

How to save the eye on 95% of your cancer eye surgeries

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Abstract

The overwhelming majority of cows with squamous cell carcinoma (SCC or “cancer eye”) can have the neoplastic tissue removed so that the eye does not have to be removed. Early detection of SCC is the key to only having to excise the neoplastic tissue while saving the eye. A lesion of approximately 1 cm or less can be readily seen when the cow walks through the chute for yearly vaccinations and/or pregnancy examination, and it is easily removed at this time.

Cows with SCC should not necessarily be automatic culls. A cow with a small lesion on the third eyelid or on the cornea that is removed in a timely fashion can have a long and productive life in the herd.

Key words: squamous cell carcinoma, cancer eye, surgery

Introduction

There are extensive publications written on the economic costs, risk factors, and prevention of squamous cell carcinoma (SCC or “cancer eye”) in cattle. Those topics are discussed elsewhere. This paper focuses on how to surgically remove most SCC lesions so that the cow retains her eye and her sight.

Lesion Location

Third eyelid (nictitating membrane) – lesions here are quite easy to remove. Technique:

- Restrain cow in chute. Use a halter or head table to minimize movement of the head.
- Place a few drops of proparacaine hydrochloride onto the surface of the eye, being sure to include the 3rd eyelid.
- Draw up ~1-2 mL lidocaine into a 3 mL syringe with a 20-22 ga. needle. Place the tip of the needle between the medial canthus and the third eyelid. Quickly and carefully thrust the syringe with needle attached into the tissue of the 3rd eyelid. The tissue will have some resistance to the needle. Moving the syringe and needle slowly into the tissue will likely just move the tissue away from the needle and not allow penetration. You need to ‘pop’ the needle in.
- Inject the lidocaine. If you are in the correct position, the 3rd eyelid will quickly swell as you inject.

- Wait ~1-2 minutes.
- Apply locking forceps (Kelly or similar) in a wedge shape so that the neoplastic tissue is medial to the forceps. It is ideal to leave a few millimeters of normal tissue lateral to the neoplastic tissue and cut medial to the forceps.
- Remove tissue. There is no need for suturing
- Take a large ‘pig ear-notcher’ or similar tool and ‘notch’ the identification tag in the ear ipsilateral to the lesion to remind you and the owner that this cow has had SCC surgery.

Eyelids – removal of lesions on the eyelids is very similar to the technique described above for removal of cancerous tissue on the 3rd eyelid.

Liquid nitrogen freezing can also be used in some cases. Be careful to cover the globe so that no liquid nitrogen contacts the eye. A cryogenic unit can be used or if the lesions are small enough, a cotton-tipped swab can be placed in liquid nitrogen and then the swab can be pressed to the lesion for 20 to 30 seconds. If the lesion is larger than about 0.5 cm, it can be debulked first and frozen afterward. Always do 2 freeze/thaw cycles.

Globe – these are the lesions where some advocate removing the entire globe. Of the hundreds of SCC surgeries I have done, I would estimate that over 95% were done with the following technique while saving the eye. I learned this technique during my externships in Nebraska many years ago. Technique:

- Restrain cow in chute. Use a halter to minimize movement of the head by pulling head laterally contralateral to lesion.
- Place a few drops of proparacaine hydrochloride onto the surface of the eye, being sure to include the neoplastic lesion.
- It is nearly impossible to get a few drops of proparacaine from the bottle onto the surface of the globe without contaminating the bottle due to the position of the cow’s head. To circumvent this problem:
 - place a new nasal cannula onto a 1 mL syringe
 - partially unscrew the lid on the proparacaine
 - use the lid to ‘pop’ the dropper top off of the proparacaine bottle
 - place the cannula into the proparacaine solu-

