrence. Although the causes and timing of visual acuity loss varied, retinal pigment epithelium tears were observed only in the first year. Most (86.7%) patients who experienced vision loss recovered their vision to pre-loss levels at least once; however, the final BCVA was worse than that in the group that did not experience acute vision loss.

Conclusion:

Approximately half of the patients with AMD experienced acute vision loss during a 4-year, despite continuous anti-VEGF treatment. Most patients recovered from vision losses temporarily; however, they experienced worse visual outcomes subsequently.

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2) Am J Ophthalmol. 2022 OCT; 11;247:137-144

Optical Coherence Tomography Biomarkers for Conversion to Exudative Neovascular Age-related Macular Degeneration

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Purpose: To identify optical coherence tomography (OCT) biomarkers, including thin and thick double-layer sign (DLS) for the progression from intermediate AMD (iAMD) to exudative macular neovascularization (MNV) over 24 months.

Design: Retrospective cohort study.

Methods: Setting: Retina consultants of Texas.

Patient population: 458 eyes of 458 subjects with iAMD in at least 1 eye with 24 months of follow-up data.

Main outcomes measures: The following biomarkers were assessed at baseline: high central drusen volume (≥0.03 mm3), intraretinal hyper-reflective foci (IHRF), subretinal drusenoid deposits, hyporeflective drusen cores, thick DLS, thin DLS, and central choroidal thickness. A binary logistic regression was computed to investigate the association between baseline OCT covariates and the conversion to exudative MNV within 24 months. In addition, fellow eye status was also included in the model.

Results: During follow-up, 18.1% (83 of 458) of eyes with iAMD progressed to exudative MNV. Thick DLS, IHRF, and fellow eye exudative MNV were found to be independent predictors for the development of exudative MNV within 2 years. The baseline frequencies, odds ratios, 95% confidence intervals, and P values for these biomarkers were as follows: thick DLS (9.6%, 4.339, 2.178-8.644; P < .001), IHRF (36.0%, 2.340, 1.396-3.922; P = 0.001), and fellow eye exudative MNV (35.8%, 1.694, 1.012-2.837; P = .045).

Conclusions: Thick DLS, IHRF, and fellow eye exudative MNV were associated with an increased risk of progression from iAMD to exudative MNV. These biomarkers, which are readily identified by the review of OCT volume scans, may aid in risk prognostication for patients and for identifying patients for early intervention trials.

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3) Br J Ophthalmol 2023 Jan 31;bjo-2022-322183

An ensemble of deep convolutional neural networks is more accurate and reliable than board-certified ophthalmologists at detecting multiple diseases in retinal fundus photographs.

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Aims: To develop an algorithm to classify multiple retinal pathologies accurately and reliably from fundus photographs and to validate its performance against human experts.

Methods: We trained a deep convolutional ensemble (DCE), an ensemble of five convolutional neural networks (CNNs), to classify retinal fundus photographs into diabetic retinopathy (DR), glaucoma, age-related macular degeneration (AMD) and normal eyes. The CNN architecture was based on the InceptionV3 model, and initial weights were pretrained on the ImageNet dataset. We used 43 055 fundus images from 12 public datasets. Five trained ensembles were then tested on an 'unseen' set of 100 images. Seven board-certified ophthalmologists were asked to classify these test images.

Results: Board-certified ophthalmologists achieved a mean accuracy of 72.7% over all classes, while the DCE achieved a mean accuracy of 79.2% (p=0.03). The DCE had a statistically significant higher mean F1-score for DR classification compared with the ophthalmologists (76.8% vs 57.5%; p=0.01) and greater but statistically non-significant mean F1-scores for glaucoma (83.9% vs 75.7%; p=0.10), AMD (85.9% vs 85.2%; p=0.69) and normal eyes (73.0% vs 70.5%; p=0.39). The DCE had a greater mean agreement between accuracy and confident of 81.6% vs 70.3% (p<0.001).

Discussion: We developed a deep learning model and found that it could more accurately and reliably classify four categories of fundus images compared with board-certified ophthalmologists. This work provides proof-of-principle that an algorithm is capable of accurate and reliable recognition of multiple retinal diseases using only fundus photographs.

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4) Retina 2023 Feb 1;43(2):338-347

COMBINED HAMARTOMA OF THE RETINA AND RETINAL PIGMENT EPITHELIUM AT PEDIATRIC AGE: Surgical Versus Conservative Approach

Ozdek S, Ucgul AY, Hartnett ME, Akdogan M, Sen P, Bhende M, Besirli CG, Karacorlu M, Dedania V, Parolini B, Mittal S, Banker A, El Rayes E, Tawfik M, Wu WC, Attiku Y, Hansen E, Portney D, Sarvaiya C, Sahin O, Ozdemir HB , Gurelik G

Purpose: To report outcomes of pediatric patients with combined hamartoma of the retina and the retina pigment epithelium followed up conservatively or after pars plana vitrectomy.

