Use and practical prescribing of ocular medicines in paediatric practice

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# Learning Aim: to develop practitioner knowledge of common ocular medicines used in paediatric practice



Tips for instillation of drops in infants and young children When should we note potential for increased ocular or systemic side effects?

When should optometry should refer to ophthalmology and with what urgency (what constitutes a good referral letter?)

# Tips to instill drops

- Calm approach and total expectation of success
- Let child know why and likely experience
- Try to lessen parent anxiety
- Recline child
- Give child something to hold or swaddle
- Reduce elimination
  - Eye lid closure
  - Nasolacrimal occlusion
  - Smaller drop volume 10-20 μl
- Ointment
  - longer duration, less elimination nighttime use
- Reduce systemic absorption
  - Nasolacrimal occlusion
- Rewards sticker, lollypop
- Clear instructions for home use safe storage, expected local SE, potential system SE





### Diagnostic and therapeutic agents

- Assist ocular examination
- Treat infections
- Treat inflammation
- Treat allergies
- Treat uveitis
- Treat glaucoma
- Manage myopia progression
- Treat amblyopia





#### When is there greater risk in kids?

- When should we note the potential for increased ocular and systemic side effects with certain medications in paediatric patients for the treatment of inflammation, infection or glaucoma?
- If very young child
  - Prem baby
  - Less than 6 months
  - Less than 12 months
  - Less than 2 years
- If need LONG TERM use e.g. steroids
- Amblyopia risk with corneal scars keratitis or infiltrates can have dire consequence



## **Risks Anaesthetics**

- Dose same as adult: 1 gtt as needed
- Local SE: transient epithelial keratitis, pupil dilation, contact dermatitis
- Eye Rubbing





Risks cycloplegics/mydriatics

Diagnostic Use Therapeutic Use

# Diagnostic: Cycloplegic Refraction



### Paralyze accommodation Dilate pupil

#### Anti-cholinergics

- Cyclopentolate hydrochloride
- Tropicamide
- Atropine sulphate

#### Local side effects

- COMMON
- Light intolerance
- Stinging
- Blurred vision
- Transient increase IOP
- INFREQUENT (0.1-1% occur)
- Contact allergic blepharitis
- Persistent ocular irritation

#### Systemic adverse effects

- RARE (<0.1% occur)
- tachycardia,
- ataxia,
- irritability,
- disorientation,
- visual hallucinations

### Atropine

### Therapeutic use

### RISK – concentration errors

#### **Amblyopia Penalisation**

3–7 years, 1 eye drop (1%) in the unaffected eye once daily each Saturday and Sunday.

#### **Uveitis**

For young children, use atropine 0.5% eye drops (may be available from some hospital pharmacies).

2–18 years, 1 eye drop (1.0%) once daily. If this is inadequate, consider alternative treatment rather than increasing the dose.

#### **Myopia Management**

Low concentration <1% requires compounding

5-18 years, 1 eye drop (<0.1%) daily at night



Risk: systemic absorption will lead to systemic adverse effects

=> be mindful of dose

#### DOSE

#### Cycloplegia for refraction

- •1 month 1 year, 1 eye drop of 0.5%; repeat in 5–15 minutes if necessary.
- •1–18 years, 1 eye drop of 0.5% or 1%; repeat in 5–15 minutes if necessary.
- Inappropriate concentration atropine several uses => errors in dispensing

# Risks antiinflammatory

USE

Viral Conjunctivitis Allergic Conjunctivitis Uveitis in kids with JIA RISKS

IOP rise => glaucoma

Cataract



### VIRAL INFECTIONS

### Conjunctivitis



#### ADENOVIRUS

- Mild and self-limiting
- Acute phase: Symptomatic relief cool compress, freq flushing chilled lubricants
- Betadine but stings
- Beware pseudo-membranes or infiltrates
  - FML tid
  - Maxidex

### Allergic Eye Disease

Mild – allergen avoidance, ocular lubricants, cool compresses,

- Zaditen combine antihistamine and mast cell stabilizer bottle, unit dose
- Patanol twice day over period of weeks
- OTC oral non-sedating anithistamine Acute flare up
- Opticrom, Chromofresh Mast cell stabilizer prevent seasonal symptoms

TOPICAL STEROIDS - Acute flare up or recalcitrant chronic

- FML or Flarex, 2-3 gtt/day weaned over few weeks
- Hycor ointment useful at night if resistant to gtt or periocular eczema

COMANAGE – if requires more than short course of low potency steroid with view to escalating under close monitoring or alternative long-term steroid sparing Tx

**Risks: IOP rise, cataracts** 



# Trantas Dots







### TOPICAL STEROIDS ON CHILDREN



#### Immune (Sterile) Keratitis

Topical antibiotic and low dose steroid

#### Blepharokeratoconjunctitivitis

Chloramphenicol to reduce the levels of staphylococcal carriage and low dose steroid to reduce inflammation

