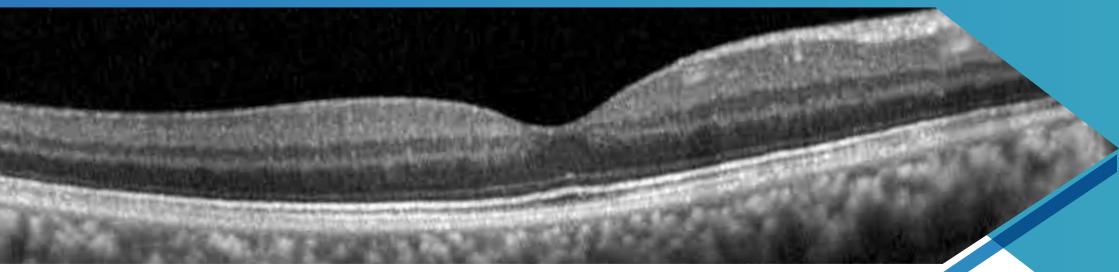

A Simple Guide to OCT Interpretation of Common Macula Diseases

NOVARTIS

MALAYSIAN SOCIETY OF OPHTHALMOLOGY

Foreword

Optical coherence tomography (OCT) of the retina is now an indispensable tool in every ophthalmologists clinic. Optometrists are also beginning to use this diagnostic tool in their daily practice. I am pleased that Novartis has taken the initiative to publish this handbook for all OCT users.

This handbook has the typical OCT images of the most common macula diseases encountered in your clinic and I hope it will help you diagnose conditions and maximise the use of your OCT machine.

Some useful tips when interpreting OCT images:

1. Use the black and white images as it will help you identify the different layers of the retina better.

2. Work your way systematically through each of the layers (vitreous, inner limiting membrane (ILM), inner and outer retina, retinal pigment epithelium (RPE), choroid and sclera. Which layers are the abnormalities in?

3. Always examine the retina yourself to correlate your findings with the OCT image. Avoid making a diagnosis based on OCT images alone.

Dr Kenneth Fong
President

MALAYSIAN SOCIETY OF OPHTHALMOLOGY

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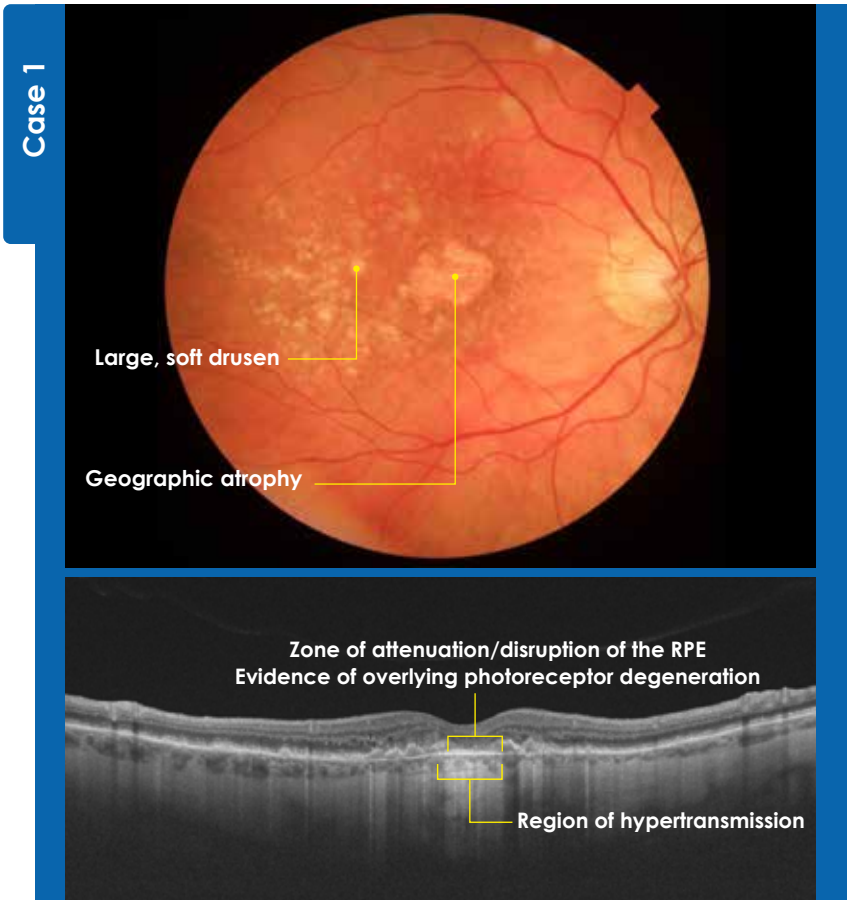
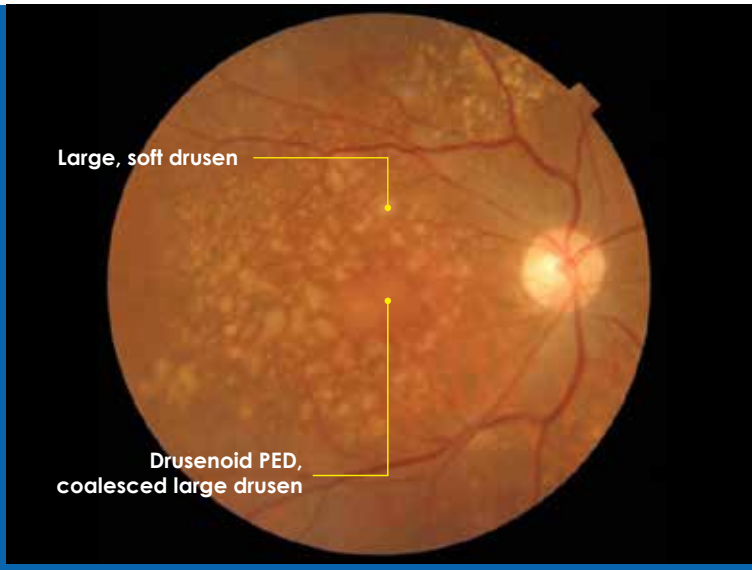
Age-related macular degeneration (AMD)

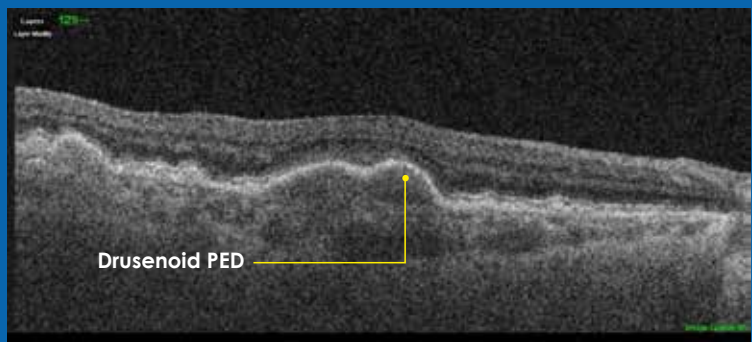
Dry AMD

Atrophy and drusen are the main signs of dry AMD. Key OCT features are generalised thinning of the outer retinal layer, RPE and choroid. Localized elevations in the RPE layer correspond to drusen as seen in the colour photos. Advanced dry AMD will show atrophy and loss of the outer retinal layers.