tion and draw up ~0.5 mL

- put the tip of cannula near the lesion, manually close the lids and slowly dispense the proparacaine so that it bathes the lesion on the surface of the globe
- Draw up 27 mL lidocaine and 3 mL 8.4% NaHCO₃ into a 35 mL syringe.
- Attach a 4" 16 ga. ("pig bleeding") needle to the syringe
- Place the tip of the needle just caudal to the edge of the lower lid and thrust the needle through the skin.
 - to make a precise injection, place the tip of the needle on the medial aspect of your index finger just distal to the tip of your finger while the lateral side of your finger is placed on the cow's head.
 - rotate your hand medially so that the needle pierces the skin precisely where you want to place the needle.
- Advance the needle 3 to 3.5" (7.6 to 8.9 cm) so that the tip of the needle is caudal to the globe.
- Aspirate and if no blood is encountered, inject the entire solution retrobulbarly.
- Wait about 2 to 3 minutes.
 - If extreme chemosis occurs, you were not deep enough with your injection.
 - take an 18 ga. needle and prick the areas of chemosis to allow the edema fluid to escape.
 - You may or may not have to inject more lidocaine. If eye does not proptose easily as described below, inject 20 ml of the lidocaine/bicarb solution being sure to get deep enough.
- Place 1 thumb parallel to the upper lid and the other parallel to the lower lid, making sure you are exactly at the edge of the eyelid.
- Press inward with firm and steady pressure until the globe is proptosed from the socket.
- Keep one thumb firmly on the lower lid under the globe so that the globe does not retract into the socket.
- Place a scalpel in your hand and firmly place the lateral aspect of your hand on the cow's head so that if the cow moves even slightly, your hand and the scalpel moves with her.
- It is ideal to place your scalpel in a vertical position pointing downward. Move the scalpel like a pendulum and use the tip to slice off the neoplastic tissue flush with the normal tissue of the eye.
 - if the lesion is at the limbus (junction of the cornea and sclera) it is easiest to cut from the cornea to the sclera.
- After the lesion is removed, spray some lidocaine or saline onto the eye, grasp the upper and lower lids and pull rostrally and medially so that the globe returns to the eye socket.
 - if the eye has swollen and it is impossible to

replace, incise the lateral canthus to replace the eye (I have never had to do this, but this was mentioned when I learned the technique.)

- Take a large 'pig ear-notcher' or similar tool and 'notch' the identification tag in the ear ipsilateral to the lesion to remind you and the owner that this cow has had SCC surgery.

Advantages vs enucleation:

- Better for the cow – she still has her eyesight
- Cow will sell at full market value when she goes to slaughter
- Faster
- Less costly
- Zero or minimal blood
- After doing 1 of these you are an expert on the procedure

Disadvantages:

- Neoplasia may return
- this has been rare in my experience, especially if the lesion was discovered early in the disease
- if this happens, a repeat surgery can be done

Although this technique may look daunting the first time you see it, I can say with complete confidence that it is very simple. I taught many veterinary students to do this technique and each agreed that after they had done their first one they could do the next one with no additional instruction.

Cows with SCC should not necessarily be automatic culls. A cow with a small lesion on the third eyelid or on the cornea that is removed in a timely fashion can have a long and productive life in the herd. If you remember to notch the ID tag of these cows, they will get additional scrutiny and if a lesion does redevelop, they are generally identified quickly. Cows with repeat SCC episodes may be asking to leave the herd.

A Few Notes on the Cancer Eye Video

- 0:00 – 0:30 Shows injecting 30 mL lidocaine retrobulbarly. Advance the 4" x 16 ga needle (I use a pig bleeding needle) at least 3.5" (8.9 cm), aspirate and inject. This anesthetizes the nerves that innervate the muscles that control the eye and adds volume to help proptose the eye.
- 0:31 – 0:44 1 mL proparacaine hydrochloride being infused around the globe to anesthetize the surface of the cornea. This is critical to eliminate pain and to keep eye from moving during surgery. Do not try to put a drop in from the bottle. You will touch the surface and contaminate the bottle. I use a 1 mL syringe and a nasal canula.
- 0:56 – 1:05 The best video of proptosing the globe. Thumbs adjacent and parallel to the lids. If it does not come out easily, can give 10 mL more lidocaine. I rarely need to add more.
- 1:27 – 1:31 old way of dropping proparacaine onto globe. Canula works better.

- 2:08 – 2:56 best example of surgery. Attach hand to head so if cow moves you don't make a mistake (I have done hundreds of these and never inadvertently cut the eye). Use scalpel like a pendulum and slice tumor off. Can use a caustic stick to control bleeding if needed (not shown).
- 2:56 – lubricate eye with saline or lidocaine before replacing.
- 3:25 – end replace eye into socket. Cow will be partially blind in this eye for about 2 hours. On rare occasions, I have done surgery on both eyes the same visit. Cow must be very calm and owner must have a pen for cow to recover for ~ 2 hours.