Condition Spotlight: White and Dark Without Pressure

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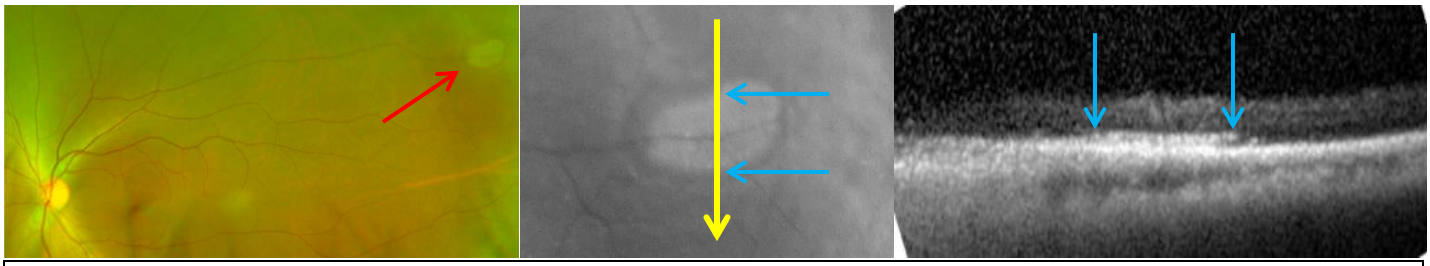
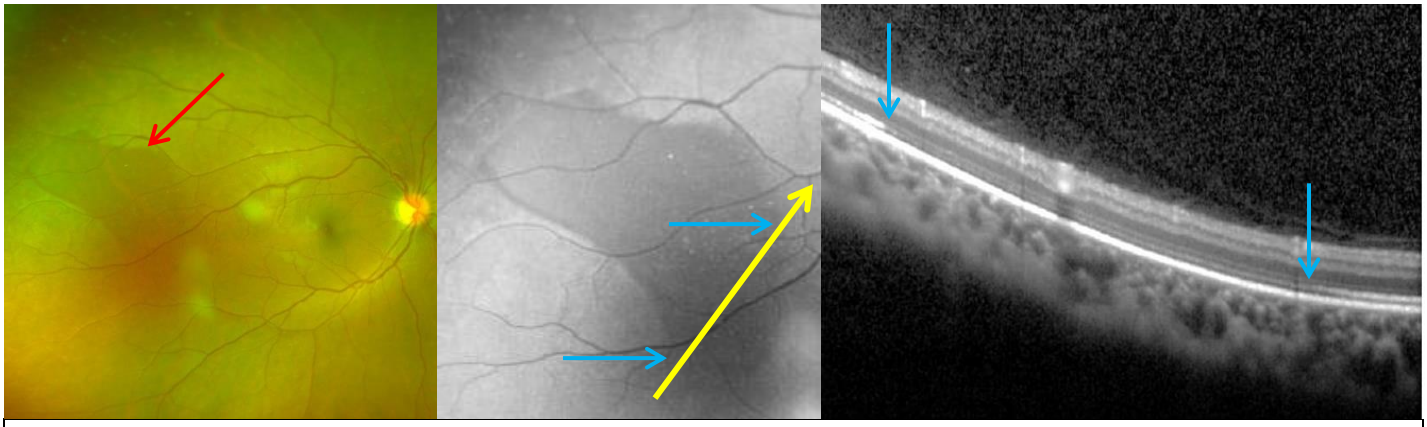
Case 1: A 34 year old Asian female was referred to CFEH for a peripheral retinal assessment. She was asymptomatic, had normal acuity and her ocular and family histories were unremarkable.



Optomap ultra widefield pseudocolour (left) and green separation (middle) images showed a white circular area with a red-brown coloured border in the temporal periphery of the left eye (red arrow). An OCT line scan (right) in the location denoted by the yellow line in the Optomap green separation image showed hyper-reflectivity at the inner segment ellipsoid zone corresponding to the area of retinal pallor (blue arrows).

Case 2: A 28 year old myopic Middle Eastern female was referred to CFEH for a peripheral retinal assessment regarding longstanding floaters in the right eye. She was otherwise asymptomatic and her ocular and family histories were unremarkable.