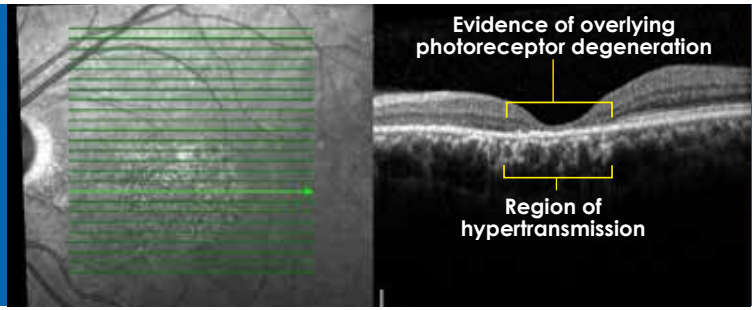


Case 2


Large, soft drusen
Drusenoid PED,
coalesced large drusen

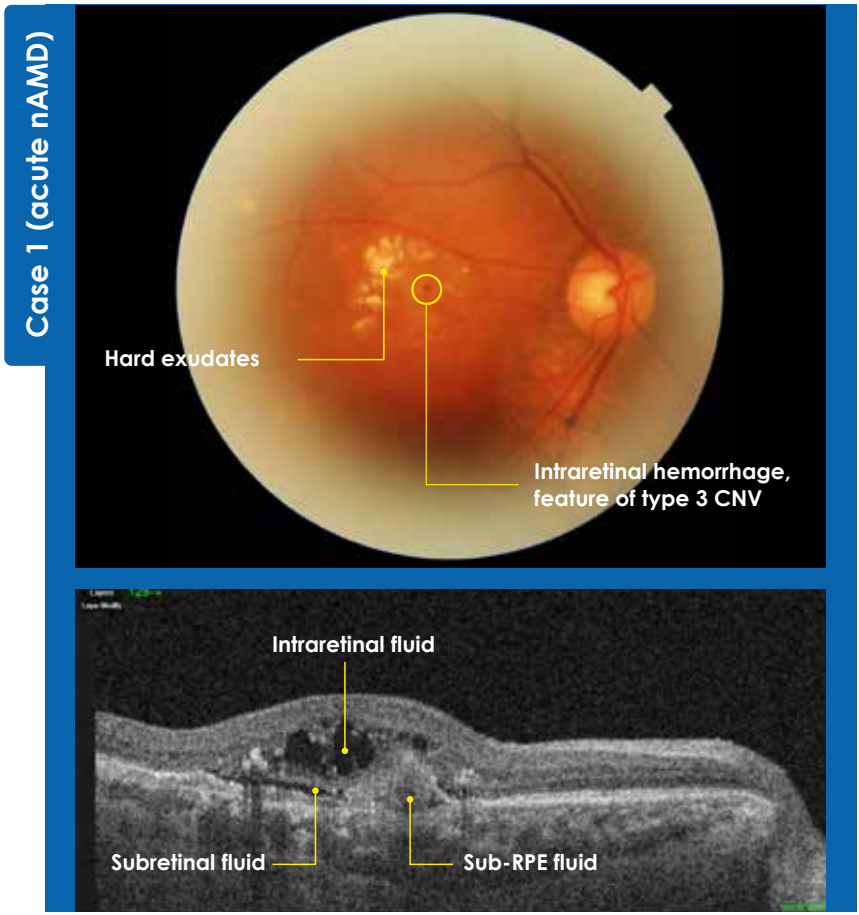

Drusenoid PED

Case 3


Evidence of overlying
photoreceptor degeneration
Region of
hypertransmission

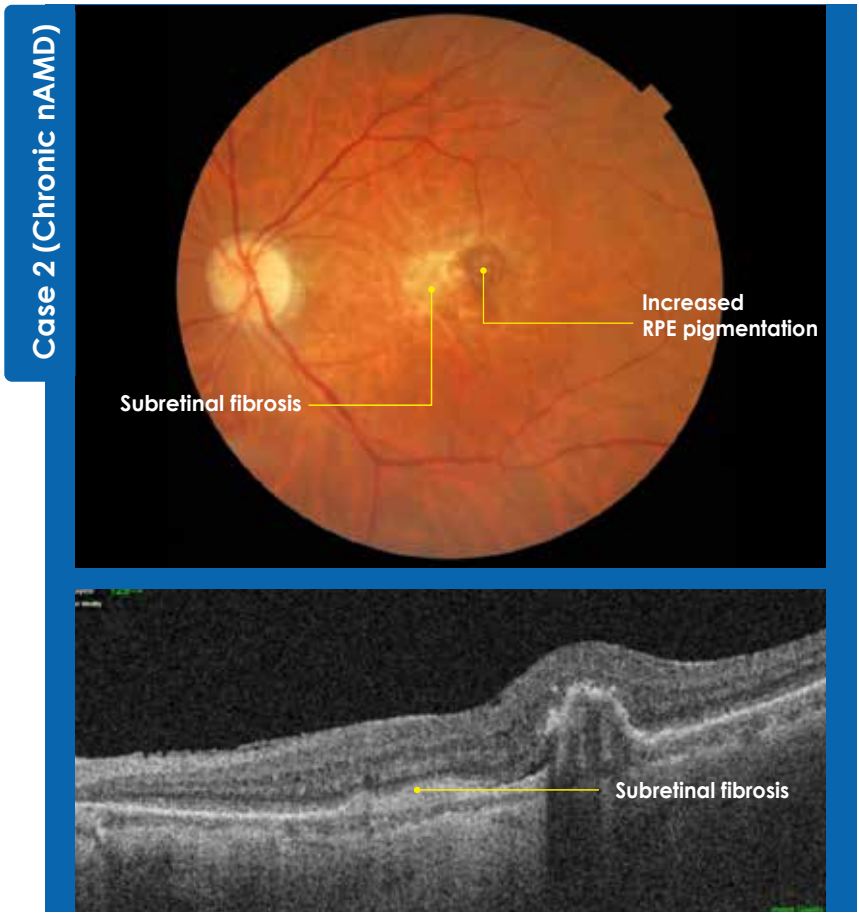
Neovascular age-related macular degeneration (nAMD)

Typical nAMD is much less common in the Asian population. This is seen as localised subretinal hemorrhage with edema and/or drusen on fundus photo. The OCT findings are intraretinal and/or subretinal fluid and exudates (case 1), pigment epithelial detachment (PED) and subretinal hemorrhage. The actual neovascular membrane can sometimes be seen as a lesion that grows from the choroid under the RPE layer. Chronic cases would have RPE pigmentation of the intraretinal or subretinal layers as seen in case 2. The other eye would often have signs of dry AMD.



