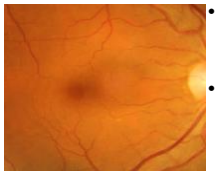
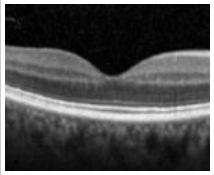
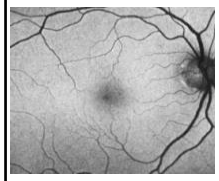
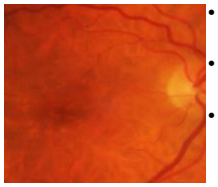
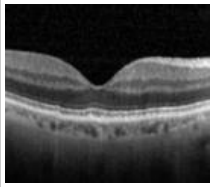
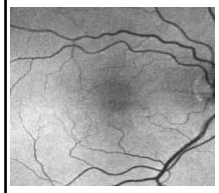
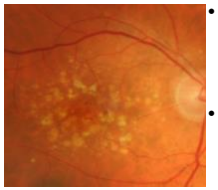
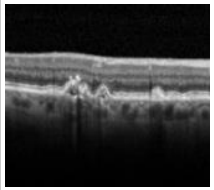
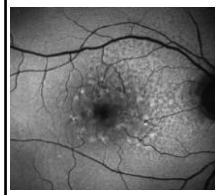
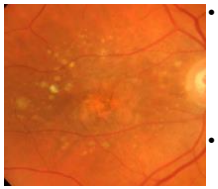
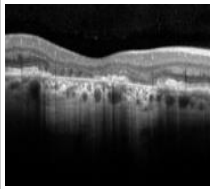
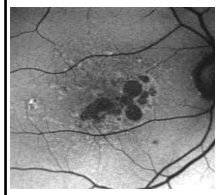
Centre for Eye Health

Chair-side Reference: Age Related Macular Degeneration

Optometry NEW SOUTH WALES AUSTRALIAN CAPITAL TERRITORY

AMD phenotype and distinguishing clinical features	Optical coherence tomography (OCT)	Fundus autofluorescence (FAF)
Normal aging changes		
 • Drupelets only (≤63µm diameter, up to approximately half the width of a large vein at the disc margin) • Should not show any characteristics of early, intermediate or late AMD	 • Drupelets appear as just detectable discrete irregularities or elevations of the RPE with variable internal reflectivity • Some drupelets may be too small for OCT to resolve	 • Drupelets may colocalise with punctate spots of normal, hyper- or hypo-fluorescence • FAF may also appear normal with the central macula showing diffuse, homogeneous autofluorescence and a gradual reduction in signal approaching the fovea
Early AMD		
 • Medium drusen only (63 to 125µm diameter) • Should not have any of the characteristics of intermediate or late AMD • May present with a different stage of AMD in the fellow eye	 • Medium drusen typically appear as discrete elevations of the RPE with variable internal reflectivity (similar to drupelets)	 • Similar to drupelets, medium drusen may display a variable normal, hyper- or hypo-fluorescence pattern • A range of patterns may be observed in early and intermediate AMD including: normal, minimal change, focal increased, patchy, linear, lacelike, reticular, speckled, focal confluent, focal plaque-like or scattered
Intermediate AMD		
 • Large drusen (>125µm in diameter) and/or pigmentary abnormalities (hyper- or hypo-pigmentary changes associated with at least medium sized drusen) • No characteristics of late AMD	 • Large drusen may appear as dome shaped, occasionally confluent, elevations of the RPE, with visible underlying BM • May be associated with: overlying disruption of the EZ and ELM, subsidence of INL or OPL, and/or inhomogeneous choroidal hypertransmission due to focal interruptions of RPE (incomplete RPE and outer retinal atrophy) • Hyper-pigmentary abnormalities may be seen as discrete hyper-reflective foci (in the ONL or attached to drusen) with posterior shadowing	 • May reveal any of the patterns described under early AMD • Predominantly reveals spots or punctate hyper-fluorescence • Less commonly, spots of hypo-fluorescence and lines of hyper-fluorescence may also be observed • Patchy, linear and reticular FAF patterns have been associated with a higher risk of conversion to neovascular AMD
Late AMD (Geographic atrophy or Complete RPE and Outer retinal atrophy)		
 • Any sharply delineated round or oval hypopigmented areas at least 250µm in diameter that feature apparent absence of the RPE and increased visibility of choroidal vessels • Areas may coalesce to form a ring type configuration, eventually involving the fovea centralis • May be preceded by calcification of large drusen and/or drusen regression • Also displays signs of other AMD stages	 • Absence of RPE causes sharply demarcated areas of homogenous choroidal hypertransmission ≥250µm • Associated outer retinal atrophy is seen as thinning or loss of the ONL, ELM and EZ which may extend or taper beyond the margins of the GA	 • Single or multiple areas of well-demarcated marked hypo-fluorescence • Foveal sparing is characterised by irregular hypo-fluorescence at the residual foveal island (such as in this example) or a symmetrical and gradual reduction in FAF approaching the fovea • The “diffuse trickling” pattern in this image is associated with a significantly higher rate of progression • FAF may enable better detection of discrete/small areas of GA

Abbreviations: Bruch’s membrane (BM), Ellipsoid zone (EZ), External limiting membrane (ELM), Inner nuclear layer (INL), Outer plexiform layer (OPL), Outer nuclear layer (ONL)