Optomap ultra widefield pseudocolour (left) and green separation (middle) images showed a dark region in the temporal midperiphery of the right eye (red arrow). An OCT line scan in the location denoted by the yellow line in the Optomap green separation image showed hypo-reflectivity at the level of the photoreceptors corresponding to the area of darkening in the retina (blue arrows).

Case Summary

The findings were consistent with white without pressure (WWOP) in the temporal peripheral retina of the left eye in Case 1 and dark without pressure (DWOP) in the temporal midperiphery of the right eye in Case 2.

Management

Annual review with the referring optometrist was recommended in both of these cases (Case 2 also exhibited areas of WWOP – not shown).

Clinical Implications

- ***White and dark without pressure are common findings, particularly in darkly pigmented fundi, and may vary in size and shape over time.***

White without pressure (WWOP) is a common and often incidental finding in the normal peripheral retina, occurring in up to 30% of the general population.[1] It is seen more frequently in myopic eyes and with increasing age. It appears clinically as an area of translucent white to grey retina, frequently sharply demarcated from normal retina and often with a red-brown posterior border. It is usually more pronounced in darkly pigmented fundi. The affected area may appear thickened and resemble retinoschisis or retinal detachment but is in fact flat. Regions of WWOP can assume varying shapes which may migrate or change in size over time.[2]

Dark without pressure (DWOP) is observed less frequently than white without pressure. It appears as discrete patches of darker retina, usually in the retinal midperiphery or posterior pole, often with well-defined scalloped edges. [1] It is more common in darkly pigmented individuals. Like WWOP, affected areas are flat, vary in shape and can change over time. DWOP may appear at the border of areas of WWOP. It appears to have no relationship to the vitreous. A connection to sickle cell disease was originally reported in 1975, [4] however there has been a lack of evidence to support this.

- ***The exact cause of WWOP and DWOP is unknown***

Although WWOP lesions are commonly believed to be due to vitreoretinal interface abnormalities, OCT imaging shows that both white and dark without pressure are associated with changes at the level of the outer retina.[5,6] Compared to the adjacent, unaffected fundus, WWOP shows relative hyper-reflectivity on infrared reflectance at the level of the photoreceptors while DWOP shows relative hypo-reflectivity. Both WWOP and DWOP have been shown to exhibit relative hypo-autofluorescence.[6]
The specific structural aetiology of the outer retinal changes is still unknown, however it has been postulated that these findings are related to the presence of photopigment with different density or spectral range within these lesions.[6] It is still uncertain whether the changes in outer retinal reflectivity correlating with DWOP and WWOP seen on OCT may be induced by vitreous traction. It has been suggested that acquired WWOP may involve traction exerted on the peripheral retina by the vitreous base as globe diameter increases with age or myopia, leading to outer retinal changes.[5]

- ***The potential association between WWOP and the development of retinal breaks is unclear.***

Regions of WWOP may be found near areas of lattice or snowflake degenerations, localized retinal detachments, and in vitreous degeneration or PVD. [1] WWOP has been postulated to result from changes in reflectivity at the vitreoretinal interface, possibly from increased vitreoretinal adhesion and traction, however this has not been shown consistently.[1,3] Retinal tears can develop along the posterior border of white with pressure or WWOP and as such, 6 monthly follow-up is recommended in the case of additional risk factors for retinal tears, such as lattice degeneration or progressive vitreous degeneration. In absence of associated risk factors for retinal tears, follow-up review every 1-2 years recommended. [1]

References

1. Alexander LJ, *Primary Care of the Posterior Segment*, 3rd edn., McGraw Hill, 2002, pp.514-517.
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3. Shukla M. White with pressure and white without pressure lesions. Indian Journal of Ophthalmol. 1982;30(3):129-132.
4. Nagpal KC, Goldberg MF, Asdourian G, Goldbaum M, Huamonte F. Dark-without-pressure fundus lesions. Br J Ophthalmol. 1975;59(9):476-9.
5. Diaz RI, Sigler EJ, Randolph JC, Rafieetary MR, Calzada JI. Spectral domain optical coherence tomography characteristics of white-without-pressure. Retina. 2013: 1020-1.
6. Fawzi AA, Nielsen JS, Mateo-Montoya A, Somkijrungroj T, Li HK, Gonzales J, Maugt-Faysse M, Jampol LM. Multimodal imaging of white and dark without pressure fundus lesions. Retina. 2014;34(12):2376-87.