Case 2 (Chronic nAMD)

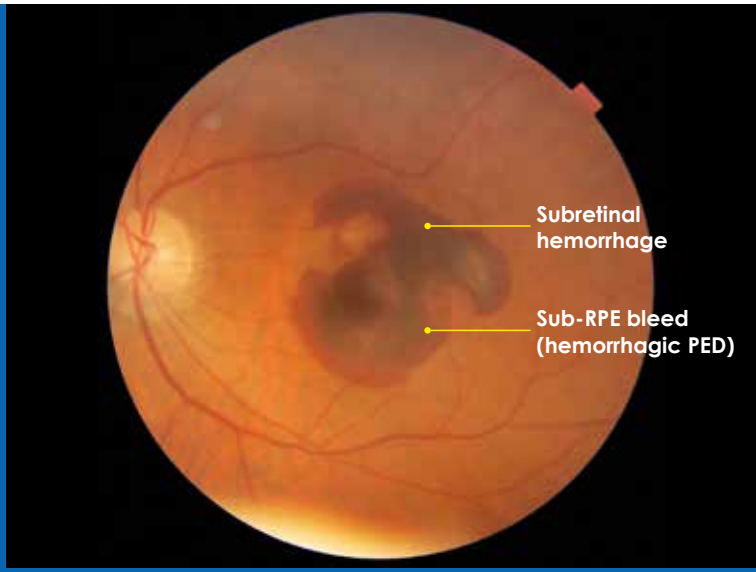
Patient who has nAMD with scarring. Monitor for any increase in fluid to decide on need for treatment.

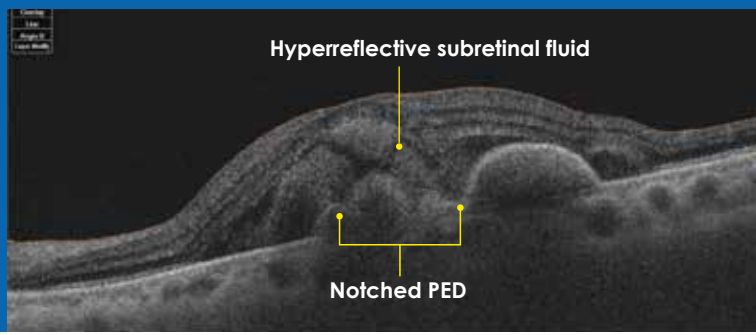


Polypoidal choroidal vasculopathy (PCV)

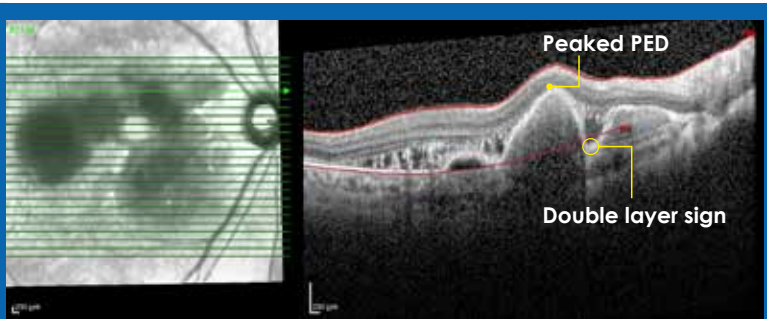
PCV presents in more than 50% of cases of suspected AMD in Malaysia. The other eye is often normal. There is often a large submacular hemorrhage present with multiple hemorrhagic PEDs (case 1). The OCT findings include multiple highly peaked PED (case 2), intraretinal and subretinal hemorrhage and fluid, highly reflective layer under the RPE (double layer sign), notching of the PED and intraretinal hard exudates.

Case 1

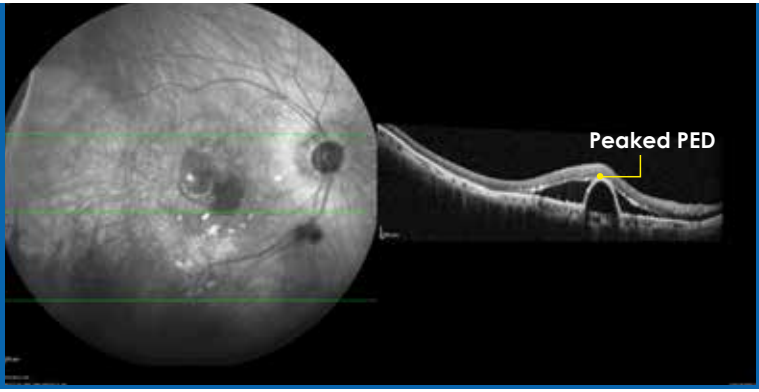




Case 2



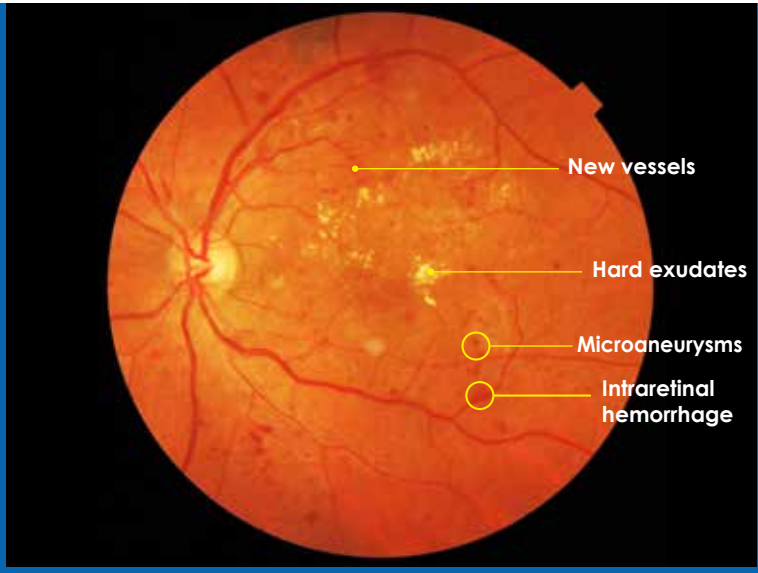
Case 3

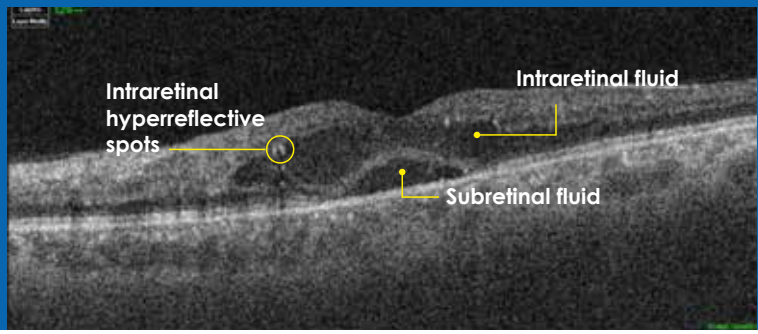


Diabetic Macular Edema (DME)