Methods: This retrospective multicenter study included 62 eyes of 59 pediatric patients with combined hamartoma of the retina and the retina pigment epithelium from 13 different international centers with an average age of 7.7 ± 4.7 (0.3-17) years at the time of the diagnosis and having undergone pars plana vitrectomy or followed conservatively. At baseline and each visit, visual acuity values, optical coherence tomography for features and central foveal thickness, and tumor location were noted. Lesions were called as Zone 1, if it involves the macular and peripapillary areas, and the others were called as Zone 2 lesions.

Results: Twenty-one eyes of 20 patients in the intervention group and 41 eyes of 39 patients in the conservative group were followed for a mean of 36.2 ± 40.4 (6-182) months. Best-corrected visual acuity improved in 11 (68.8%) of 16 eyes in the intervention group and 4 (12.9%) of 31 eyes in the conservative group ($P < 0.001$). The mean central foveal thickness decreased from 602.0 ± 164.9 μ m to 451.2 ± 184.3 μ m in the intervention group, while it increased from 709.5 ± 344.2 μ m to 791.0 ± 452.1 μ m in Zone 1 eyes of the conservative group. Posterior location of tumor, irregular configuration of the foveal contour and ellipsoid Zone defect in optical coherence tomography, subretinal exudate and prominent vascular tortuosity were associated with poor visual acuity.

Conclusion: Vitreoretinal surgery is safe and effective in improving vision and reducing retinal distortion in Zone 1 combined hamartoma of the retina and the retina pigment epithelium in children

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5) J Curr Ophthalmol 2022 Nov 30;34(3):323-327

Long-term Complications of Conventional and Chandelier-Assisted Scleral Buckle for Primary Repair of Rhegmatogenous Retinal Detachment

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Purpose: To compare the outcomes of conventional indirect ophthalmoscopy and wide-angled visualization with chandelier endo-illumination methods in scleral buckle surgery by focusing on postoperative complications in the postoperative long-term period.

Methods: In this retrospective comparative study, patients who underwent scleral buckle surgery due to rhegmatogenous retinal detachment were included in the study. Conventional scleral buckle surgery using indirect ophthalmoscopy was performed in Group 1, and wide-angled visualization with chandelier endo-illumination method in scleral buckle surgery was performed in Group 2. The outcomes of the two methods were compared.

Results: The demographic and baseline clinical characteristics of the groups were similar ($P > 0.05$, for all). The mean follow-up time was 70.47 ± 20.32 weeks (52-116) in Group 1 and 64.89 ± 18.12 weeks (52-100) in Group 2 ($P > 0.05$). There was no significant difference in the mean postoperative best-corrected visual acuity and redetachment rates of the groups ($P > 0.05$, for both). The cumulative rate of postoperative complications was more frequent in Group 1 ($P = 0.011$) despite being not significant in one-by-one comparison of the complications including epiretinal membrane, proliferative vitreoretinopathy, glaucoma, cystoid macular edema, foveal atrophy, gaze restriction, and macular hole ($P > 0.05$, for all).

Conclusion: Using wide-angled visualization with chandelier endo-illumination in scleral buckle surgery, favorable surgical outcomes can be achieved in the postoperative long-term period with fewer complications.

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6) Clin Ophthalmol 2023 Jan 7;17:115-121.

Anatomical and Functional Outcomes in Delayed Onset versus Concurrent Retinal Detachment in Endophthalmitis

Srinivasan R, Roy K, Mahesh M, Surya J , Raman R

Purpose: To determine the functional and anatomical outcomes of patients with endophthalmitis with concurrent or delayed onset retinal detachment (RD), and compare the preoperative, intraoperative and postoperative features.

Patients and methods: This was a retrospective review of 121 eyes in 121 patients presenting with endophthalmitis and RD. Subjects were categorized into two groups: endophthalmitis with delayed onset RD (group 1, N=76) and endophthalmitis with concurrent RD (group 2, N=45).

Results: The mean age of patients in groups 1 and 2 was 38.21±21.60 and 46.78±24.42 years, respectively (P=0.047). Exogenous endophthalmitis was common in both groups 1 and 2 (86.84% and 84.44%, respectively). No significant differences were found between the groups in the type of RD, retinal breaks, number of quadrants involved or proliferative vitreoretinopathy grade. In the overall cohort, visual acuity improved post-surgery in one-third of the patients who were in the near or total blindness category at presentation. We found good anatomical success rates of an attached retina in both groups 1 and 2 (84.3% and 77.7%, P=0.376).

Conclusion: Our study presents the results of patients with endophthalmitis and delayed onset RD or concurrent RD. It shows a few differences in presentation between the groups, but the anatomical and functional outcomes were almost the same.

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