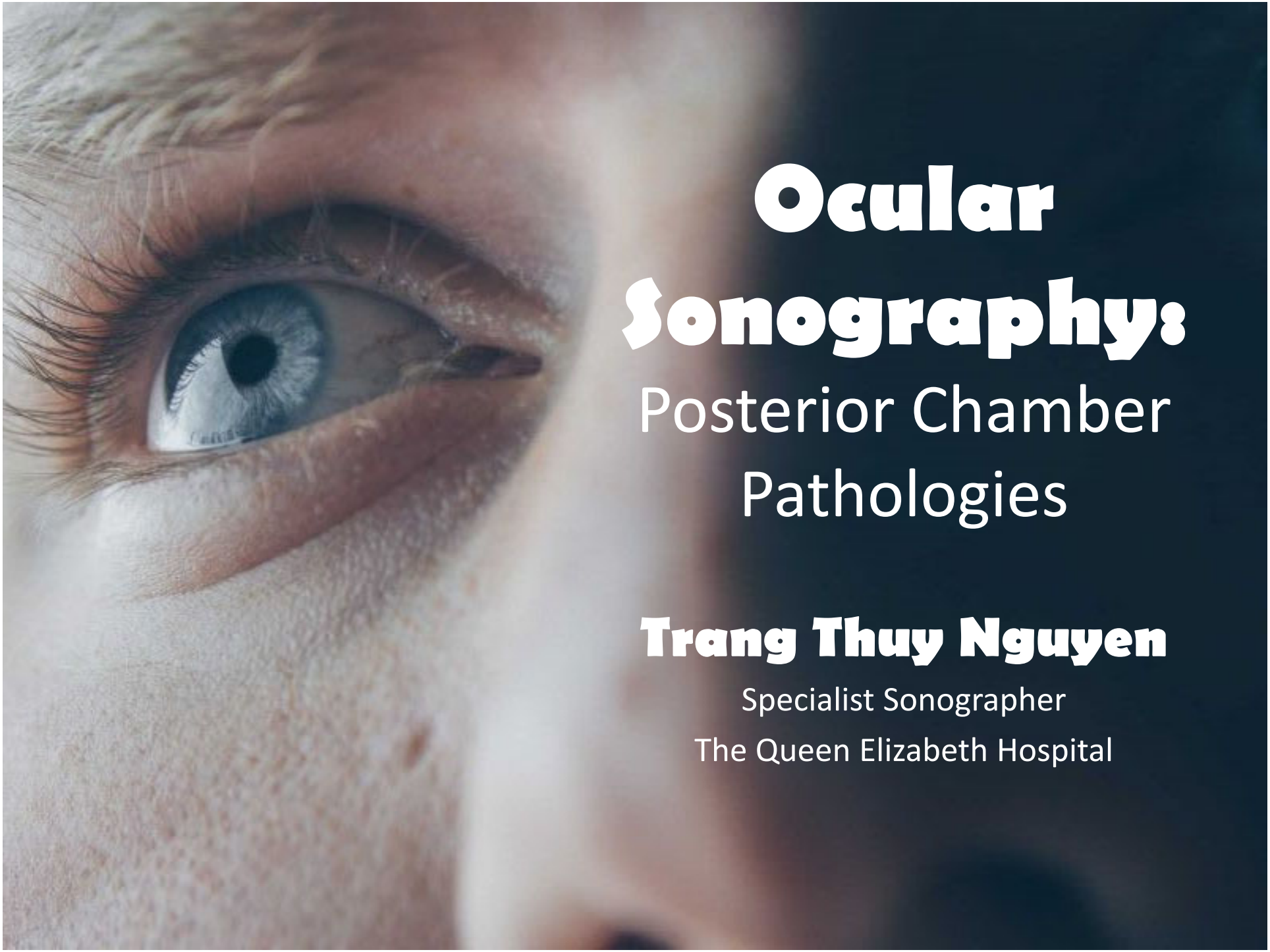

Ocular Sonography:
Posterior Chamber Pathologies

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Introduction

- Targeted sonographic study of eye of interest
  - Adapted to the patient's condition and the clinical indications (Fielding 2011, p. 940)
- Majority of cases presented are to check for pathologies in the posterior chamber
  - Asteroid hyalosis
  - Vitreous haemorrhage or detachment
  - Retinal or choroidal detachment
- Pathology images are the Queen Elizabeth Hospital Ultrasound department

