

Ocular Ultrasound Cheat Sheet

Introduction

Basics

- Use linear probe with ocular settings
- Ocular settings are ESSENTIAL to not damage optic nerve. Can make settings manually
- Ocular setting: TI of < 0.3 & MI of < 1
- Indications: vision Δ s, trauma, eye pain, FBs
- Don't ultrasound if concerns for open globe to prevent losing vitreous fluid (controversial)

Technique

- Make pillow of gel over eye & float probe in it. Use lots of gel. No pressure on eye!
- Stabilize hand on bony structures of face
- Probe marker to patient right
- Slightly overgain looking inside the eye
- Turn gain down looking behind eye
- Kinetic exam: patient looks side to side; dynamic exam

Normal Anatomy

- Globe – round structure with hyperechoic walls & anechoic fluid
- Lens – curved structure with hyperechoic walls in posterior chamber behind iris
- Retina – hyperechoic membrane along posterior eye, appears thin wavy when lifted off
- Optic nerve – linear structure posterior to globe, hypoechoic relative to surroundings
- Anterior chamber separated from posterior chamber by hyperechoic boundary

Retinal Detachment

- Hyperechoic serpentine membrane attached to ora serrata anterior & optic nerve posteriorly
- Detached retina more obvious w/ kinetic exam
- Mac on: still attached lateral to optic nerve
- Mac off: not attached lateral to optic nerve

Lens Dislocation

- Look for hyperechoic curved lens
- Can dislocate anteriorly or posteriorly

Vitreous Hemorrhage

- Hyperechoic debris within anechoic posterior chamber
- Can look like a starry night
- Washing machine sign: hyperechoic swirling of hemorrhage during kinetic exam

Foreign Bodies

- Can see variety of materials- wood, metal, glass, etc.
- No pressure on eye in case open globe
- Look for hyperechoic FB w/ or w/out shadowing or reverberation artifact
- Twinkle artifact possible w/ color doppler
- More sensitive than x-ray or CT scan AND can see material CT can't (like glass)

Optic Nerve Sheath Diameter

- Find optic nerve where side are parallel, fan through, & freeze. Cine back to find maximal width more easily.
- Measure maximal width 3 mm posterior to globe in both eyes. Average the numbers.
- Normal ICP: 5mm, Elevated ICP: > 5.7
- Grey zone: 5-5.7, if symptomatic is likely elevated

Retrobulbar Hematoma

- Hypoechoic fluid behind eye
- Important, since proptosis can be hidden by facial swelling from trauma/fractures

Pupil Assessment

- If unable to assess pupil due to swelling or other damage, can visualize pupil & apply light to contralateral pupil
- Two approaches: (1) probe over anterior eye, look for pupil in iris OR (2) probe inferior to eye aiming superior, will see whole pupil