

# Bovine Squamous Cell Carcinoma (SCC)

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# Bovine SCC quick facts...

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- ❑ SCC by far most common.
- ❑ Can affect: 3rd eyelid > Eyelids > Globe > Conjunctiva.
- ❑ (Also, vulva commonly affected).
- ❑ Significant economic and welfare issue for farmers using Euro breeds.
- ❑ Can be well-managed with a good program.



# Aetiology – cause.

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- ❑ Solar radiation causing neoplastic lesion on eye.
- ❑ Breed predisposition based upon eyelid pigmentation main factor.
- ❑ Other factors of less importance (nutrition, production system etc)
- ❑ In white faced Euro cattle **eyelid pigmentation** has little effect upon incidence of 3rd eyelid cancers.





# Breed Predilections

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## European Breeds.

- ❑ Holstein Friesian, Montbéliarde - Very susceptible.
- ❑ Any cross with these breeds will increase risk of eye cancers significantly.
- ❑ Jersey, Guernsey very resistant. Brown pigmentation in 3rd eyelid and eyelid skin.
- ❑ Gir and Sahiwal (& other local breeds). Very Resistant.

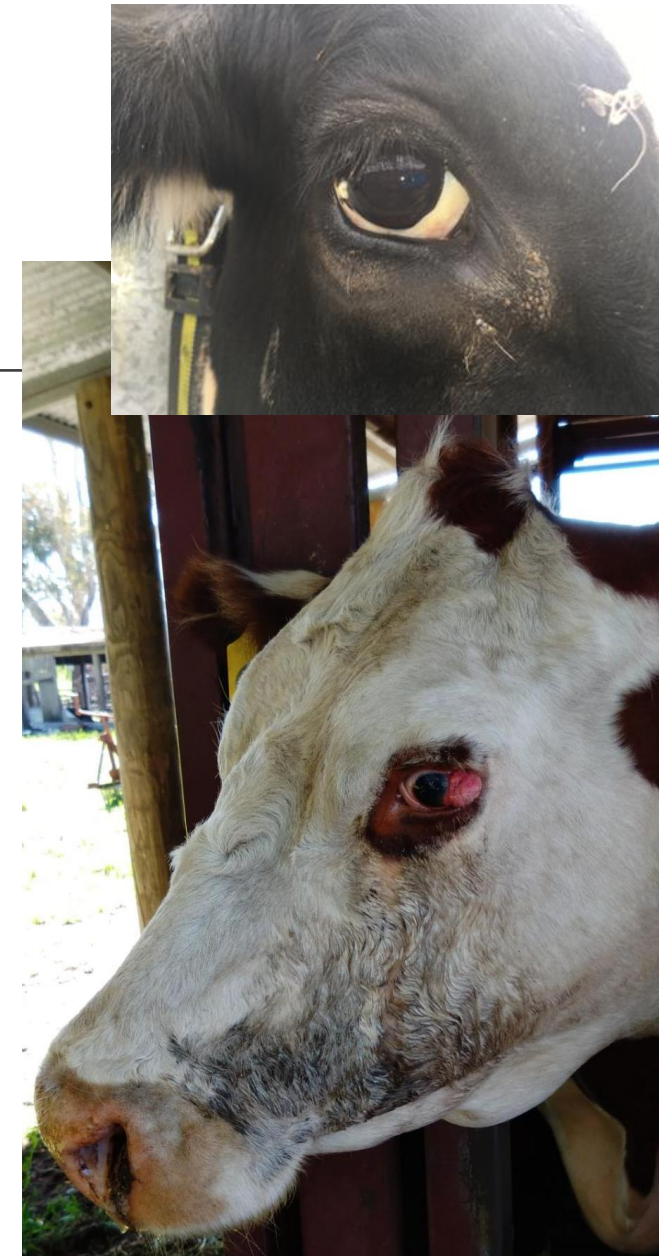


# Pathogenesis (Globe cancers).

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Corneoconjunctival globe lesions in cattle usually start at the limbal sclera and grow across the cornea.

