


Moving Beyond Barbiturates

Practical Applications of Captive Bolt and Intrathecal Lidocaine in Farm Animal Euthanasia

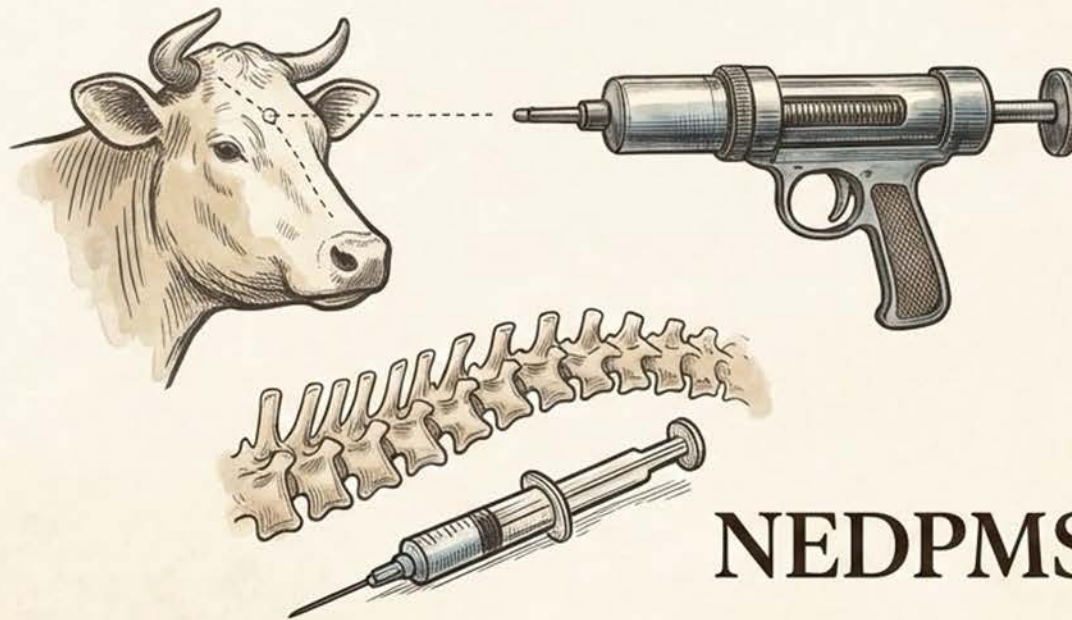
Jon E Higgins VMD/Acorn Farmvets LLC



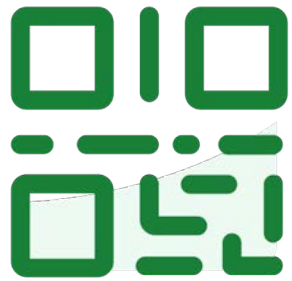
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Practical Applications of Captive Bolt and Intrathecal
Lidocaine in Farm Animal Euthanasia



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Audience Q&A

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Introduction: The Case for Change

The “Barbiturate Burden”:



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- Environmental persistence and secondary toxicity (scavenger protection).
- Regulatory hurdles: Record-keeping and carcass disposal restrictions.
- The “Yellow Bag” problem: Increased costs for professional disposal.

The Ethical Mandate:



The Ethical Mandate:

- Ensuring a “Good Death” (Euthanasia) through rapid unconsciousness and minimal distress.
- The “Three-Step” Goal: Unconsciousness, followed by cardiac or respiratory arrest, followed by death.

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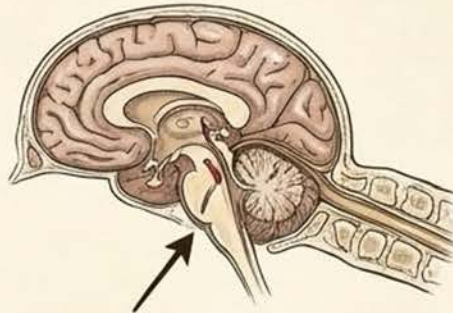
Chemical Euthanasia: Intrathecal Lidocaine in the bovine

Why Lidocaine?



