Surgical Case Report:

Lung Lobectomy

EMPHASIS:
There are numerous indications for lung lobectomy in dogs and cats. Neoplasia, lung lobe torsion, trauma, pneumonia, or foreign bodies may all necessitate removal of a lung lobe.

In this paper, we will discuss the surgical technique for lateral thoracotomy and lung lobectomy.

PREOPERATIVE DIAGNOSTICS:
1. Complete physical examination.
3. Two-view thoracic radiographs.
4. Thoracic ultrasonography.
5. Ultrasound guided (or fluoroscopically guided) fine needle aspirate or biopsy, if warranted.

AXIOM: If a solitary mass is present, there may be no need for a preoperative biopsy; the entire lobe can simply be submitted postoperatively.

6. CT scanning may be indicated, to assess the extent of the lesion.
7. Cytology and aerobic/anaerobic culture & sensitivity of pleural effusion, if present.

AXIOM: If significant pleural effusion is present, take follow-up radiographs after draining the fluid, to help clarify the extent of pulmonary lesions.

PREOPERATIVE CARE:
1. Indwelling cephalic catheter.
2. Intravenous anesthetic induction protocol (ketamine/Valium, Propofol, etc.)
3. Endotracheal intubation and Isoflurane inhalant anesthesia to effect.
4. Lead II ECG and pulse oximetry monitoring during prep and surgery.
5. Clip and prepare the thorax for aseptic surgery.
6. Commence intermittent positive-pressure ventilation.

LATERAL THORACOTOMY:

AXIOM: A lateral thoracotomy is performed at the 5th intercostal space, unless the caudal lung lobe is involved, in which case the 6th intercostal space is selected.

1. Incise the skin and subcutaneous tissues as shown, from the level of the rib head, to a level below the costochondral junction.
2. Incise the underlying musculature (cutaneous trunci, latissimus dorsi, serratus ventralis and scalenus) and place a self-retaining retractor such as a Gelpi.
3. Incise the intercostal muscles.

DANGER:
Incise on the cranial aspect of the caudal-most rib at that space to avoid the intercostal artery which runs along the cranial aspect of each rib.

DANGER:
Be careful not to incise the underlying lung!

4. Use a Finochietto retractor to retract the ribs.
5. If the caudal lobe is to be removed, mobilize it by incising the pulmonary ligament (a thin fold of pleura extending caudally from the hilus).
6. Using a TA 30-V autosuture device, the artery, bronchus, and vein can be simultaneously stapled closed (See Figure 1).

DANGER:
In larger patients, the small TA 30-V staple arms may not be long enough to pass completely through both walls of the bronchus (See Figure 2). This could result in air leakage at the bronchus. So, in patients over 15 kg, we typically continued on page 2
will use a TA-55 (whose larger staples will be certain to properly close the bronchus) in addition to the TA 30-V. (See Figure 3).

**AXIOM:** Place a clamp distal to the stapling device, and incise the tissues between the stapler and the clamp to remove the lobe (See Figure 4).

7. Alternatively, the lobectomy can be accomplished as shown in Figure 5 by:
   - double ligating the artery and vein with 2-0 or 3-0 monofilament non-absorbable material,
   - then, placing a clamp across the bronchus, suturing the end of the bronchus in a continuous horizontal mattress pattern,
   - finally, removing the clamp and oversewing the end of the bronchus with a simple continuous pattern using 2-0 or 3-0 monofilament absorbable material.

**AXIOM:** A partial lobectomy can be accomplished using a TA-30, TA-55, or TA-90 stapler, depending on the size of the involved lobe.

**AXIOM:** It is generally not necessary to oversew the cut edge of the partial lobectomy. However, if hemorrhage or air leakage occur, either place hemostatic clips or oversew the edge with a simple continuous pattern of 3-0 or 4-0 monofilament absorbable suture.

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**Figure 1:** This schematic drawing depicts: **1A)** A right-sided T4-T5 thoracotomy. **1B)** The application of a TA 30-V auto-suture machine across the bronchus, the artery and the vein.

**Figure 2:** This schematic drawing depicts: **2A)** The use of a TA 30-V auto-suture machine in a small patient. Note that the staples penetrate the tissues properly turning back on themselves securely sealing the vessels and the bronchus. **2B)** The use of a TA 30-V auto-suture machine in a larger patient. Note that the staples do not penetrate the tissues completely, and the bronchus and vessels could remain patent.
8. Place a thoracostomy tube.
9. Preplace 3-6 sutures of gauge #0 to #2 monofilament non-absorbable suture material around the ribs.

**DANGER:**
Avoid perforating the intercostal artery, at the caudal edge of the rib, with the needle.

**DANGER:**
Do not inadvertently pass a suture entrapping the thoracostomy tube!

10. Have the surgical assistant pull the ends of one suture to bring the ribs into approximation and tie all of the other sutures.
11. Close the overlying musculature with a simple continuous pattern of 2-0 or 3-0 monofilament absorbable suture.
12. Routine subcutaneous and skin closure.
13. Evacuate air from the thorax, via the chest tube.

**POSTOPERATIVE CARE:**
1. Postoperative two-view thoracic radiographs to verify that pneumothorax has been eliminated.
2. Intrapleural Bupivacaine immediately postop (1 mg/kg, diluted in 10-30 cc 0.9% NaCl, infused via the thoracostomy tube.
3. Pain management using injectable, transdermal or oral analgesics.
4. Remove the chest tube 24 hours postop, after radiographic confirmation that there is no pneumothorax.
5. Suture removal two weeks postop.

See next page for Figure 5.
DIMENSIONS IN SURGERY
continued from page 3

Figure 5: This schematic drawing depicts a lobectomy performed without auto-suture machines. 5A) Artery and vein have been doubly ligated and a forceps has been applied across the bronchus. 5B) The lobectomy. 5C) This shows the path of the needle in the horizontal mattress suture pattern applied across the distal bronchus. 5D) finished horizontal mattress suture with the clamp removed 5E) Over sewing the stump of the bronchus with a simple continuous pattern.


Several members of the American Veterinary Dental College have contacted us with concerns that our recent “Dimensions in Surgery” Article on mandibular fractures appeared to endorse inappropriate techniques, particularly those which would cause trauma to the tooth roots. Upon reviewing the article, I must agree with them. The article and drawings failed to clearly show and illustrate our opinion that avoidance of the tooth roots is of paramount importance. Indeed, it seemed to indicate the opposite, particularly in some of the drawings which were adapted from older surgical textbooks. We regret this lack of clarity.

We strongly agree with the philosophy that the least invasive technique which will provide stability is the technique that should be chosen. Typically, in patients with a sufficient number of intact teeth adjacent to the fracture site, interdental fixation with wire and acrylic is the technique of choice if possible. If this modality will not provide sufficient stability, then an alternative technique should be chosen, but no technique that traumatizes any of the tooth roots is acceptable to us.

We have asked the SCVMA to withdraw the article from the SCVMA website until it is suitably revised for republication in the near future, with the input and assistance of members of the American Veterinary Dental College, to clearly show current methods of jaw fixation. We deeply apologize for any mistaken impression conveyed, and we would also like to express our sincere thanks to those colleagues who brought this to our attention.

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• The SCVMA now publishes Dimensions in Surgery articles and drawings on the Internet. Please visit us at: www.DVMPulse.com

AUTHOR’S NOTE

If you have any questions concerning this paper, additional references, surgical supplies or sources of products mentioned or used in this protocol, please FAX us at 1-310-479-8976. We will answer your questions promptly.