Typically, they begin as benign, smooth, white plaques on the conjunctival surfaces; they may progress to a papilloma and then to a SCC or go directly to the malignant stage.





# Pathogenesis (3<sup>rd</sup> Eyelid)

- ❑ Lid lesions usually begin as either an ulcerative or a hyperkeratotic lesion (cutaneous horn). While in this benign stage, ~30% may spontaneously regress.
- ❑ The tumor may become quite large without invading the globe; however, invasion into the eye and orbit as well as metastasis to parotid and submandibular lymph nodes occur in late stages of the disease.
- ❑ Varying rate of growth, many farmer anecdotally report rapid advancement in summer (high sunlight, hot dusty conditions).



Bulk of tumor sloughs leaving ulcerated raw tissue deep in medial canthus

# Sloughed 3<sup>rd</sup> Eyelid SCC

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SCC tumors commonly slough leaving much less evidence for their presence.

Advanced 3<sup>rd</sup> eyelid cancers often fall away leaving a medial canthus discharge and redness. In this case palpation reveals hard, thickened tissue around the conjunctiva and base of 3<sup>rd</sup> eyelid.

Note severe tear staining, and reddened tissue at medial canthus.

Almost 100% are advanced cancers NOT infections.





# Diagnosis / Differentials

Easy. If it has a white face/eyelids or its Friesian cross  
90%+ of lesions are SCC.

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## Differentials.

- ❑ Pinkeye (Moraxella bovis),
- ❑ Eye injuries from foreign bodies
- ❑ Corneal scars from pinkeye
- ❑ Hyperkeratosis lesions very rare (benign)





# Treatment

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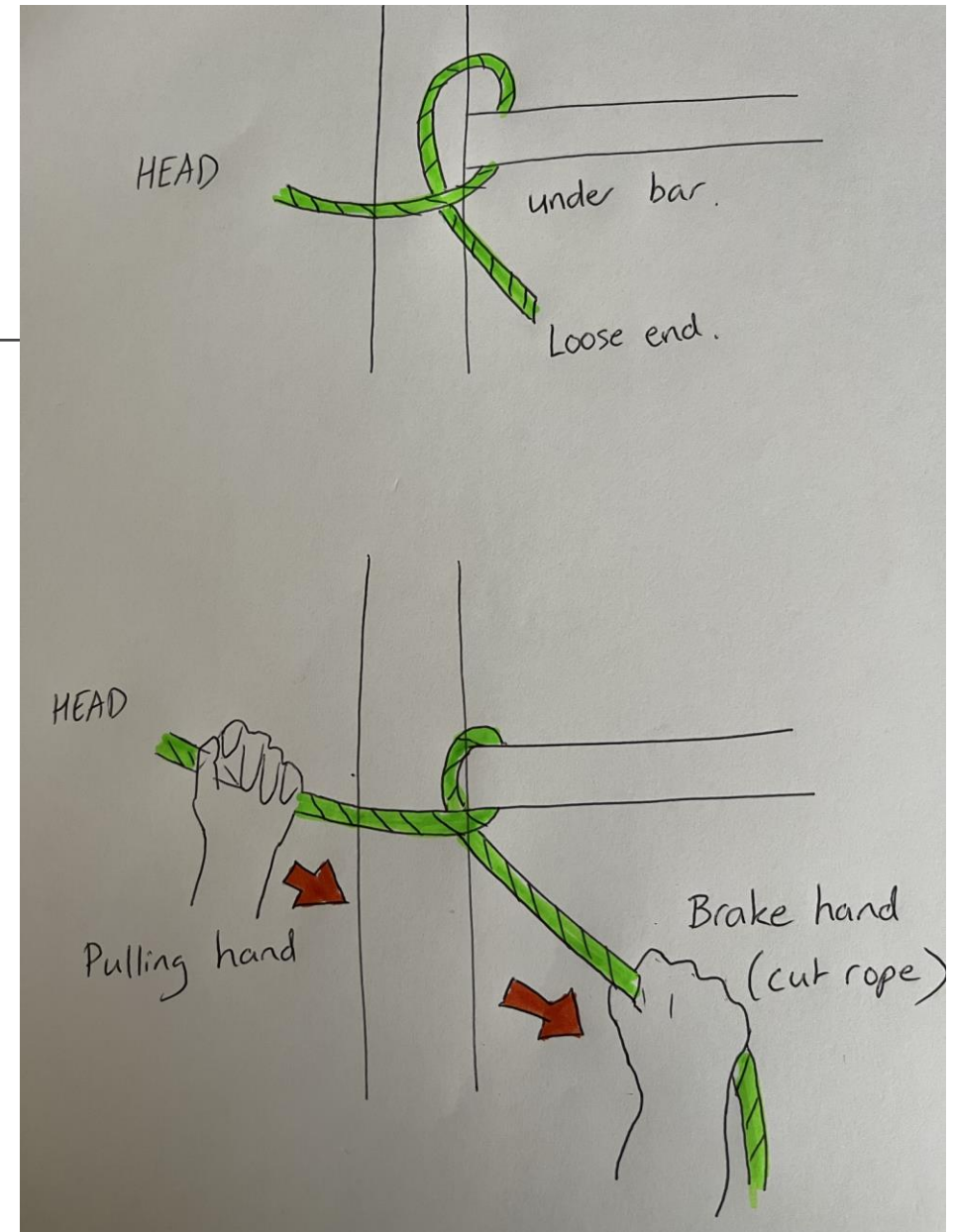
## RESTRAINT