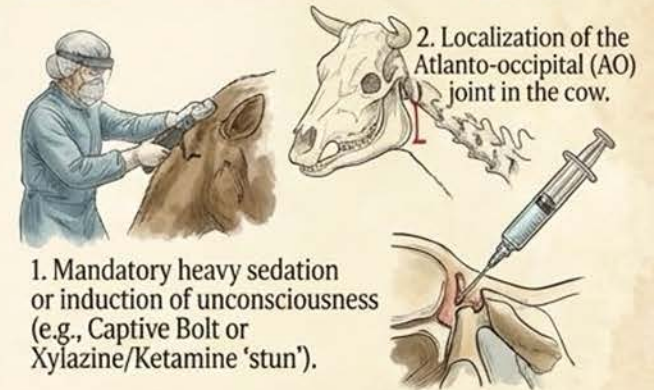
Non-controlled, inexpensive, no environmental residue concerns, and readily available in the farm truck.

The Mechanism:



Rapidly induces high-level anesthesia and medullary paralysis when injected into the cerebrospinal fluid (CSF).

The Protocol:



1. Mandatory heavy sedation or induction of unconsciousness (e.g., Captive Bolt or Xylazine/Ketamine 'stun').

2. Localization of the Atlanto-occipital (AO) joint in the cow.

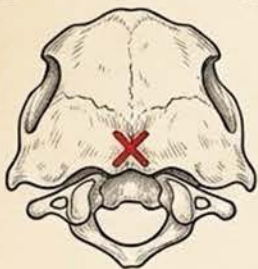
3. CSF tap and injection of 2% Lidocaine - usually 60ml in adult. I prefer using a 5.0" x 16ga needle.

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Anatomy of the A-O Junction

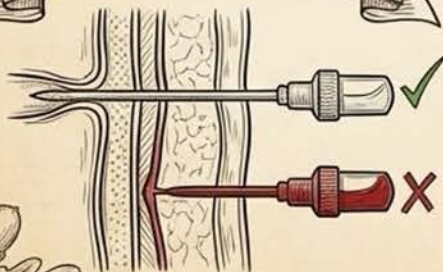
Use these notes to guide your audience through the "blind" placement of the needle.

The Sweet Spot:



The goal is the subarachnoid space at the atlanto-occipital joint. This is the "hinge" of the head. To find it, palpate the wings of the atlas -C1 and the occipital protuberance of the skull. The injection site is the exact midline, in the depression just caudal to the skull.

The 'Pop' and the Flow:



As you advance the needle, you will feel a distinct "pop" or change in resistance as you pass through the dorsal atlanto-occipital membrane and the dura mater.

To confirm placement, remove the stylet (or use an open needle); you should see a clear flow of cerebrospinal fluid (CSF). If you see blood, you are likely in the venous sinus; redirect slightly toward the midline.

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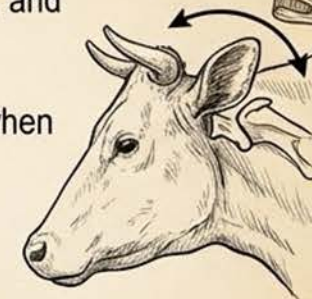
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Step 3: CSF tap and injection of 2% Lidocaine - usually 60ml in adult. I prefer using a 5.0" x 16ga needle

Positioning Matters:



For the most reliable access, the head must be flexed at a 90-degree angle to the neck. This opens the dorsal arch of the A-O joint. If the head is extended, the bony plates of the skull and C1 will overlap, making needle entry nearly impossible.

The Injection:



Inject the lidocaine rapidly. The goal is a high-pressure bolus that travels cranially to the medulla, causing immediate respiratory and cardiac arrest. You will often see a final "stretch" or respiratory gasp; this is a physiological reflex, not a sign of consciousness.

