Angles Assessment

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Angle assessment
Why is it important?

• Diagnostic
• Evaluate mechanism of elevated IOP
  – Angle closure
  – Excessive TM pigmentation
  – Neovascularization of the angle
  – Angle recession
• Diagnosis and staging of primary angle closure: Extent of ITC, PAS

Angle assessment
Why is it important?

• Therapeutic:
  – Laser trabeculoplasty
  – Angle based surgical procedures
Angle assessment – How?

- van Herick method?
  - Quick
  - Easy to use

Definitions of angle closure

By Van Herick: Grade 1 or 2 = closed
By Gonioscopy: PTM not visible for at least 180°

<table>
<thead>
<tr>
<th>Observer</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technician</td>
<td>58%</td>
<td>89%</td>
</tr>
<tr>
<td>Resident</td>
<td>79%</td>
<td>88%</td>
</tr>
<tr>
<td>Attending</td>
<td>68%</td>
<td>88%</td>
</tr>
</tbody>
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Low Sensitivity of the Van Herick Method for Detecting Gonioscopic Angle Closure Independent of Observer Expertise

- 14% of eyes with ITC of at least 180° were classified as ‘deep’ on VH testing
- Risk of misdiagnosis higher in
  - PAC and PACG (versus PACS)
  - Males
  - Black or Asian race
  - Myopes
Angle Assessment – How?

- Indirect assessment with van Herick can miss angle closure
- Patients with deep AC and no obvious glaucoma risk factors can have angle pathology

**Direct visualization of the angle is the best way to assess**

Gonioscopy

- Quick, 360° angle Assessment
- Indentation possible - PAS, plateau configuration
- Can detect causes of elevated IOP such as pigment dispersion, recession

Gonioscopy – Who is a candidate?

- Every glaucoma suspect
- Every patient with glaucoma
- Consider gonioscopy for every patient at least once

CLINIC-BASED OPPORTUNISTIC SCREENING
Angle assessment – **Who is a candidate?**

**POPULATION BASED SCREENING**

- Gonioscopy requires specialized equipment and personnel
- Angle imaging for detection of angle closure does not have high enough specificity

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**Angle Assessment – What should you look for?**

**SCLERAL SPUR**

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**Gonioscopy**

- First locate the Scleral Spur
- If not visible, look in a different quadrant
  - May need to tilt goniolens
- If still not visible, indent
What to look for?

• What angle structures are visible?
• Profile of peripheral iris
  – Convex / Flat / Concave
• Degree of TM pigmentation
• Abnormal findings
  – Excessive TM pigment, PAS, Abnormal blood vessels,
    Inflammatory nodules, Foreign bodies

Gonioscopy in Laser Trabeculoplasty

Intraoperative gonioscopy

• Surgical goniolens (mostly direct lenses)
• Microscope is tilted 30 degrees toward the surgeon and the
  patient’s head is tilted 30-40 degrees away from the surgeon
• Coupling agent on cornea
• Working distance increases
Limitations of gonioscopy

- Subjective
- Requires highly skilled observer
- Potential sources of error
  - Illumination
  - Contact

Angle assessment – How else?

- Anterior segment imaging
  - Provides valuable cross-sectional information
    - Anterior segment OCT
    - Ultrasound biomicroscopy

Anterior segment OCT

- Non contact
- Allows angle assessment in dark
- Entire AC in one scan

Cannot image posterior to the iris

Enhanced Anterior Segment Single Scan

Well-centered Visante ASOCT image with central reflex saturation beam visible and no lid or eyelash artifacts
High Res Corneal Scan

Anterior segment imaging with fourier domain OCT

- Retinal OCT devices
  - Optovue
  - Cirrus
  - Spectralis
- Dedicated anterior segment OCT devices
  - Tomey

Optovue Avanti ~ 830nm
Spectralis 870 nm
Cirrus 840nm
Cirrus OCT anterior segment external lens kit

Ultrasound biomicroscopy

Excellent visualization posterior to iris
Requires immersion system
Highly trained examiner

Angle Assessment in my practice

- Gonioscopy is the primary method
  - Sussman lens
  - Perform in every patient on initial examination
  - Perform periodically in phakic patients
How I use anterior segment imaging

• Adjunct to gonioscopy
  – Understand the mechanisms of primary and secondary angle closure

How I use imaging devices

• OCT first line device in most cases due to ease of use and patient comfort
• UBM when assessment of structures posterior to iris is required

Conclusions

• Gonioscopy is the primary method for angle assessment and is important for diagnostic and therapeutic purposes
• Imaging devices are a useful adjunct
  – Can provide unique information useful in clarifying pathogenesis of primary and secondary angle closure