- ❑ Crush, sedation, ropes, nosegrrips.
- ❑ Head Tied with Strong, Thick, NON-STRETCH rope around side of crush/chute.
- ❑ Tie as tight as possible to prevent movement.



# Restraint – tightening rope

- Use the “up and around” technique to “cut” the rope and prevent animal from pulling rope back when head tightened.
- Keep “taking up the slack” with R hand as head is dragged around crush. Finally tie off with suitable knot. Ideally quick release so if the animal drops down, easily undone.





# Sedation and Anaesthesia

## Sedation.

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Xylazine 20mg/ml

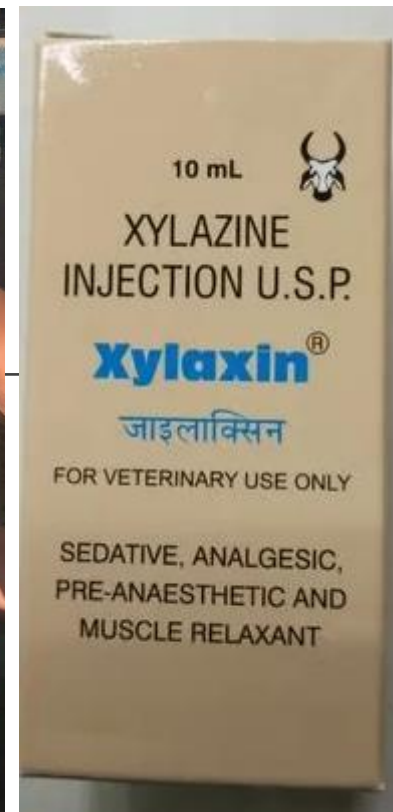
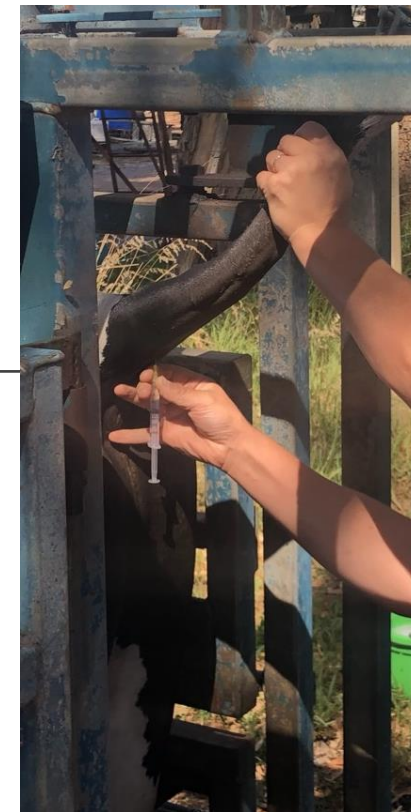
20-30mg IV using coccygeal vein or jugular vein.