#### Viral keratitis

Beware pseudo-membranes or infiltrates FML tid; Maxidex

#### Intraocular inflammation

Iritis/Uveitis rare but potentially blinding

Tertiary Hospital = Paed Ophtal + Paed Rheumatologist

Chronic uveitis assoc with JIA => long term Maxidex or pred forte with systemic immunosuppression

Risks Cataract, Glaucoma

# Risks antiinfectives

USE Conjunctivitis Blepharitis Prophylaxis Keratitis

RISKS

Systemic - aplastic anaemia

Scar => amblyopia

# Bacterial Infections

### Chloramphenicol

MEMACIST ONLY MEDICINE

CUTP OUT OF REACH OF CAR DRIVE





**Bacterial Conjunctivitis** 

usually resolves spontaneously,

antibacterial treatment may hasten recovery and reduce transmissibility

Review if symptoms do not improve within 48 hours of starting Tx.

All ages, 1 eye drop every 2 hours for the first day, then gradually decrease to every 6 hours as symptoms improve for 5–7 days.

All ages, use eye ointment at night if drops are used during the day, or as a single agent 3 or 4 times daily for 5–7 days.



#### **Bacterial Blepharitis**

All ages, massage eye ointment into lid margin once or twice daily for 1–3 weeks.

#### Prophylaxis

(after superficial trauma or surgery)

All ages, 1 eye drop 4 times daily until epithelium healed (rarely >4 days)

### Microbial Keratitis

Seek Paediatric Ophthalmologist Advice



#### Tobramycin (aminoglycoside)

Drops

1 gtt q 2–4 (q1h if serious) for day 1,

gradually decrease to q6 h as improvement occurs.

Ointment

Apply at night if drops are used during the day Use as a single agent bid to tid (q 3–4 h if severe) for day 1, gradually decrease frequency as improvement occurs.

#### Prophylaxis after superficial eye trauma or surgery

1 eye drop 4 times daily until epithelium healed (rarely >4 days).



### Microbial Keratitis



Seek Paediatric Ophthalmologist Advice



#### Ciprofloxacin Ofloxacin (Quinolone)

1 month – 18 years

before starting treatment, obtain sample for microbiological culture.

Day 1, 1 eye drop q 15 min for the first 6 hours, then q 30 min. Day 2, 1 eye drop q1h. Subsequent days, 1 eye drop q4h.

Decrease frequency according to clinical response

(only under ophthalmologist supervision).

# HERPES SIMPLEX (HSV)





#### **HSV BLEPHARITIS**

• Self limiting in 1-2 weeks; prophylactic Chlorsig ointment

#### **HSV KERATITIS - DENDRITIC**

- Topical aciclovir ointment
- Zovirax, Acivision same regime as adults
- Conjunctival sac 5x/day 2 wks or 3 days after epi healed
- Topical Ganciclovir
- Virgan Gel for ophthalmic use

**RECURRENT** = Paed ophthal + infectious disease specialist

- Systemic anti-viral prophylaxis
- oral valaciclovir dose by weight







# Risks Glaucoma medications

Higher systemic side effects

### Childhood Glaucoma

ONSET: 34% Congenital < 3 m 56% Infantile 4 m to 2 y 6% Juvenile 2 y to 16 y

Requires Paediatric Ophthalmologist Management



Aetiology usually anterior angle abnormality

94% primary and 64% of secondary require surgery

**Topical medicines:** mild cases, adjunct to Sx or temporizing measure prior to Sx

Children higher risk of systemic side effects

Alpha agonists contraindicated in < 12 years

Beta blockers often used, but beware asthma

\*\*Timolol 0.25% solution and 0.1% gel

CAI (Diamox) safe, but beware appetite suppression and weight loss

Aetiology → Prostoglandin analogues less efficacious

# Conclusion

Dosage of most eye drops same in children as adults

Exception = those with more likely side effect

Keratitis (bacterial and HSV), uveitis and glaucoma require paediatric ophthalmologist, best in tertiary hospital setting



# Break out session

#### Reflect - did the presentation meet learning objectives?

- Through this session and further independent learning you should have greater
- 1. Knowledge of tips to help instil eye drops
- 2. Knowledge of risk profile
- 3. Knowledge of when to refer to ophthalmology

- Discuss the tips for prescribing eye drops for home use
- Reflect on your practice and how you deliver a management plan



# Where to look for information

Australian Medicines Handbook (AMH)

AMH Children's Dosing Companion (CDC)

Local and systemic side effects and pharmacodynamics for classes of drugs

Product linking to AMH Online and to the PBS Website

Childhood specific information on dosage, administration advise, off-label use, practice points and products, when ophthalmology advice advised

Paediatric doses for gtt usually expressed for age ranges

Paediatric doses for oral is by weight and/or age

CLINICAL AND EXPERIMENTAL OPTOMETRY https://doi.org/10.1080/08164622.2021.1877533

INVITED REVIEW

#### Practical use and prescription of ocular medications in children and infants

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