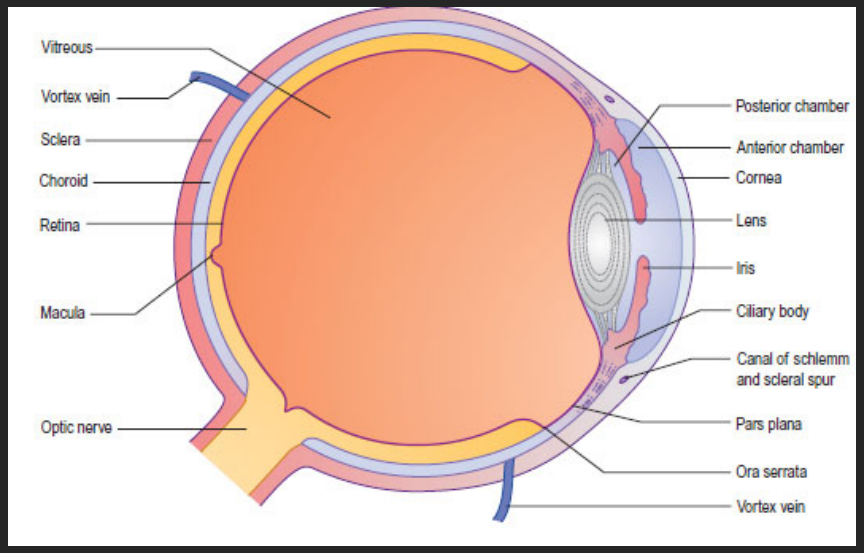


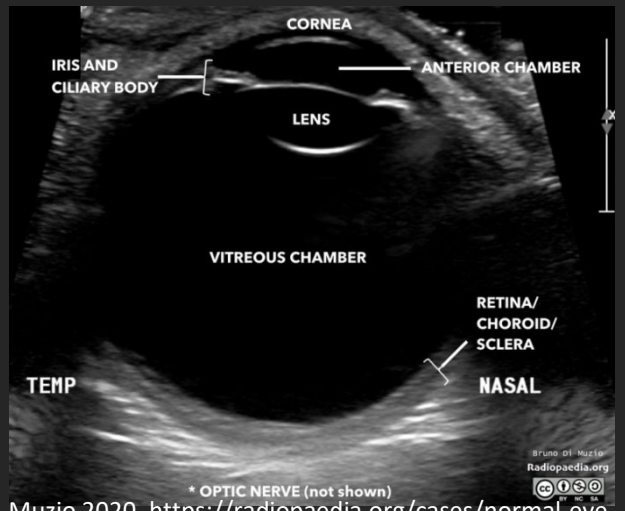
Fig 1: Horizontal section through eye, (Fielding 2011, p. 940).

Methods

- Patient's position: supine.
- Eyes closed with abundant use of sterile or dry eye gel over eyelid.

De La Hoz Polo 2016, p. 353

- High – frequency linear probe or a hockey stick L15-7io probe.
  - Minimal pressure on eye to not compressing eye contour.
- Ensure anterior and posterior chamber in field of view.
  - Both chambers assessed in transverse and longitudinal views with dynamic scanning (Piotto 2007, p. 16).
- High gain setting and focus to visualise floaters.
- Low gain setting for globe walls and optic nerve sheath (De La Hoz Polo 2016, p.364).
- Be aware of reverberation artefacts.
- Colour Doppler is useful to differentiate between retinal detachment (vascularity) with vitreous detachment (no vascularity) and tumours (Fielding 2011, p.942).



Muzio 2020, https://radiopaedia.org/cases/normal-eye-ultrasound

Results: Pathologies – Sonographic appearances

ASTEROID HYALOSIS

- **Cause:** A degenerative disorder of vitreous body of unknown origin.
- Happen in healthy eyes and mostly uni-ocular in 75% of cases.
- Made of calcium soaps / lipids (Fielding 2011, p. 949).
- Demonstrate as multiple hyperechoic mobile echoes with sparkling appearance (De La Hoz Polo 2016, p.357).
- Highly mobile with dynamic scanning (Fielding 2011, p.949).