Must leave cow for 5 minutes to relax and for sedative to take effect.

Many other alternatives including sedation and casting (100-150mg xylazine IV).

## Anaesthesia - Lignocaine 2%

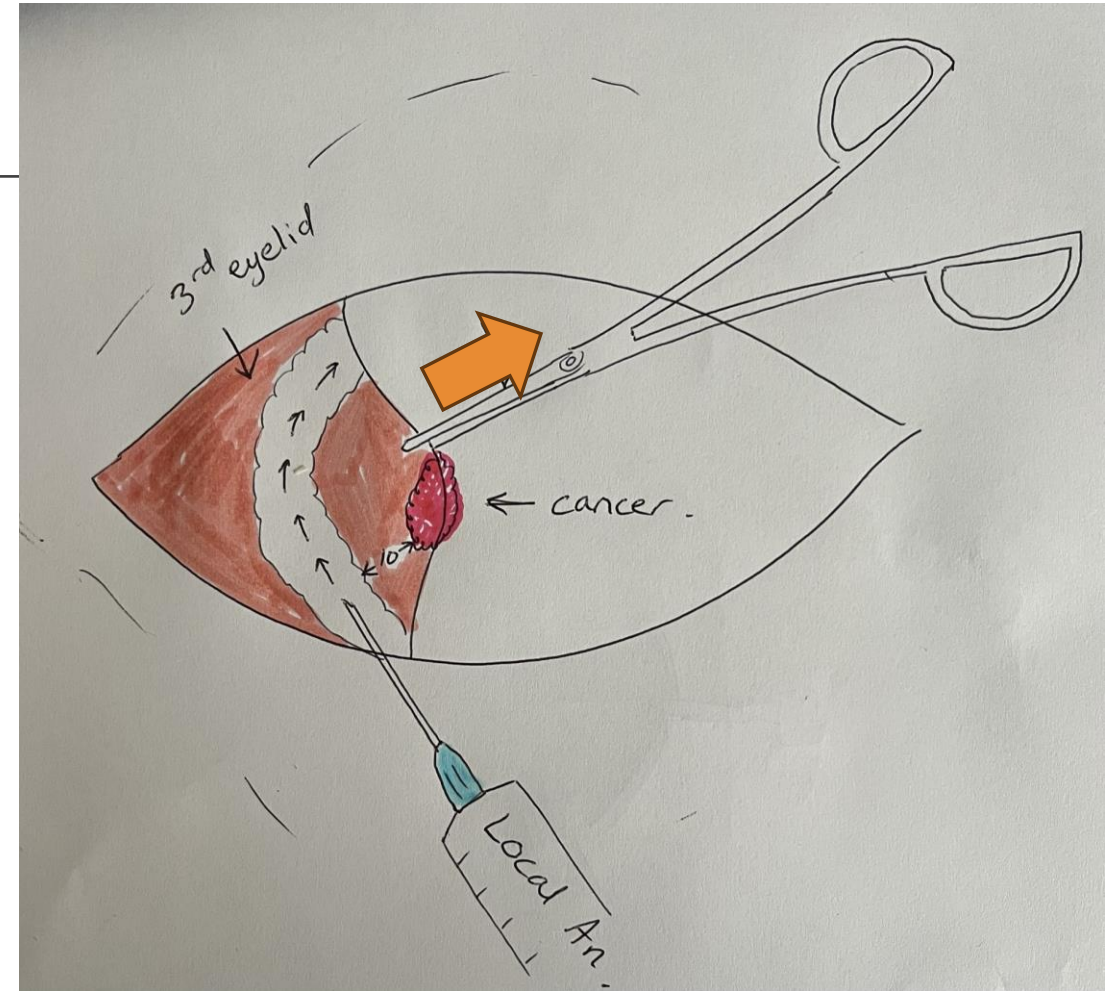
With good technique local anaesthetic (lignocaine) can be infused with minimal pain or distress to animal (bleb, inject and push slowly). Use 21-19G needles. Smaller needles less painful but need reasonable gauge for large volumes.