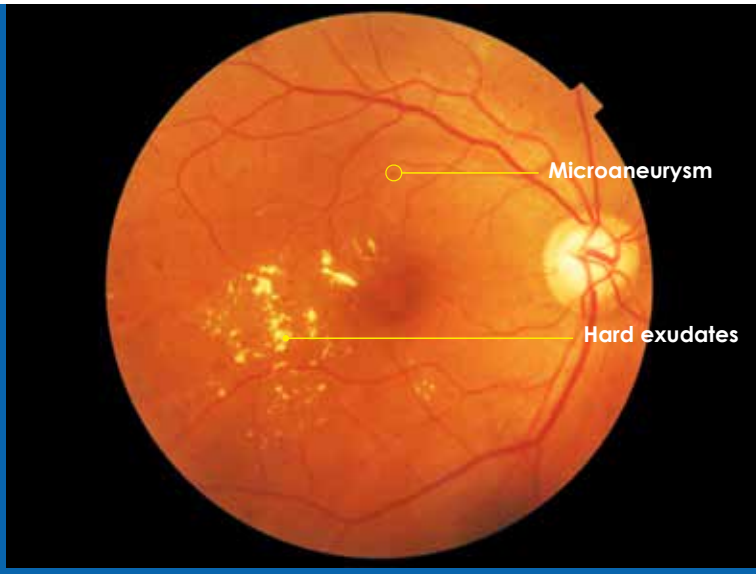
DME is easily diagnosed by clinical examination in diabetic patients. The colour fundus features include hard exudates, macula edema, intraretinal hemorrhage, microaneurysm and new vessels. OCT findings are quite specific and include intraretinal and subretinal fluid or cysts (case 1), intraretinal hyperreflective spots (case 1 and 2) and intraretinal exudates. There may also rarely be vitreomacula traction visible on OCT.

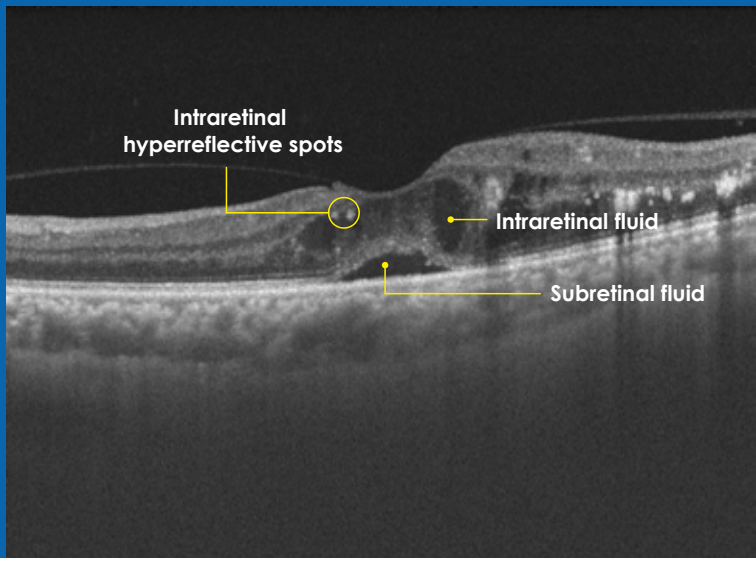
Case 1





Case 2


Microaneurysm
Hard exudates

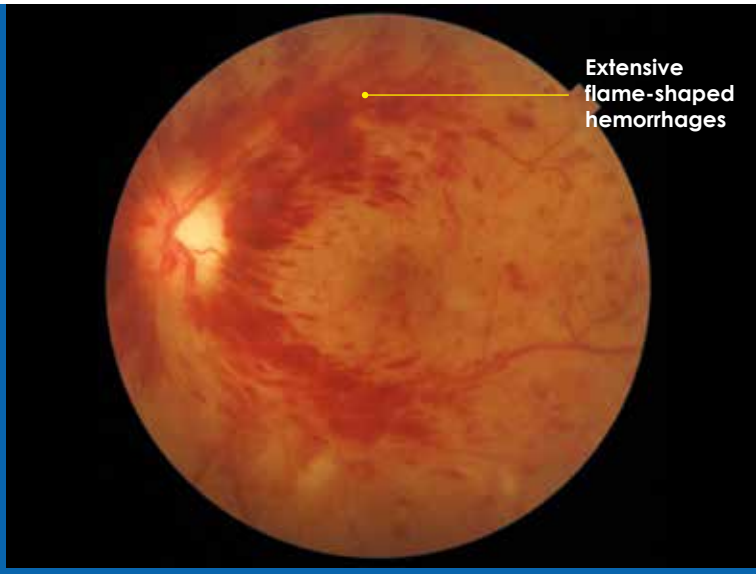

Intraretinal
hyperreflective spots
Intraretinal fluid
Subretinal fluid

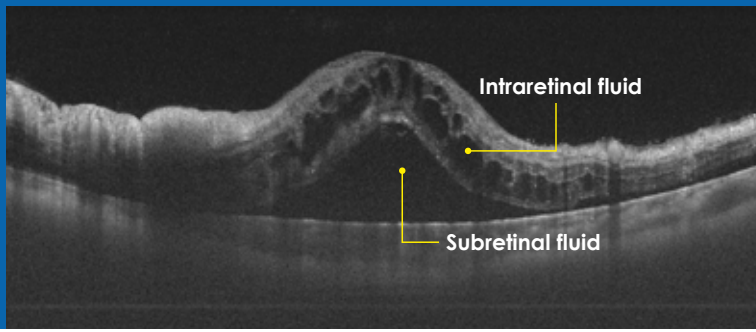
Retinal Vein Occlusion

Central Retinal Vein Occlusion (CRVO)

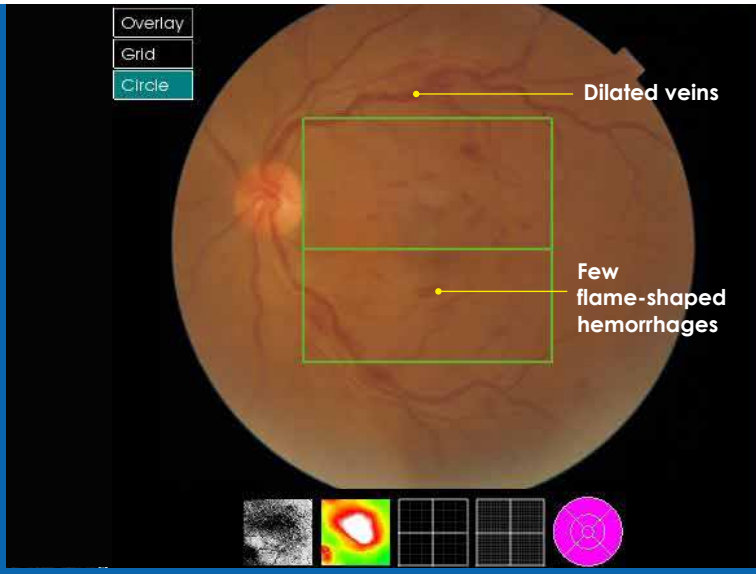
CRVO is easily recognised on colour fundus photo as extensive intraretinal hemorrhage with macula edema. OCT findings include extensive intraretinal cysts, subretinal fluid, and epiretinal membrane in chronic cases,

