Subconjunctival injection

CONTRIBUTOR(S): Ash Phipps James Breen

University of Nottingham
UK | CHINA | MALAYSIA

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Introduction

- Subconjunctival injections are another means of achieving high therapeutic levels of drugs in the cornea, sclera and anterior segment of the orbit.
- This is particularly important in the emergency management of acute infection or inflammation of the orbit.
- Placing injections subconjunctivally bypasses the lipid layers of the bulbar conjunctiva and places the drugs adjacent to the water-permeable sclera, increasing water-soluble drug penetration into the eye.
- Local deposition allows for the leakage and therefore, corneal penetration.

Uses

- To achieve high corneal and intra-ocular levels of drugs for short periods.
- Administration of drugs that penetrate the cornea poorly (antibiotics) or have slow absorption characteristics (corticosteroids).
- When topical medication cannot be administered, or only infrequently.
- Infrequent yarding of an animal is only possible.

Advantages

- Markedly increased penetration of water soluble drugs.
- Short term high concentrations of drugs in cornea and anterior segment.
- Supplement to topical therapy.

Disadvantages

- Local irritation, residues, necrosis and granuloma formation can occur at the site of injection.
- Once injected the drug(s) cannot be removed.
- Temporary pain at site of injection.
- Injection is quite difficult with potential for injury to eye.

Technical problems

- If the animal is not adequately restrained, there is a risk of accidental needle stick injury to the cornea/sclera/orbit Bovine restraint techniques.
- If inappropriate drugs are injected into the subconjunctiva, this could lead to discomfort for the animal (blephrospasm, epiphora and narrowing of the palpebral fissure).

Alternative techniques

- Topical application of ocular drugs.
- Placement of an indwelling lavage drain system to allow for topical ocular drugs to be applied to the surface of the eye.

Time required

Preparation

- 2-5 minutes (to adequately restrain the animal).

Procedure

- Within 1 minute.

Requirements

Personnel

Veterinarian expertise

- This procedure can be carried out by a non-specialist veterinary practitioner.

Nursing expertise

- It may be useful to have an assistant to aid in holding the eyelids open for the procedure. However, the procedure can be carried out without an assistant.

Materials required

Minimum equipment

- Halter .
- Needle (25 to 22 gauge).
- Syringe.

Ideal equipment

- Tissue forceps.

Minimum consumables

- The drugs that being used to treat they ocular condition (these will be dependent on the condition being treated).
- Topical anesthetic suited for the treatment of the ocular conditions.

Preparation

Pre-medication

- Premedication is generally not required.
- However, if the animal to be treated is particularly fractious, then mild to moderate sedation Sedating cattle may be indication to facilitate restraining the animal and carrying out the procedure:
  - 0.05-0.07mg/kg xylazine hydrochloride Xylazine.

Restraint

- The procedure is generally carried out in the standing animal.
- Standard restraint in a crush .
- A halter is used to restrain the animals head .

Procedure

Approach

Step 1 - Restraint

- Ensure the animal is adequately restrained (unable to move their head).

> Note: if the head is rotated to the opposite side to the eye being treated, this takes advantage of the vestibular eye movement, rolling the eye ventrally and therefore, exposing the dorsal bulbar region.

Step 2- Topical anesthetic

- Spray the cornea with the topical anaesthetic.

> It may be beneficial to utilise local analgesia in the form of a palpebral nerve block Palpebral nerve block both to facilitate examination of a painful eye and to perform the subconjunctival injection painlessly.

Core procedure

Step 1

- Retract the upper and lower eye lids with your non-dominant hand or have an assistant to do so.
- Grasp the dorsal bulbar conjunctiva with tissue forceps (optional).

Step 2

- Rest your dominant hand with the syringe and medication in on the side of the animals head or just below the eye.
- This aids in stabilizing the hand when administering the medication.
- The needle (with syringe containing the medication is attached) is inserted bevel upwards through the tented dorsal bulbar conjunctiva.
- If the dorsal bulbar has not been grasped with tissue forceps, the needle can be inserted bevel upwards thought the bulbar conjunctiva.

Step 3

- The syringe content is then slowly deposited

> A subconjunctival bleb will appear at the site of injection. 0.5ml to 1ml at the site of injection only.

Exit

Step 1

- Gently remove the needle from the subconjunctival bleb.

Aftercare

Immediate Aftercare

Monitoring

- Observe the treated animal frequently to assess response to treatment and whether further treatment is required.

General care

- Monitor the treated eye(s).

Analgesia

- Analgesia may be required as part of the treatment of the underlying condition.
- Severe eye infections are still probably best treated systemically and the importance of an NSAID for these cannot be over-stated Non-steroidal anti-inflammatory drugs: an overview.

Antimicrobial therapy

- Systemic antimicrobial therapy may be required as part of the treatment of the underlying condition.

Other medication

- Other medical therapies may be required as part of the treatment of the underlying condition.

Wound Protection

- Under some circumstances it is necessary to cover the eye with a fabric patch to aid in the protection of the eye.

Potential complications

- Irritation at injection site.
- Granuloma formation.
- Accidental intraocular penetration.

Long term Aftercare

Medication

- Repeat subconjunctival injections may be required depending on the condition being treated and the respose to treatment. This is not a depot injection, but a short acting treatment.
- Systemic medications may be required as part of the treatment of the underlying condition.

Follow up

- Observe the treated animal frequently to assess response to treatment and whether further treatment is required.

Outcomes

Complications

- Irritation at injection site.
- Granuloma formation.
- Accidental intraocular penetration.

Reasons for treatment failure

- Inappropriate administration of medications.
- Inappropriate treatment for the underlying condition.

Prognosis

- This will be dependent on the underlying condition and the response to therapy.

Further Reading

Publications

Refereed Papers

- Recent references from PubMed and VetMedResource.
- Townsend W M (2010) **Examination techniques and therapeutic regimens for the ruminant and camelid eye**. *Vet Clin North Am Food Anim Pract* **26** (3), 437-458 PubMed.

Other Sources Of Information

- Maggs D J, Miller P & Ofri R (2012) **Slatter's Fundamentals of Veterinary Ophthalmology.** Elsevier Health Sciences. pp 32.
- Peiffer R & Petersen-Jones S (1997) **Small Animal Ophthalmology: A Problem Orientated Approach**. 2nd edn. W B Saunders, UK. pp 29-30.
- Sinclair J, Abeynayake P & Steffert I J (1981) **Technique for Subconjunctival Injections of Antibiotic for the Treatment of Bovine Infectious Keratitis.** In: *Proceedings of the Society of Sheep and Beef Cattle Veterinarians of the New Zealand Veterinary Association.*