Pediatric Glaucoma Suspect

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Suspect?

At Risk of Developing Glaucoma
WHY?

• Childhood Glaucoma $\rightarrow$ 6% of Childhood Blindness

• Suspects $\rightarrow$ 1/3 Pediatric glaucoma clinic

• ½ Suspects $\rightarrow$ initial Normal IOP $\rightarrow$ Unnoticed


What are the Challenges?

• Glaucoma is *Multi-factorial*

• Suspects $\rightarrow$ *Asymptomatic*

• No clear *Definition*

• No clear diagnosis-/management- *Guidelines*
How do we diagnose glaucoma? (Parameters)

- ++ IOP
- Optic nerve cupping
  - ++ CDR (evidence of increase)
  - Asymmetry ≥ 0.2
  - Focal thinning
- Cornea:
  - Diameter
  - Haab’s striae/edema/ Clarity
- Myopic shift/ ++ AXL
- Gonioscopy
- Field defects (>6Y)

When to Suspect?

- Anticipate:
  - History:
    - Family/ Siblings
    - Consanguinity
  - Factors predisposing to secondary glaucoma

- Findings:
  - ?? Unilateral PCG??
  - Abnormal parameters
When to Suspect?

Reason to ANTICIPATE glaucoma

FINDINGS linked to glaucoma

History:
1- Family (30%)*
2- Siblings
3- Consanguinity (60%)*

If there is a condition that might cause glaucoma
1- Cataract surgery in a child
2- Ocular anomalies (ASD....)
3- Systemic anomalies (NF1, SWS....)
4- Acquired conditions (trauma, uveitis, steroids..)

Abnormal parameters:
- IOP
- CDR
- HCD/clarity
- Gonioscopy
- AXL
- Rx
- VF

???? Unilateral PCG????

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- AXL
- Rx
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???? Unilateral PCG????

Progression

Normal parameters at a glance

• C/D <0.3 (racial factors)
  Asymmetry <0.2
  No Focal thinning (initial decrease)

Other family members
- Myopes
- Large discs
OCT in Children

• No normative data
• Data not available < 5y*
• Variable with age, race and AXL** →
• Diagnostic capacity (under study)†

• Not a diagnostic tool

• ?? Documentation, follow up for progression

*Kiziloglu et al, 2018  **El Dairi et al., 2009  † Morales Fernandez et al., 2018
Normal parameters at a glance

- Corneal diameter

- >1 year $\rightarrow$ 9mm
- 1-2 years $\rightarrow$ 10mm
- > 2 years $\rightarrow$ 11mm

CCT
Normal parameters at a glance

• **CCT**
  - Varies with specific diagnosis\(^1\)/ **not alone**\(^2\)
  - Varies with ethnicity\(^3\)
  - May poorly correlate with GAT\(^3\)
  - **Do not use correction factors**\(^4\)

2. Freedman, *Central corneal thickness in children—does it help or hinder our evaluation of eyes at risk for glaucoma?* https://doi.org/10.1016/j.jaapos.2007.12.004

Normal parameters at a glance

• **AXL**
  
  >1 year → 17mm
  1-2 years → 17-21mm
  2-10 years → +1-2mm
Normal parameters at a glance

• IOP
  – Literature (≥ 21 mmHg → glaucoma)
  – Practice:
    in a child ≤ 2y → 15 mmHg (highly suspicious)
  – Bresson-Dumont, 2009
    < 8 mmHg (<3 months )
    < 12 mmHg (6-9 months.)
    Approach adult levels by 12 years of age

• ORA
  – CH markedly reduce in PCG
  – ORA IOPs are significantly higher than GAT
  – GAT and ORA → Not interchangeable

Normal parameters at a glance

• Refraction:
  – <3 months → 2 D of hyperopia (SD± 2 D).
  – 3-12 months → fast emmetropization (applies to myopes)
  – slow change till **2 years** in hyperopes.
  – Little change between 3-6 years

  – **Monitor these levels of refractive errors for a rapid MYOPIC SHIFT**

Normal parameters at a glance

• Gonioscopy (UGA)

Courtesy Prof Ghada Gawdat
Literature

• Identified risk factors:
  – Kooner et al., 2014

  Pediatric glaucoma suspects

  [Image of a study on pediatric glaucoma suspects]

  – Greenberg et al., 2017

  Clinical management outcomes of childhood glaucoma suspects

  [Image of a study on clinical management outcomes]

Pediatric glaucoma suspects (features).
Kooner 2014 (retrospective study-USA)

• Defined suspects <15y
  – Suspicious disc $\rightarrow$ 76%
    • CDR $\geq$ 0.6 (largest in African Americans)
    • >0.2 asymmetry
    • Notching of the rim
  – IOP persistently $\geq$ 21mmHg $\rightarrow$ 33%
  – Family history of glaucoma $\rightarrow$ 17%
  – Glaucoma in opposite eye
  – History of blunt trauma
  – Conditions closely associated with glaucoma
    • SWS
    • AXR.......
Clinical management outcomes of childhood glaucoma suspects. Greenberg 2017 (retrospective-USA)

• How many converted to frank GLAUCOMA

• When did they convert

• How were they managed

Conversion criteria:
1. A progressive increase in CDR/focal rim thinning (documented on serial disc Photos)
2. A progressive thinning of cpRNFL≥ of 10 microns
3. Progressive myopic shift with
   – an increase in ocular dimensions
   – elevated IOP > 21 mmHg on two or more occasions
4. An acquired visual field defect, or a reproducible deepening and/or expansion of a preexisting
Clinical management outcomes of childhood glaucoma suspects. Greenberg 2017 (retrospective-USA)

- How many converted to frank GLAUCOMA
  - 22/214 subjects (10.2%)
- When did they convert
  - 32.8±33.5 months
- What was the commonest risk factor for conversion
  - IOP (av., min., max.) not base line IOP
- How were they managed

IOP on initial evaluation was included. The decision to initiate treatment was at the discretion of the attending pediatric glaucoma specialist; no criteria or protocol were used in this decision-making.

Take home message

- **IOP** can be misleading (الضغط وحده لا يكفي)
- **Monitor closely** and for a **LONG** time
- Look for **signs of progression** rather than specific figures
- **Document** objectively (fundus pictures)
- **Examine the family** (the apple doesn’t fall far from the tree)
Remember!!!

- Controversies:
  - CCT (varies with specific diagnosis\(^1\)/ not alone\(^2\))
  - OCT (No normative data)
  - ORA

Auxillary Tests

2. Freedman, Central corneal thickness in children—does it help or hinder our evaluation of eyes at risk for glaucoma? https://doi.org/10.1016/j.jaapos.2007.12.004

Thank you for your Kind Attention

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