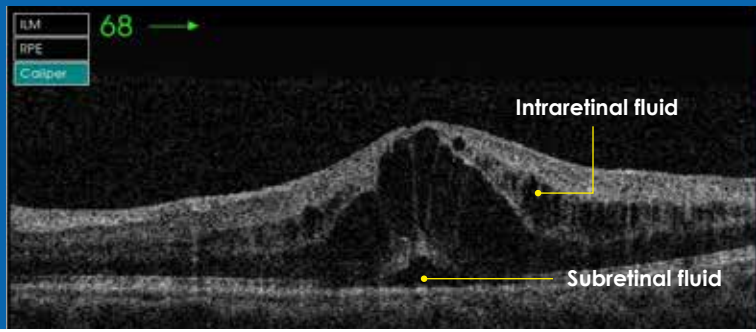
Case 1 (acute)





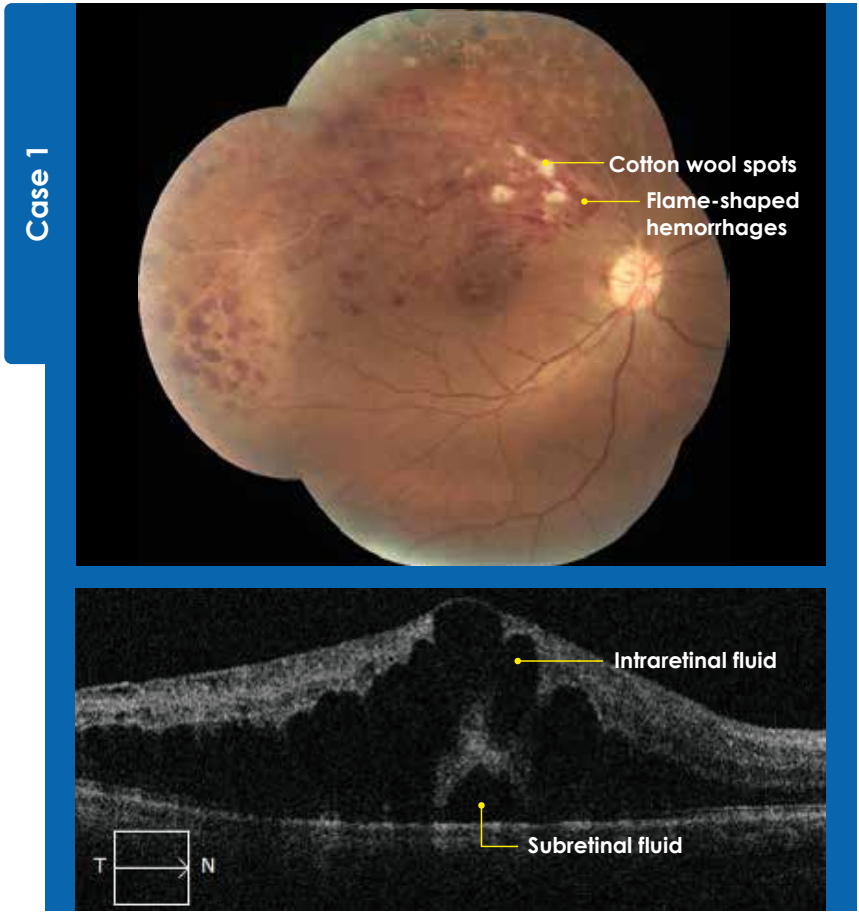
Case 2 (chronic)



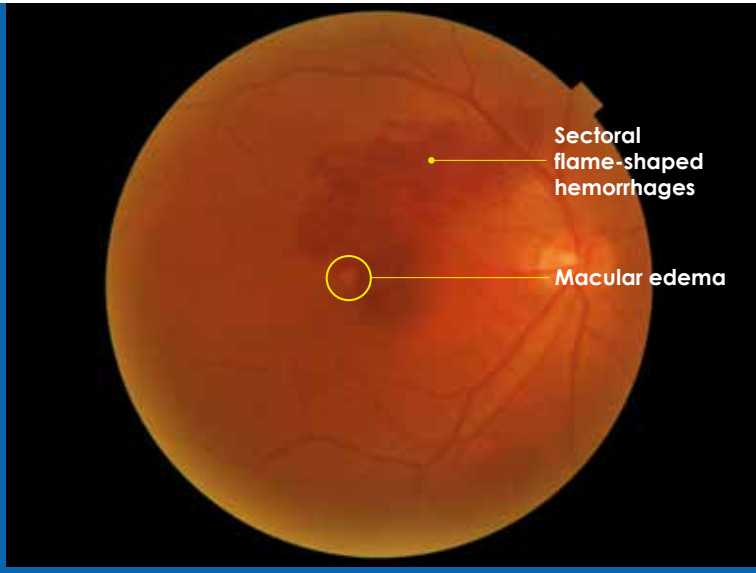


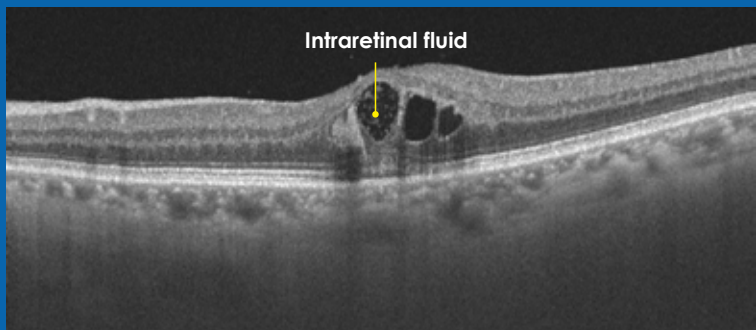
Branch Retinal Vein Occlusion (BRVO)

BRVO is also easily recognized and the OCT features are similar to that of CRVO but the amount of intraretinal edema is often much less.