# 3rd eyelid cancers

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1. Ideally squirt 2mls onto eyelid and leave for 1 minute.
2. Then grip third eyelid edge (2-5mm) with mosquito forceps and retract.
3. Then using 22g needle (3/4") penetrate needle tip into tissue then slowly start infusing as you push the needle deeper into tissue.
4. Aim at a ring from top to bottom at least 10mms (preferably 20mms) from cancer. Use 10-20mls local.





# Globe Cancers – Anaesthesia.

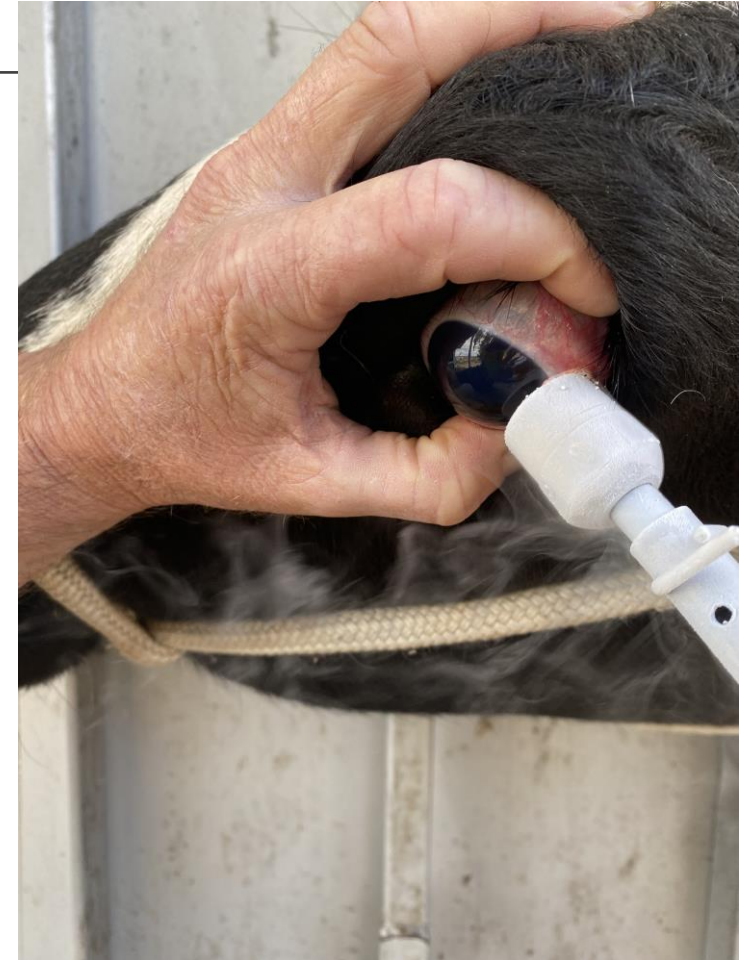
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## Globe cancers – Prolapsing Eyeball.

If using cryosurgery (freezing) usually prolapse the eyeball.

Otherwise, will immediately retract once probe touches eyeball.

Must sedate well with at least 20mls xylazine IV, then infuse 20mls dorsally behind eyeball and 20mls ventrally. Use at least a 2" needle (Ideally 19-22G). Bend the needle to conform to the eyeball profile. Inject very slowly AS you push the needle through the tissue. Start injecting as soon as the needle tip penetrates the conjunctiva. Wait at least 10 minutes before prolapsing the globe. Describe.



# Eyeball Prolapse

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Occasionally a small (1cm) incision will be made in the lateral canthus if the eyelids are too tight to prolapse the globe. It is sutured at the end of the procedure.

## Eyelid cancers

Infuse local under cancer. Good margins essential so wide local infusion.





