Overview of Retinopathy of Prematurity

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Learning Objectives

- To understand the pathophysiology of ROP
- To understand the risk factors for ROP
- To distinguish the stages of ROP
- To understand the screening for ROP
- To understand the treatment and prevention for ROP
- To understand the complications of ROP
Background: History

- Accounts for 19% of childhood blindness
- First described in 1942 (Terry)
- Epidemics in the UK/US in the 40s - 50s
- Oxygen identified as major factor (Campbell 50s)
- 1960s fall in ROP, increase in mortality
- 1970-80s increase of ROP as smaller babies survived
Situation in Kenya?

- Wanjala study (2003-4); 120 babies. 240 eyes
  - ROP Prevalence: 16.7%
- Sitati Study: (2015); Study in Western Kenya.
  - ROP Prevalence: 3%
- Onyango Study (2015); 102 babies.
  - ROP Prevalence: 42%

- KNH screening started in 2016; 183 babies; prevalence; 10%
Background: Development of retinal vessels
How does ROP develop?

- **Hyperoxic state**
  Causes decrease in VEGF-1→vessels to regress and stop growing

- **Relative hypoxic state**
  Relative ischaemia causes more VEGF production →abnormal vessels→ ROP

- Other factors: vasoactive cytokines, IGF-1 (Oxygen independent), free radicals
Evolution of ROP

Stage 1
- Demarcation line
- Avascular retina

Stage 2
- Vascularized retina
- Ridge
- Isolated neovascular tufts

Stage 3
- Severe extraretinal fibrovascular proliferation
- Detached retina

Stage 4 & 5
- Plus disease
AP-ROP - Aggressive posterior retinopathy of prematurity

- Zone one; Posterior location
- Prominence of plus disease and deceptively featureless neovascularization
- Vascular dilation and tortuosity out of proportion to the peripheral retinopathy
- Does not progress through the classic stages 1 to 3
- Neovascularization may be flat and easily overlooked

- Prompt treatment - within 24hrs
Zones in ROP staging
Risk Factors for ROP

- Gestational age
- Birth weight
- Oxygen
- Hypoxia
- Sick baby (anaemia, sepsis)
- Genetics (Norrie gene)
- Hypotension
- Twin pregnancy
- Intraventricular haemorrhage
- Surfactant therapy
Screening for ROP: Who and When?

WHO?
- Infants < 1500 grams
- OR < 32 weeks
- Sick Baby

WHEN? (4-6 weeks postnatal)
- Born <27 weeks screen at 30-31 weeks
How to screen?

- **Dilate** - cyclopentolate 0.5%, or tropicamide & phenylephrine 2.5%
- **Encourage** parents to leave
- **Barrier** to avoid onlookers
- **Glucose** feed pre-exam
- **Local** anaesthetic
- **Swaddling** to keep arms away
- **Support** of head by smiling helper
- **Speculum** and scleral indentor
- **Indirect** with 28 dioptre lens

- **Frequency? 2-3 weekly**
Treatment for ROP

Focal therapy within **48-72 hours**
(cryotherapy, laser and anti-VEGF)
- Plus disease
- Stage 3
Retinal surgery: **Stage 4 and 5**
Termination of screening

- If no ROP develops and baby is **44 weeks** (EDD+ 1 month)
- When retina **fully vascularised** into zone 3 (peripheral retina)
- **Regression** of ROP
Prevention of ROP: **POINTS** of care

- Pain control
- Oxygen monitoring (91% and 95%)
- Infection control
- Nutrition support
- Temperature control
- Supportive care- positioning, kangaroo
Follow up?

Life long follow up with paediatric ophthalmologist

- Retinal detachment
- Refractive errors - myopia
- Strabismus
- Amblyopia
- Glaucoma
- Cataract
- Neurological damage

Multidisciplinary care: Paediatricians, Neurologist, ENT
Summary

ROP blindness is both **preventable** and **treatable**