Imaging of Choroidal Nevi

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Are we ever 100% sure?

- 1% of tumor-related mortality after 10 years has been observed in patients with small, indeterminate, pigmented choroidal lesions
Classification

- Choroidal Nevomelanocytic lesions
- Indeterminate melanocytic tumours
- Choroidal Nevi
- Choroidal Melanoma
Definitions

- **Nevus** = Thickness < 2mm + no other risk factors
- **Melanoma** = Thickness greater than 2.5 mm + 2 other risk factors
- **Indeterminate** = not otherwise indicated

6 risk factors for growth

- Thickness > 2 mm
- Orange pigment
- Subretinal fluid
- Symptoms
- Within 3 mm of optic disc
- Ultrasonographic hollowness
Ultrasound: what can we distinguish?

- Most choroidal nevi are too flat to be detected on echography.
- A choroidal nevus with a minimum elevation of approximately 0.8 mm can be distinguished from the surrounding retinochoroidal layer with an A-scan or B-scan examination (8- and 10-MHz probe, respectively)
Limitations of US

- Ultrasonography overestimates choroidal melanoma thickness by at least 2 mm (compared with histopathologic analysis) in 10% of cases
- Choroidal tumors deemed undetectable by ultrasonography can be measured by EDI OCT at less than 1-mm thickness (Torres et al)
Learning Point 1

- U/S golden standard
- Overestimates true size of nevus
- May not detect small nevi < 0.8 mm
- Its role increasingly important for thicker lesions
- Offers essential information of lesion echogenicity reflecting cellularity
US vs OCT

- Caliper measurement of choroidal tumors on EDIOCT has consistently shown lesser thickness compared with ultrasonography.
- Shah et al found that choroidal nevus was measured as approximately 54% less thick on EDI-OCT (mean, 685 μm) compared with ultrasonography (mean, 1500 μm)
Nevus oct measurement
EDI-OCT features choroidal nevi:

- Homogeneous optical reflectivity along the anterior surface with gradual shadowing more deeply.
- The internal characteristics of the nevus are occasionally unresolvable for larger lesions.
- The OCT findings reflect pigment within the mass and do not correlate to internal reflectivity by ultrasonography, which implies density of cellularity.
OCT features nevus vs melanoma

- Features on EDI-OCT significantly more often found in small choroidal melanoma vs choroidal nevus
  - increased shaggy photoreceptors
  - loss of external limiting membrane
  - loss of inner segment–outer segment junction
  - intraretinal edema
Learning Point 2

- OCT useful for measurement of smaller lesions
- Offers better estimate of true dimensions than US
- Less reliable for thicker lesions
- Offers useful additional clues for malignant potential (SRF, Retinal changes)
- Does not offer information equivalent to echogenicity on US
Autofluorescence Qualitative

• Intrinsic tumour autofluorescence offers little to differentiate choroidal nevus from melanoma, but

• Information from the overlying RPE could be important in the diagnostic differentiation
  – bright hyperautofluorescence of orange pigment and subretinal fluid is more common in melanoma.
  – Areas hypoautofluorescence generally signify RPE atrophy or hyperplasia, features often associated with nevi.
AF Nevus/ Drusen vs Melanoma
Quantification of Autofluorescence

- Nevi median IRA value 67 gsi2
- Melanomas median IRA value of 226 gsi2
- Indeterminate lesions median IRA of 359 gsi2

After 10 months

- Initial IRA values < 150 gsi2, none showed clinical progression at follow-up
- 6 of the 12 patients (50%) with IRA values more than 150 gsi2 exhibited clinical progression at follow-up
- The sensitivity for IRA of 150 gsi2 in indeterminate choroidal nevomelanocytic lesions was 100%
- Potential screening test to indicate the propensity for malignant progression
Learning Point 3

- Autofluorescence complements but does not replace orange pigment as risk factor
- Qualitative assessment may be misleading as other sources of AF (drusen, RPE changes)
- Quantification of AF promising technique to ascribe degree of malignant propensity
MREH Nevus clinic

- Idea for a one-stop, streamlined service
- New patient pathway/Policy and procedure as per RCOPTH guidance
- Robust training of allied health professionals of U/S - Shared care
- Opportunity for collaborative research/Establishing new model of service delivery
- Discharge to optician/Follow up in nevus clinic/Refer to oncology unit
- Wide field fundus imaging/AF/OCT/US
Thank you