# Cryotherapy - Globe

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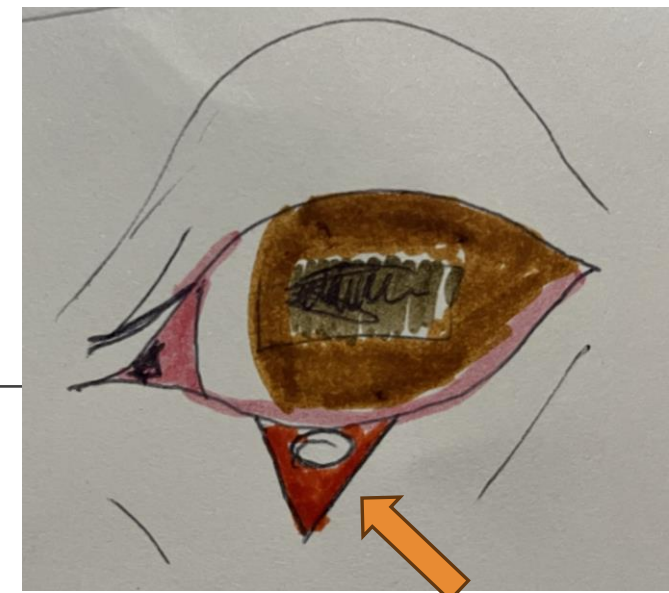
Can use a liquid nitrogen "gun" if available.

- ❑ In most cases a brass/copper probe is dipped into liquid nitrogen Al can and used. Instill local onto eyeball 30s before start procedure.
- ❑ Can freeze and shave small lesions (scalpel) before repeated freezing.
- ❑ Good for globe lesions up to 10mm. Any larger more chance of recurrence.
- ❑ 3 x Freeze/Thaw cycles of 30 seconds.
- ❑ Anti-inflammatory (e.g. Ketoprofen, Flunixin) if prolapse the eyeball.



# Eyelids – Cryo. / Surgery

- ❑ Small cancers (<10mm) can be triple frozen from the eyelid skin.
- ❑ Cancers up to 15mm can be excised without damaging the eyelid structure too much. Small diamond shaped incision with good (10mm) margins. If you remove too much eyelid skin, the lid will function poorly, and the eye will become ulcerated and eventually need to be removed due to pain and infection.
- ❑ With a cow with pink medial eyelids, multiple cancers and precancerous tissue mean that the only viable option is eye removal.