Case 2

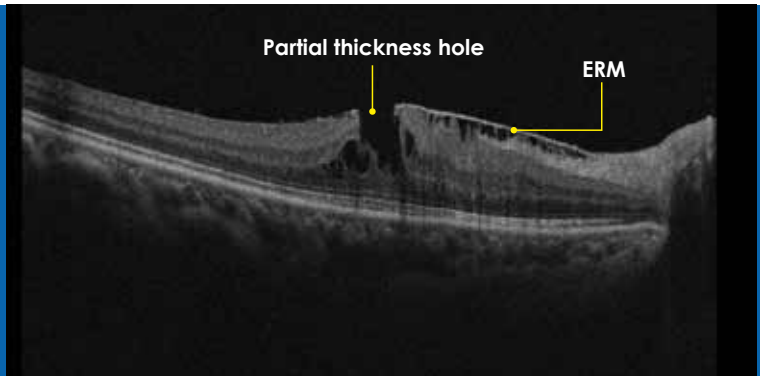

Sectoral
flame-shaped
hemorrhages
Macular edema


Intraretinal fluid

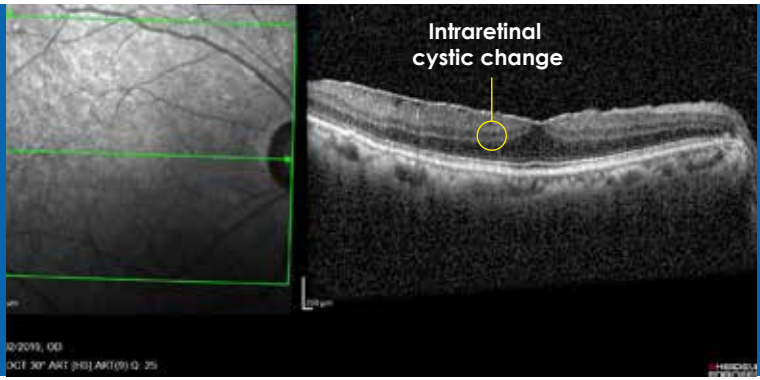
Epiretinal membrane (ERM)

ERM is very common and often co-exists with elderly patients diagnosed with cataracts. The cataract may make it hard to clinically diagnose fine ERM. Performing OCT prior to cataract surgery would identify pre-existing ERM that may impact visual outcomes. The ERM is seen as a highly reflective layer on the inner retina layer and may be associated with partial thickness lamellar hole (case 1) and intraretinal cystic change (case 2 and 3).

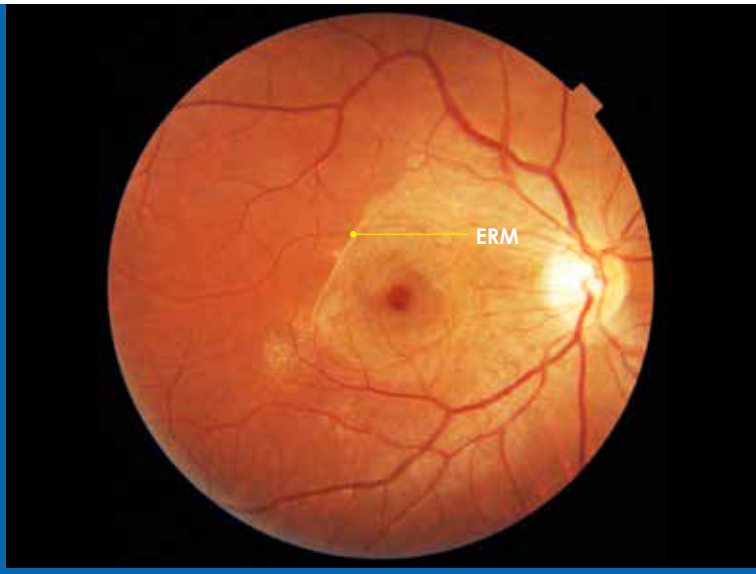
Case 1

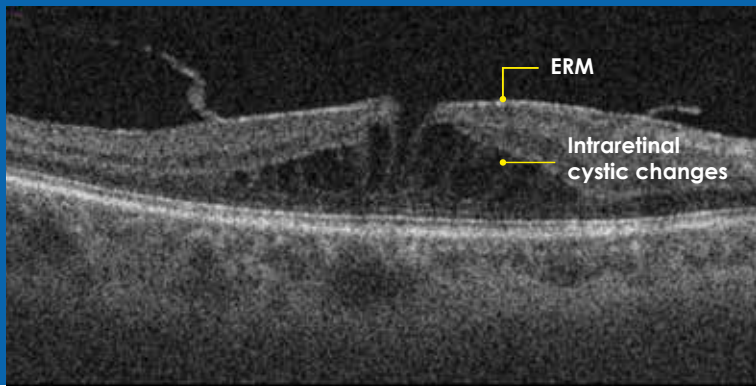


Case 2



Case 3

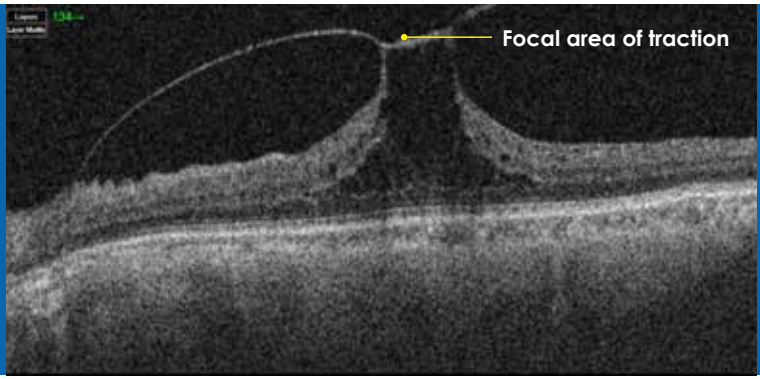




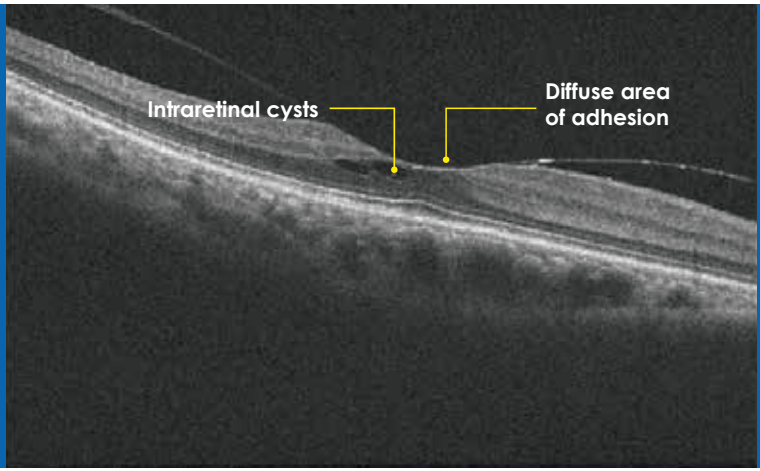
Vitreomacular traction (VMT) or adhesion (VMA)

VMT or VMA can be hard to diagnose on fundoscopic examination alone. VMT refers to a focal area of traction from the vitreous (case 1) while VMA refers to a broad area of vitreous adhesion. Most OCT machines can now reliably detect the posterior hyaloid face of the vitreous.

