



## STANDARD OPERATING PROCEDURE 310 Preparation of Pregnant Ewe for Hysterectomy

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### 1. PURPOSE

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This Standard Operating Procedure aims to describe the preparation methods of the pregnant Ewe before surgery.

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### 2. RESPONSIBILITY

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Principal investigator (PI) and their research staff.

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### 3. MATERIALS

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- 3.1. Shearing clippers
- 3.2. Washing hose connected to warm water.
- 3.3. 4% Chlorhexidine gluconate solution (Septal Scrub®).
- 3.4. 0.4% Chlorhexidine gluconate with 70% ethanol solution (Septol®).
- 3.5. Sterilized large gauze pads.
- 3.6. 18G catheter.
- 3.7. Medical tape.
- 3.8. Epidural Needle – 18G, 3.5".
- 3.9. Mercaine spin heavy 0.5%.
- 3.10. Lidocaine 2%.
- 3.11. Propofol 20mg/mL.
- 3.12. Epinephrine 1:1000.
- 3.13. Midazolam 5mg/ml.
- 3.14. Oxygen 100%.
- 3.15. Oxygen nose buds

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## 4. PROCEDURE

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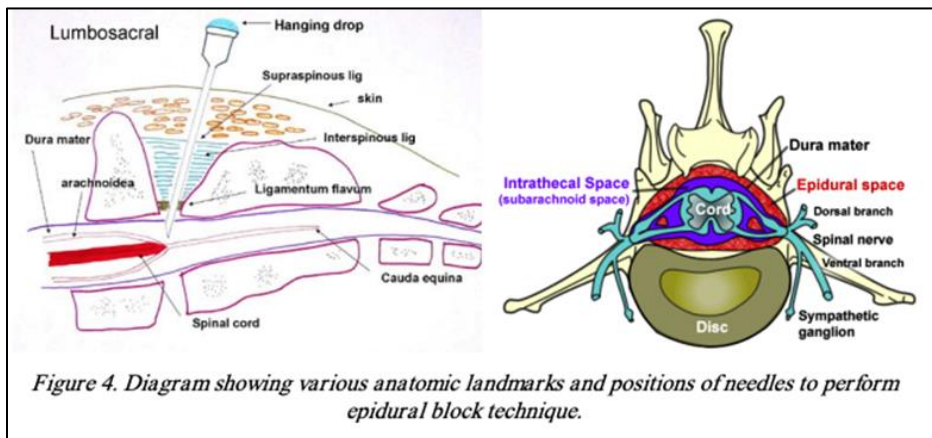
- 4.1 Shear the Ewe along her left and right sides, back, and belly.
- 4.2 Shower her with warm water (ensure the temperature is not too hot).
- 4.3 Scrub her body using the chlorohexidine solution and scrub exceptionally well in the area of the epidural and incision.
- 4.4 Rinse her with warm water.
- 4.5 Wipe the Ewe with dry towels.
- 4.6 Locate the epidural site between vertebrae L6 and S2 scrub with Septol<sup>®</sup> and inject the lidocaine/epinephrine (1:200,000) solution subdermal/subcutaneously at the site of injection.
- 4.7 While the lidocaine takes effect, insert an 18G catheter (venflo) into the cephalic vein and secure it using medical tape. Take care to flush the catheter with saline and confirm its proper placement.
- 4.8 Inject 0.2mg/kg midazolam slow IV (over 2 min).
- 4.9 The epidural space is located immediately below the ligamentum flavum separating the dura mater from the vertebral periosteum, the lining of the spinal canal. To locate the site, identify the iliac prominences on either side and take an imaginary line between them, crossing the dorsal spinous process of the last lumbar segment. The site for the needle insertion is immediately caudal to this, in the midline. After the aseptic preparation of this landmark, insert the spinal needle perpendicularly to the spinal cord into the lumbosacral space. To reach the epidural space, the needle must be passed in a ventral direction through the skin, subcutaneous fat, supraspinous ligament, interspinous ligament, and ligamentum flavum (yellow ligament). The epidural space is identified by advancing the needle from an area of high resistance (ligamentum flavum) to low resistance (epidural space). This is usually accomplished using the "hanging drop" or the "lack of resistance" technique during the injection. If CSF fluid exits, the needle has entered the subarachnoid space (spinal injection).
- 4.10 Confirm the appropriate needle location and inject 5-10 mL of Marcaine (bupivacaine).
- 4.11 Hold the Ewe's head above the spine level and support the Ewe while her hind legs lose tonus and sensation, and she becomes recumbent. Once the Ewe is down, place her in right lateral recumbency, left side up, on the surgical table, and strap her forelimbs and hindlimbs to the surgery table.
- 4.12 Perform aseptic scrub of the left flank using chlorohexidine 5%. And then with Septol.
- 4.13 Mark the incision line with a permanent marker, and infiltrate anesthesia with lidocaine/epinephrine solution along the incision line.
- 4.14 Wheel the Ewe from the preparation room to the surgery room.
- 4.15 Place the oxygen nose buds in Ewe's nostrils.
- 4.16 Administer boluses of propofol IV to effect (3-10 mg/kg) as needed if the Ewe expresses pain and discomfort (teeth grinding, lip curling, and excessive movement) throughout the preparation and operation procedure.

## Appendix 1 Epidural anesthetic techniques - The "hanging drop" technique

- This involves removing the style of the spinal needle, filling the hub of the needle with saline or anesthetic solution, and allowing one drop to hang from the hub.
- As the needle is advanced through the ligamentous structures, the drop does not move.
- However, upon penetration of the ligamentum flavum, the negative pressure in the epidural space will draw the drop of solution into the needle, indicating proper placement in the epidural space.
- A "pop" felt through the needle is usually encountered when the spinal needle is passed through the ligamentum flavum.
- The chance for a successful "hanging drop" technique is more significant in large dogs than in smaller dogs and cats.
- If the "hanging drop" technique fails, the "lack of resistance" technique can be used.

### The "lack of resistance" technique

- This indicates proper placement of the injection needle in the epidural space based on the resistance to the injection of air or saline.
- Once in the epidural space, the injection of air, saline, or anesthetic solution will encounter minimal resistance.
- A separate syringe of normal saline (3 ml or air preferred by others) should be prepared for the "lack of resistance" technique.
- When minimal resistance to the saline injection is encountered, the saline syringe is replaced with a syringe-containing anesthetic, and the injection is completed.
- To rule out the possibility of administering drugs into the venous sinus (presence of the blood) or subarachnoid space (presence of CSF), it is essential to aspirate or allow a few seconds to check bleeding before epidural injection.



**SOP 310 Preparation of Pregnant Ewe for Hysterectomy**  
Written on (dd-mm-yyyy): 01.11.2022  
Revised on (dd-mm-yyyy): 13.03.2023  
Approved by the BGU Animal Policy and Welfare Oversight Committee