incision

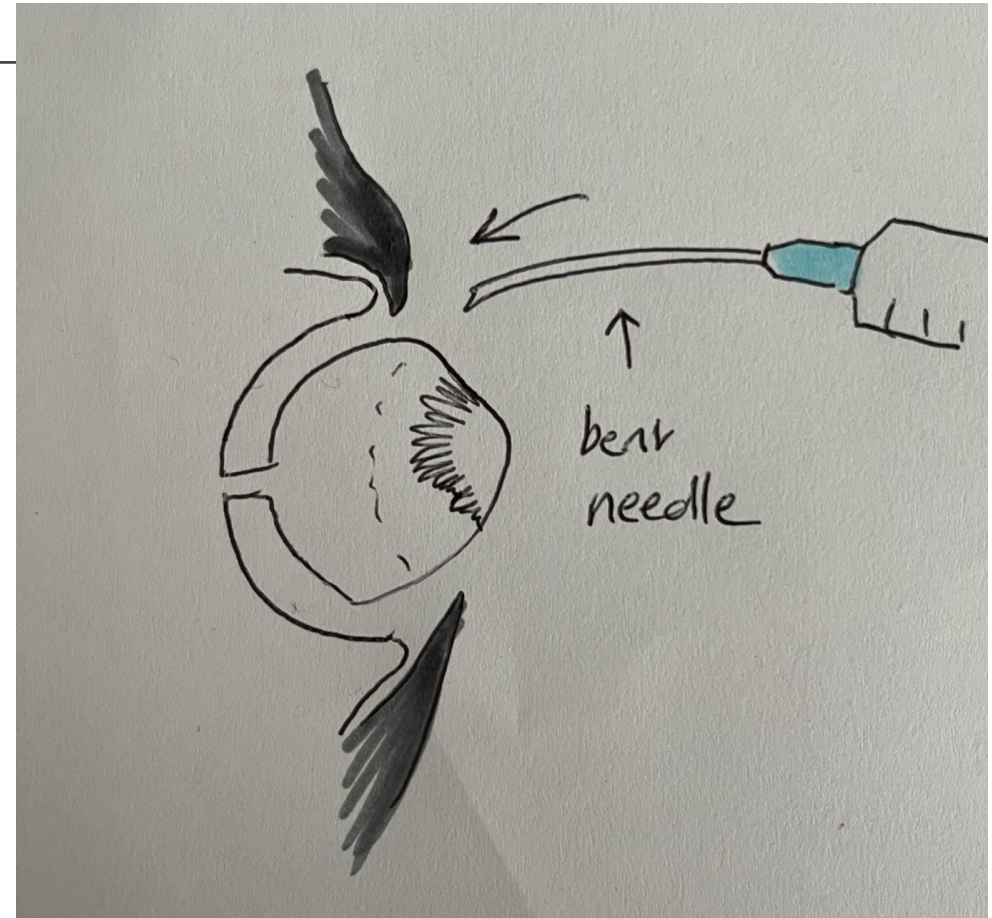


Poor prognosis

# Anaesthesia - Eye Ablation (removal).

Sedation with xylazine essential. Use a 19-21G needle minimum 2" (50mm).

- 1) Retrobulbar anaesthesia is accomplished using the "Compass Block". 15-20mls of local is infused medial, lateral, dorsal and ventral through conjunctiva (or eyelid skin if necessary).
- 2) Slow careful insertion of the need AS THE LOCAL is injected. Should be minimally painful. At least 2" needle, with hub deep into conjunctiva.
- 3) Then inject a ring of local shallower around conjunctiva (under bony orbit), use around 30mls.





# Anaesthesia - Eye Ablation (removal).

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- 1) Then inject a ring around skin where incision will planned (30mls). Wait at least 10 minute for local to take effect. If the anaesthesia poor, consider injecting more anaesthetic during surgery (make sure very good asepsis (re-glove)).
- 2) Can use up to 150mls lignocaine

# Surgery

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3rd eyelid cancers.

- ❑ Use curved scissors to excise cancer.
- ❑ Grip and retract with mosquito forceps.

Ideally 15-20mm margins but minimum 10mm.

- ❑ If cannot get 10mm margins, remove the eye instead. If the cancer has sloughed, it will be very difficult to retract the 3rd eyelid, and the conjunctival tissue will be thickened and hard at the medial canthus.
- ❑ Instill some cloxacillin eye ointment (1-2mls) into the eye afterwards.
- ❑ Ideally NSAID e.g. Flunixin, Ketoprofen. No parenteral antibiotics needed.



# Eye ablation.

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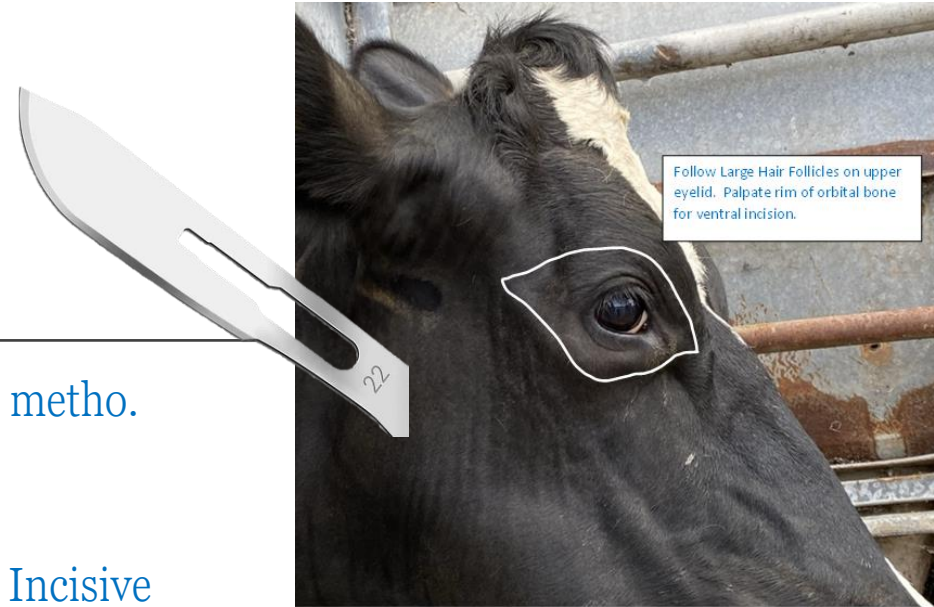
- ❑ A great option to cure ocular cancers.
- ❑ When suitable cases are chosen and a skilled surgeon, should have a success rate of 95%+.
- ❑ Complication rate (infection, wound dehiscence) of around 10%.
- ❑ Sedation and good local anaesthesia with very firm restraint with halter essential for quick easy procedure.
- ❑ Blood loss is sometimes spectacular, but as long as the procedure is completed within 30 minutes is never an issue.