Figure 1: Subtle asteroid hyalosis (Smith 2020)

Figure 2: Asteroid hyalosis (Tran 2014)

VITREOUS HEMORRHAGE

Figure 3: Vitreous hemorrhage (Nguyen 2020)

- **Cause:** old age, trauma, diabetic retinopathy, or retinal tears (De La Hoz Polo 2016, p.357).
- High gain to visualise.
- Appear as high-amplitude echoes.
- Very mobile on dynamic scanning (De La Hoz Polo 2016, p.358).

VITREOUS DETACHMENT

Figure 4: Vitreous detachment (Nguyen 2019)

- **Cause:** old age.
- Appear as undulating membrane (De La Hoz Polo 2016, p.358).
- Thinner and smoother than retina and not clearly visible when reducing gain (Chu 2017, p. 266).
- Highly mobile, usually not attached to optic disc (De La Hoz Polo 2016, p.358).

Results: Pathologies – Sonographic appearances

RETINAL DETACHMENT

- **Cause:** trauma, tumour, diabetic retinopathy or inflammation.

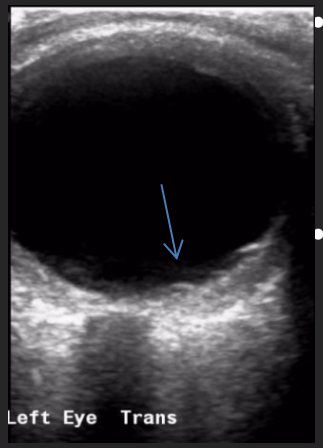


Figure 5: Focal retinal detachment (Nguyen 2020)

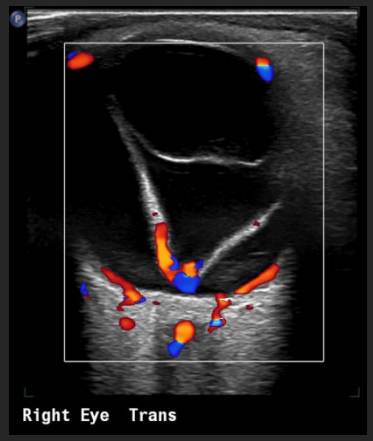


Figure 6: Total retinal detachment (Ha 2020)

- Appear as bright, continuous membrane (Byrne & Green 2002, p.54)
- Tether to optic disc, restricted movement with dynamic scanning, and visible even with low gain setting (Chu 2017, p. 266).

Doppler to confirm vascularity.

Might have mobile speckle echoes underneath due to subretinal hemorrhage (Piotto 2007, p8)

CHOROIDAL DETACHMENT

- **Cause:** inflammation of uvea/sclera, hypotony, surgery, trauma, tumour, renal disease or unknown.

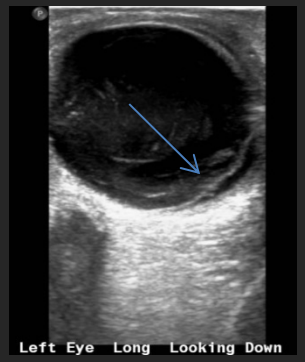


Figure 7: Focal choroidal detachment (Francis 2019)

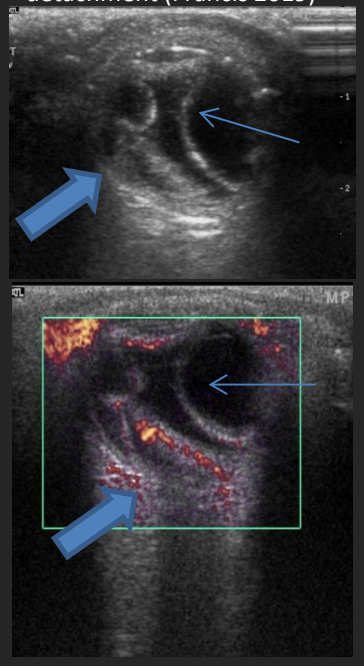


Figure 8&9: Choroidal (thin arrow) and retinal detachment (thick arrow) (Perkovic 2005)

- Appear as shallow, smooth and thick membrane or bullous.
- Hemorrhage or debris can be found in suprachoroidal space (Byrne & Green 2002, pp. 74-75).

Usually away from the optic nerve and can associate with retinal detachment (Piotto 2007, p5)

Conclusion

- Ocular ultrasound is important in the clinical setting.
  - It is therefore important that sonographers develop the ability to recognise pathologies of the eye and understand the most effective sonographic technique to visualise these pathologies

TAKE HOME MESSAGE

Familiarise yourself with ocular sonographic appearances.

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