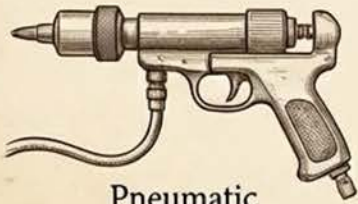
Mechanical Euthanasia: The Penetrating Captive Bolt (PCB)

Mechanism of Action:



Physical destruction of the cerebral cortex and brainstem leading to immediate unconsciousness.

The Equipment:



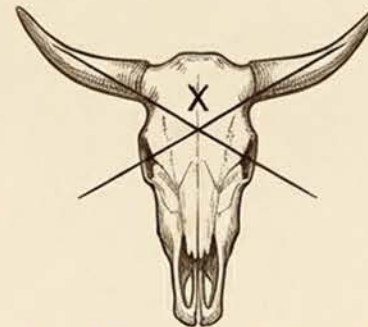
Pneumatic



Powder-actuated

Pneumatic vs. Powder-actuated. Importance of bolt length and velocity for different species (Cattle vs. Small Ruminants).

Anatomic Landmarks (The "X" Marks the Spot):



Bovine: Intersection of lines from the eye to the opposite horn base.



Sheep/Goats: Top of the head (poll) vs. frontal approach.

Common Failures:



Poor maintenance



Damp cartridges

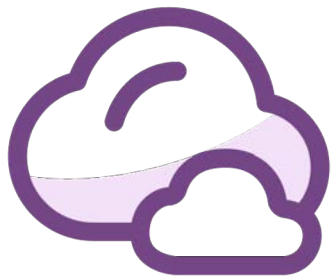


Incorrect positioning

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Feature	Penetrating Captive Bolt	Intrathecal Lidocaine (Post-Stun)
Speed	Instantaneous unconsciousness	Seconds to minutes for clinical death
Visual Impact	High (involuntary movement/bleeding)	Low (appears peaceful)
Carcass Disposal	Highly Flexible (rendering/burial)	Flexible (no residue issues)
Cost	Lowest (per use)	Moderate

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what besides cattle are most common species you're asked to euthanize? and what is most common method used?

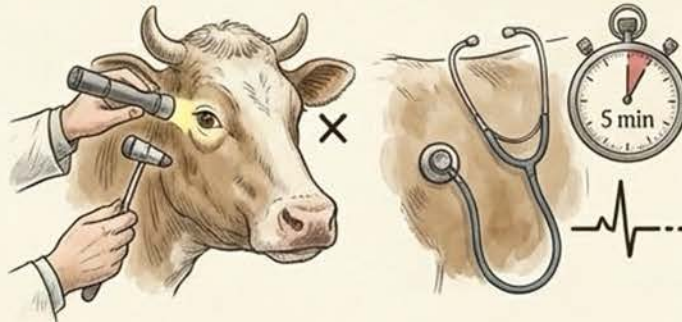
Assessing Death (The Confirmation)

Immediate Signs:



Loss of righting reflex,
absence of rhythmic
breathing.

Secondary Confirmation:



- * Lack of corneal reflex.
- * Absence of heartbeat in bovine (auscultation for at least 5 minutes).

If needed:



Use a secondary step
(pithing or
exsanguination) if
there is any doubt in
a field setting.

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Conclusion & Practitioner Safety

The Human Factor:



Managing client expectations—explaining “reflexive movement” vs. pain.

Safety First:



Handling heavy animals after they drop; physical safety during bolt discharge.

Summary:



Integrating these methods allows for an environmentally responsible, cost-effective, and welfare-centric end-of-life protocol.

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Take home summary



Try it out on cattle-
it may be very useful in
many instances



**Alternative farm
animal euthanasia**
method beneficial to help
with specific situations



An alternative to
firearm or barbiturate
euthanasia



**Managing
expectations.**
esp on smallholder
farms very important



Questions - reach out ANYTIME to me on Instagram @thecowdoc 