# Eye Ablation....

- 1) Shave or clip large area around eye. Prep with chlorhex and metho.
- 2) Local anaesthesia
- 3) Incise a shallow incision (around eyelids (see picture)).
- 4) Start the deep incision on the lower lid and medial canthus. Incise deeply inside the eye socket, hugging the bone. Undermine and cut the skin from the medial and lateral canthus,
- 5) Upper lid incision made deeper (again hugging socket).
- 6) Apply gentle traction to the eyeball and incise the deep tissue and eventually optic nerve ( fibrous and hard to cut). Traction on the eyeball makes cutting the optic nerve easier.
- 7) If the cancer approaches close the medial canthus pay particular attention to a very close dissection onto the periosteum. You can even scrape the bone with the scalpel blade to attempt to remove any residual cancer tissue..



# Eye Ablation....

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8. Quick closure with simple interrupted sutures of thick non-absorbable suture (Supramid) from R to L (right handed surgeon). Apply strong tension to each suture as it is placed to ensure no leakage of blood. Tie off well. Ideally no blood after cleaned up.
9. Clean thoroughly, dry and spray with pink or silver antiseptic spray.
10. Long-acting OTC or Penicillin, or 5 days of short acting. Anti-inflammatory (NSAID) for 1-3 days.
11. Examine excised eye tissue and consider prognosis.





# Complications – Infection.

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- ❑ ~10% of cases. Factors include poor asepsis (need to be very careful) and infected or sloughed cancers carrying infection.
- ❑ Diagnosis - Pain (head shaking, inappetence, depression), leakage of pus from sutures, wound breakdown.
- ❑ Management
  1. Keep on Pen. or OTC for at least 10 days after surgery. Check temperature daily, if high fever ( $>40^{\circ}\text{C}$ ) then continue antibiotics. Antiseptic spray.
  2. After 5-7 days remove a small section of sutures and drain and flush with dilute iodine/chlorhex or saline.
  3. If severe, eventually might need to open  $\frac{1}{2}$  to  $\frac{3}{4}$  of wound, remove infected blood clot, flush very thoroughly and leave open to heal by secondary intention.





# Complications and Prognosis

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2)Wound Dehiscence.

Occasionally suture caught on fence and breaks. Clean and re-suture open part.

## PROGNOSIS FOR EYE ABLATION.

- ❑Globe cancers ~100% cure.
- ❑If very concerned about cancer tissue invading much of ocular socket, chance of cure is poor.

Cancer can result in wound breakdown and infection within 2-4 weeks.

- ❑If some concern about margins, might recur in 3-12 months.



# Preventative management

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## 1. SELECTIVE BREEDING.

- ❑ Native breeds, and cross breeding.
- ❑ Consider Jersey, or Red Breeds.
- ❑ Avoid breeding replacements from animals with pink medial eyelid skin.

## 2. TREAT EARLY

3<sup>rd</sup> eyelid cancers and small globe cancers can be cured very effectively, and cost effectively if picked up early.

A missed or ignored cancer can quickly become life threatening to the cow, and result in poor welfare and economic loss to the client.