Case 1



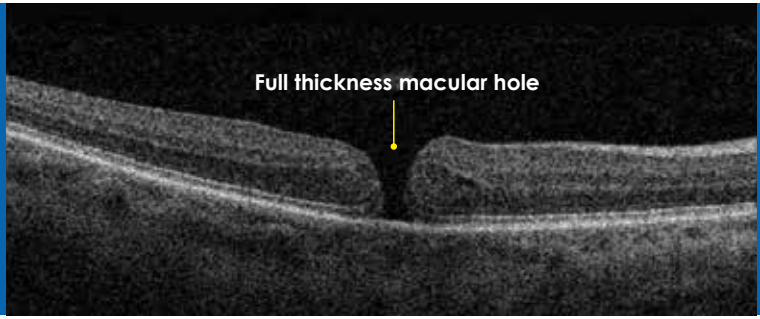
Case 2



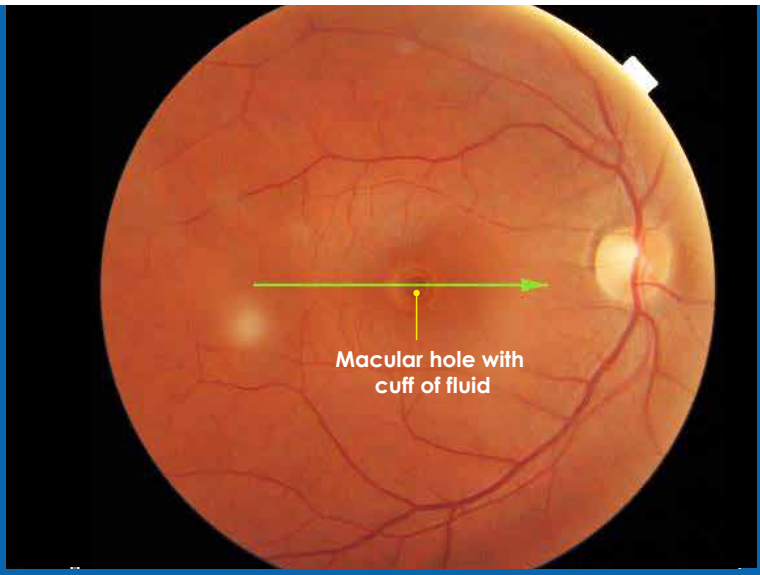
Macular Hole (MH)

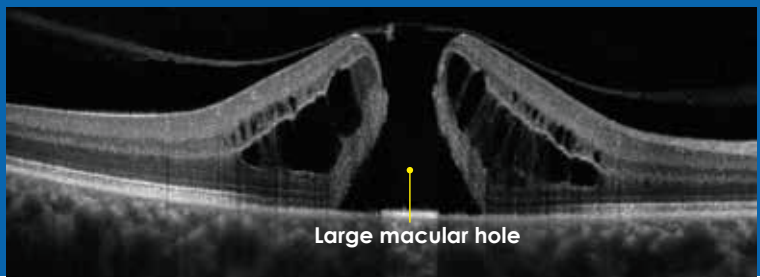
OCT is an extremely useful tool for diagnosing and staging macula holes. The key feature from stage 2 to 4 macula hole is the full thickness defect at the fovea as seen in both these images. Case 1 illustrates a small MH while case 2 shows a large acute MH with a surrounding cuff of intraretinal fluid.

Case 1



Case 2

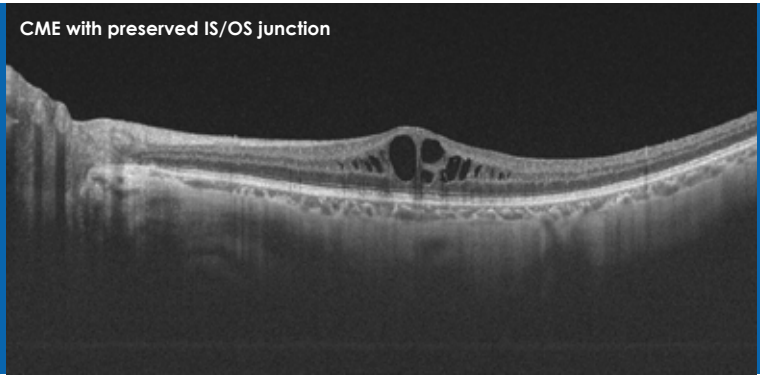




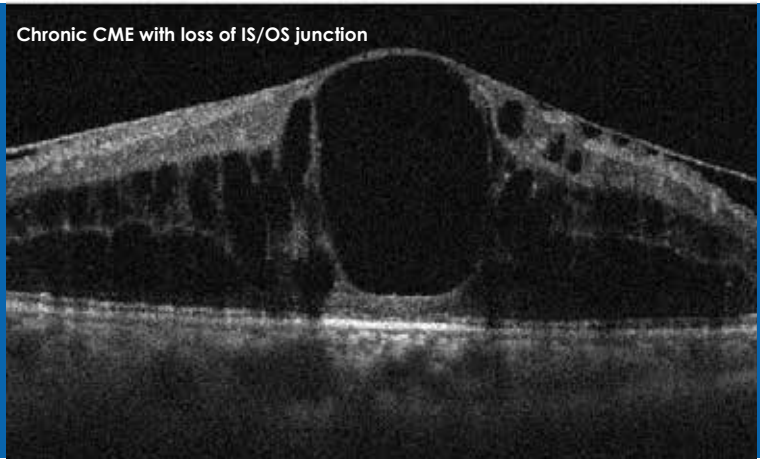
Cystoid Macular Edema (CME)

CME is caused by a variety of conditions like uveitis, post-operative inflammation, drugs, and systemic rheumatological conditions. OCT findings are similar to DME (intraretinal and subretinal fluid and cysts). ERM may be present and is usually due to the underlying inflammation.

