Drugs Affecting Rabbit's Eye

Miotics: ophthalmic agents that cause pupillary constriction.

Miosis: constriction of the pupil.

Mydriatics: ophthalmic agents that cause pupillary dilatation.

Mydriasis: extreme dilatation of the pupil.

Accommodation: adjustment of the eye for various distances.

Cycloplegia: ciliary muscle paralysis (Paralysis of accommodation).

Glaucoma: is a progressive optic nerve disease often associated with elevated intraocular pressure and visual field loss. Vision loss from glaucoma is asymptomatic and irreversible; Aqueous is a clear fluid that fills the anterior and posterior chambers of the eye. Aqueous is produced by the ciliary body, passes through the pupil, and drains through the trabecular space into the canal of Schlemm. Impaired outflow of aqueous humor causes elevated intraocular pressure.

Classification of glaucoma:
1. primary glaucoma which is two types:
   - open angle glaucoma (simple glaucoma) (chronic)
   - Closed angle glaucoma or called narrow angle glaucoma (acute), it is due to sudden obstruction.
2. Congenital glaucoma duo to congenital abnormalities.
3. Secondary glaucoma duo to systemic problem or medication (steroid) or surgical trauma or others.
The autonomic control which is typical of all smooth muscles can be easily studied in the pupil. The pupil is supplied with constrictor fibers from the parasympathetic and with dilator fibers from the sympathetic. Normally the control of the pupils dominated by the parasympathetic supply to the sphincter.

When the drugs applied to the conjunctiva pass directly through lymph channels into the eye ball and the local effects can be studied.

**Application to the conjunctiva by drugs with ACH like action such as (carbachol, pilocarpine or physostigmine) cause.**

1. Pupillary constriction.
2. Accommodation for near vision by contraction of the ciliary body and consequent increasing curvature of the lens.
3. Further pupillary constriction on exposure to light.
4. The intra ocular pressure falls as a result of miosis.
5. Conjunctival hyperaemia.

**Note:** Pilocarpine acts within 10 to 30 minutes and lasts 4 to 8 hours.

**Clinical uses of pilocarpine eye drop:**

The chief clinical use of pilocarpine is to lower intraocular pressure in chronic simple glaucoma, it produce miosis, opens drainage channels in the trabecular network and improves the out flow of aqueous humor.
Contra indication of pilocarpine eye drop:

pilocarpine is contra indicated in acute iritis, acute inflammatory disease of anterior segment of the eye, and secondary glaucoma.

Adverse effect of pilocarpine eye drop:

Suborbital headache, ciliary spasm, blurred vision, conjunctival irritation, lacrimation, change in visual field, brow pain. Pilocarpine can enter the brain and cause CNS disturbances. It stimulates sweating and salivation, bronchiolar spasm.

The action of pilocarpine which is cholinergic agonist (Muscarinic agent) on the pupil and on accommodation can be antagonized by atropine which is cholinergic antagonist (antimuscarinic agent), and atropine cause:

1. Dilates the pupil (mydriasis).
2. Light enter freely and the normal pupillary reflex .accommodation is paralyzed (cycloplegia) and the lens is fixed for far vision.
3. The intraocular pressure tends to rise.
4. Constriction to light is abolished.

Note: atropine acts within 30 - 40 minutes and can last 12 to 14 days.

Clinical uses of atropine eye drop:

1. Relieve the headache caused by miosis.
2. Acute iritis.
3. Cycloplegic refraction before eye examination
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**Contra indication of atropine eye drop:**
Atropine is contra indicated in angle – closure glaucoma.

**Adverse reaction of atropine eye drop:**

Ocular congestion in long – term use, conjunctivitis, contact dermatitis, edema, blurred vision, eye dryness.

Sympathomimetic agents such as epinephrine (Non selective adrenergic) Stimulation of $\alpha$ – agonist cause pupillary dilation but reduce intra ocular pressure in open angle glocauma. This agent reduce the production of aqueous humor by vasoconstriction of the ciliary body blood vessels

**While** $\beta$ - antagonists Timolol reduce the production of aqueous humor in the eye it is used for treatment of chronic open angle glaucoma. It differs from Pilocarpine and Epinephrine by not affecting pupil size and accommodation.
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Actions of pilocarpine and atropine on the iris and ciliary muscle of the eye.