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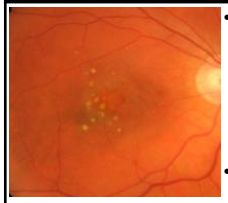
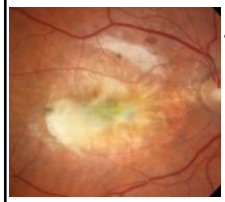
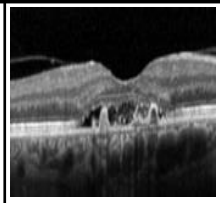
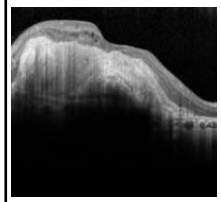
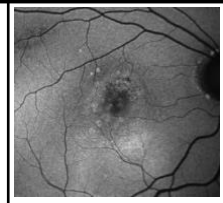
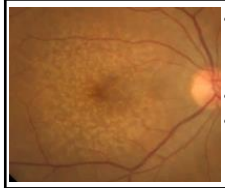
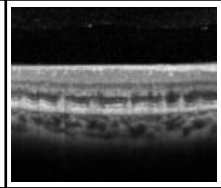
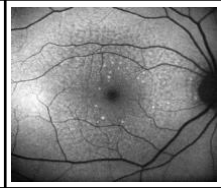
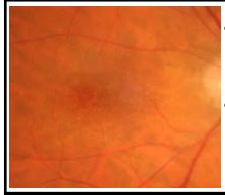
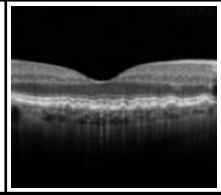
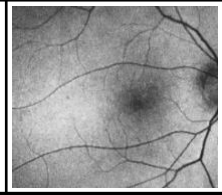
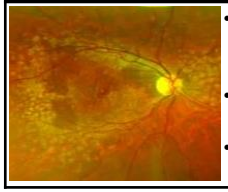
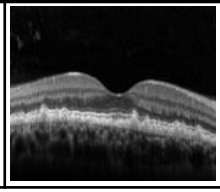
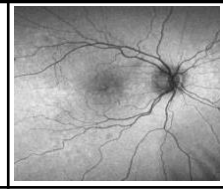
AMD phenotype and distinguishing clinical features	Optical coherence tomography (OCT)	Fundus autofluorescence (FAF)
Late AMD (Neovascular AMD)		
  • May be characterised by any of: RPE detachment(s), neurosensory retinal detachment, intraretinal, subretinal or sub-RPE scar/glial tissue or fibrin like deposits, subretinal haemorrhages and/or hard exudates • Neovascular lesions may appear subtle, green-grey or pink-yellow often complicated by the secondary signs above • End-stage: Regression of the vascular component and an increase in the fibrous component, and may appear as a disciform scar	  • PEDs present as broad elevations of the RPE band anterior to BM • Fibrovascular PEDs show irregular internal reflectivity with/without serous exudation • Serous PEDs are well demarcated, dome shaped and smooth with internal homogeneous hyporeflectivity • Haemorrhagic PEDs appear as elevations of the RPE with no reflectivity within or under the PED • Sub-RPE, subretinal or intra-retinal fluid may be present and indicative of AMD related choroidal neovascularisation • End stage: Well-demarcated, highly hyper-reflective lesions associated with loss and dysplasia of the overlying retinal layers	 • FAF changes corresponding with areas of choroidal neovascularisation may be characterised by its inherent features as follows: • Subretinal fluid corresponds with increased FAF in approximately 56.5% of cases • Haemorrhages, exudate and fibrovascular membranes are likely to cause hypo-autofluorescence patterns • Can also present with normal or near normal FAF imaging results • End stage: Disciform scarring consistently demonstrates uneven hypo-autofluorescence of the lesion, surrounded by marked hyper-autofluorescence
Reticular macular disease		
 • Indistinct, typically interlacing, yellow-white, round or oval lesions ranging from 125 - 250µm in diameter • Visibility enhanced with blue or infrared light • Can present in conjunction with other AMD features	 • Reticular pseudodrusen may colocalise with subretinal drusenoid deposits which appear as deposits above the RPE	 • Appear as low contrast hypo-fluorescent, circular, networked deposits • Individual lesions may also have a “target-like” appearance (iso-fluorescent core and surrounding hypo-fluorescent halo)
Cuticular drusen		
 • Numerous, densely packed, relatively uniform, small drusen, better seen using FA, described as a “starry-sky” pattern • 50 to 75µm in diameter	 • Blunted triangular appearance with a saw tooth pattern	 • May reveal numerous hypo-fluoresent “dots”
Familial dominant drusen/Doyne’s honeycomb dystrophy/Malattia leventinese		
 • Numerous drusen that extend beyond the vascular arcades and often nasal to the optic disc • Age of presentation is typically between 20-30 years (younger than of typical AMD) • Bilateral, radially distributed and relatively symmetrical	 • Drusen characteristics are similar to those seen in AMD • Larger, round drusen are typified by confluence and more diffuse deposition between the RPE and BM	 • Reveals marked hyper-fluorescence of large drusen • Smaller radially distributed drusen appear more faint