Case 1



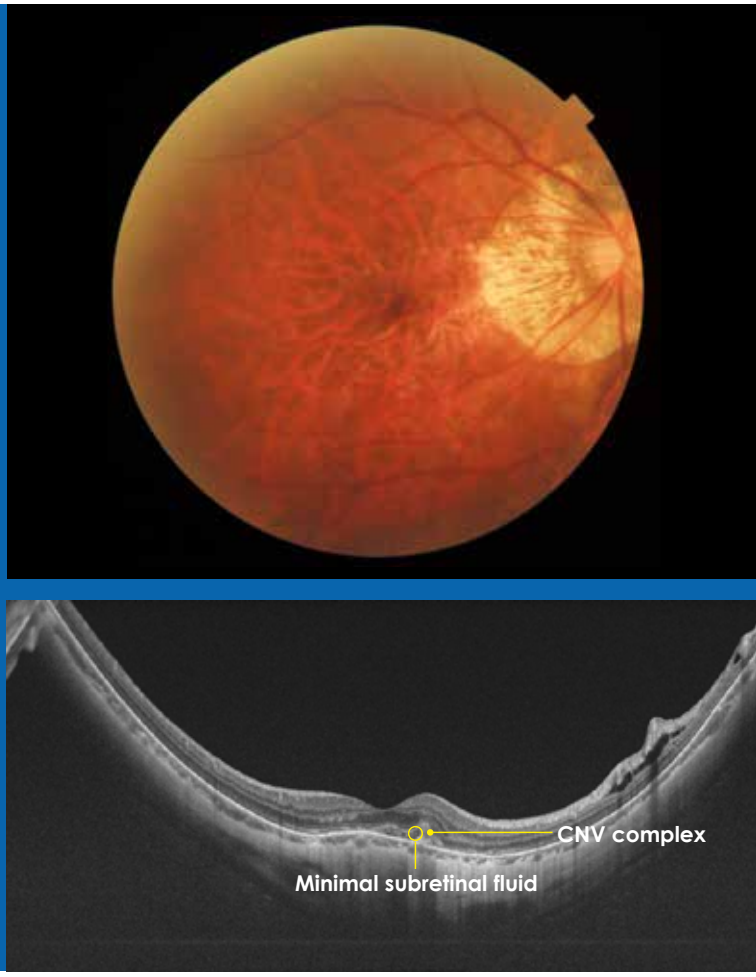
Case 2



Myopic Choroidal Neovascularization (mCNV)

mCNV may be very subtle on clinical examination in the early stages when patient complains of metamorphopsia. OCT is the diagnostic tool that will pick up changes of a type 2 CNV even before a subretinal hemorrhage is seen clinically. Color photo in the case below shows subretinal hemorrhage. mCNV has very minimal subretinal fluid. The CNV grows above the RPE (Type 2). To detect these small lesions, you have to manually scroll through all the individual OCT scans to detect it. Do not rely only on a single print out of the OCT report.

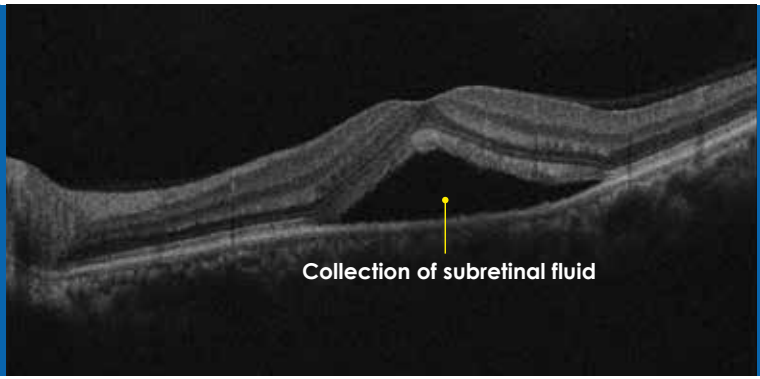
Case 1



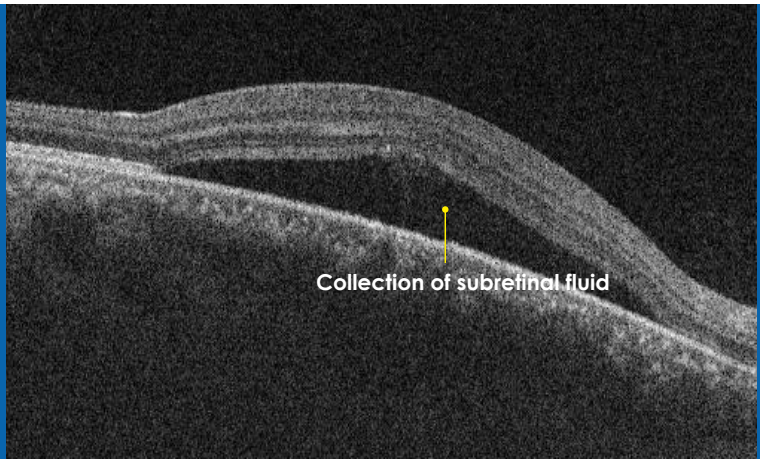
Central Serous Chorioretinopathy (CSCR)

CSCR usually occurs in young adult males and is characterised by a central neurosensory retinal detachment. There may be PED seen. It is often misdiagnosed as nAMD or PCV.

Case 1



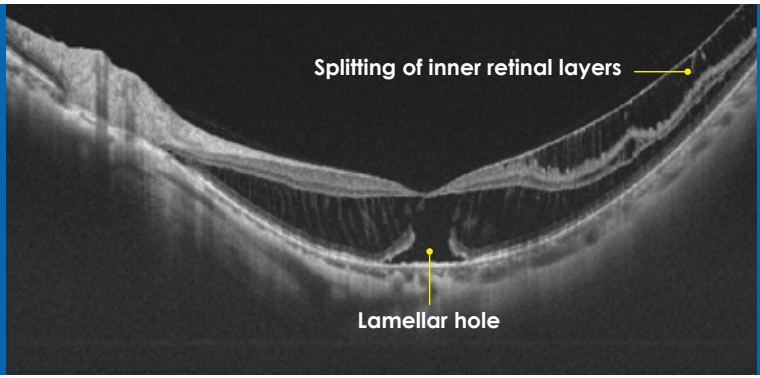
Case 2



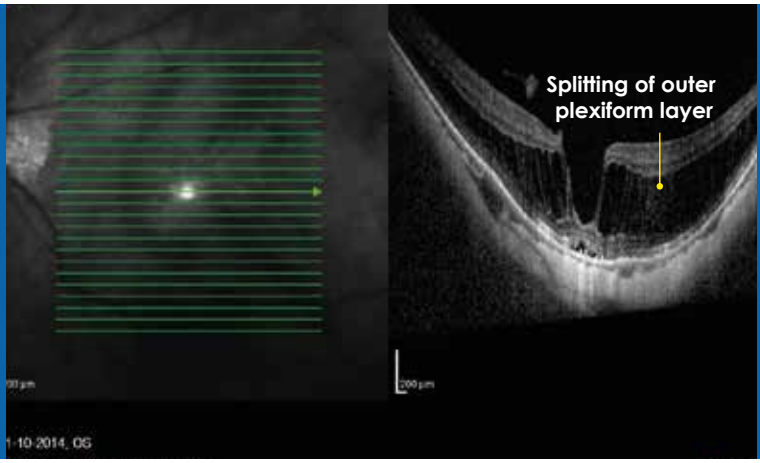
Myopic maculoschisis

This condition occurs in highly myopic eyes with posterior staphyloma. There is often splitting of the inner retinal layer "schisis" (case 1), ERM, intraretinal edema and partial thickness lamellar hole. Careful scrolling of all the OCT slices may reveal full thickness MH.

Case 1



Case 2



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A/Prof Dr Tajunisah Begam Bt Mohd Iqbal, *University Malaya Medical Center, Kuala Lumpur*

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Dr Manoharan Shunmugam, *OasisEye Specialists, Kuala Lumpur*

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Dr Wong Jun Shyan, *International Specialist Eye Center, Kuala Lumpur*

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