**DIMENSIONS IN SURGERY**

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**Surgical Case Report:**

**Cervical Dorsal Laminectomy**

**EMPHASIS:**

For cervical intervertebral disc herniations, ventral slot decompression is the treatment of choice. The approach is minimally traumatic to the musculature; the stability of the vertebral column is not adversely affected by the procedure; direct access to and removal of the offending disc material is achieved.

However, there are some cases in which a ventral slot will not give suitable results. Occasionally, a very lateralized herniation of disc material occurs, similar to what we commonly see in the thoracolumbar region. In addition, some cases of cervical vertebral instability may have a greater dorsal component of hypertrophic soft tissue. On occasion, neoplasia of the spinal cord, or trauma, may necessitate a dorsal approach. In this paper, we will describe the current technique for a cervical dorsal laminectomy.

**PREOPERATIVE DIAGNOSTICS:**

1. Complete physical and neurologic examination.

   **AXIOM:** If the patient has already been treated with corticosteroids, the severity of clinical signs may be obscured.

   **AXIOM:** Be certain to check the entire vertebral column for pain. Patients with cervical disc disease may also have thoracolumbar lesions, or chronic lumbosacral disease. Pain at these sites may affect the long term prognosis for that individual, and the owner should be made aware of these possible concurrent problems.

   **AXIOM:** Magnetic resonance imaging may be helpful if myelographic findings do not clearly establish the diagnosis.


   **AXIOM:** After injection of the contrast medium, lateral and ventrodorsal views should always be obtained; oblique views may also be helpful if the lesion is lateralized.

5. Lead II ECG, and pulse oximetry monitoring during prep and surgery.

**DANGER:**

Flexed and extended views may be indicated to confirm whether a lesion is static or dynamic. Very gentle flexion or extension is advised, rather than a hyperflexed or hyperextended view which could increase cord compression and exacerbate neurologic impairment.

**AXIOM:** An accurate and well-documented neurologic examination is necessary, not only to offer a proper diagnosis and prognosis, but also to serve as a benchmark for evaluating the patient’s progress at future rechecks.

**AXIOM:** Magnetic resonance imaging may be helpful if myelographic findings do not clearly establish the diagnosis.

**PREOPERATIVE CARE:**

1. Indwelling cephalic catheter.

2. Intravenous anesthetic induction protocol (Ketamine/Valium, Propofol, etc.).

3. Endotracheal intubation and inflate cuff.

4. Isoflurane inhalant anesthesia to effect.

5. Lead II ECG, and pulse oximetry monitoring during prep and surgery.

Next month, Dimensions in Surgery will begin its 18th year!
6. Clip and prepare the ventral cervical region for aseptic surgery.
7. Cephalexin 10 mg/lb I.V. immediately preoperatively.
8. If the neurologic signs are acute, with less than 8 hours duration, methylprednisolone sodium succinate (Solu-Medrol) may give some benefit. Various dosages and protocols are described; we give 30 mg/kg IV then repeat half that dose at 2, 6, 12 and 18 hours.

SURGICAL TECHNIQUE:

AXIOM: A dorsal laminectomy must be performed; a hemilaminectomy is risky due to the presence of the vertebral arteries, lateral to the vertebrae.

1. Dorsal midline incision through the skin and subcutaneous tissues from C2 to the dorsal process of T1.

AXIOM: If necessary, a dorsal laminectomy at C2,3 can even be performed at C2-C3, although it is somewhat more technically challenging.

2. Incise the midline fibrous raphe, to expose the underlying nuchal ligament.

AXIOM: The ligamentum nuchae is a misnomer in the dog, as it originates on the dorsal spinous process of C2. In the horse, the ligament originates on the nuchal crest of the skull. The ligament is named after equine, rather than canine anatomy.

3. Using Gelpi retractors, retract the ligament to one side.

4. Incise the thin fibrous aponeurosis of the platysma muscle.

5. Along the midline, separate and retract the rectus capitus, spinalis, spinalis et semispinalis, and multifidus muscles to expose the dorsal lamina of the vertebra.

AXIOM: It will be necessary to expose approximately one vertebral length cranial to and caudal to the intended laminectomy site, to provide adequate exposure.

AXIOM: Typically a dorsal laminectomy is performed over one disc space. On occasion, it may be necessary to expose several disc spaces consecutively. This is safe, provided the articular processes are not disturbed or traumatized (which could result in excessive instability).

AXIOM: Expose the entire width of the dorsal lamina, to the level of the medial edge of the articular processes (See Figure 1).

AXIOM: Extending the exposure to expose the entire articular facet results in more hemorrhage, and is unnecessary.

6. Using a nitrogen driven drill, delicately remove the dorsal cortex and medullary bone (See Figure 2) to the level of the inner cortical layer.

DANGER: In small breed dogs, there may be no discernible medullary layer in the lamina.

7. Using Lempert or Kerrison rongeurs, delicately remove the bony lamina to expose the spinal cord.

DANGER: Be careful not to lever or twist the bone, striking the cord, as you remove each piece.

8. Using a ball-end probe, gently lift the dorsal interarcuate ligament (See Figure 3) and with scissors, transect it at each end.

9. For cases of CVI, where the compression is due to hypertrophy of the ligament, the closure may now be commenced. For cases of disc rupture, where large amounts of disc material are lateral to the cord, this material may now be removed using suction, a ball and
probe, or a dural loop, delicately working beside the spinal cord to extract as much disc material as possible.

10. Harvest a very thin portion of subcutaneous fat, and place a fat graft over the laminectomy defect.

AXIOM: A thick fat graft, more than a few millimeters, could theoretically create some compression on the spinal cord as the overlying tissues heal and contracture of the resulting fibrous tissue occurs. In addition, the chance of devitalization, necrosis and even potentially abscessation are probably greater with a thick fat graft than with a thinner graft.

11. 3-0 PDS continuous closure of the rectus muscles along the midline.

12. Gauge 0 to Gauge 2-0 PDS continuous closure of the median fibrous raphe.

13. Routine subcutaneous and skin closure.

Figure 2: This schematic drawing depicts: 2A) This cross sectional view shows the nitrogen drill being used to remove the dorsal spinous process. The nucleus pulposus compromises the ventral cord. 2B) The dorsal cortex and medullary bone have been removed leaving the inner cortical bone. 2C) The inner cortical bone is gently removed using a Lempert or Kerrison rongeur. 2D) The decompressed cord is no longer compromised.

Figure 3: This schematic drawing depicts the use of a ball end probe sliding under the hypertrophied dorsal interarcuate ligament elevating it from the cord. This allows scissors to cut the ligament at each side removing it completely.
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POSTOPERATIVE CARE:
1. Discharge from hospital 1-3 days postoperatively.
2. Cephalexin 20 mg/kg PO TID for 5 days.
3. Pain management using oral, injectable or transdermal analgesics.
4. Physical therapy (range of motion exercises) performed by client TID until patient is ambulatory.
5. Suture removal two weeks postoperatively.

PROGNOSIS:
For acute disc rupture cases, the prognosis is quite optimistic. For CVI patients, of course the prognosis will depend on the degree of compression, as well as the chronicity.

Coming Attractions
Tumors of the mandible are commonly malignant, and surgery typically involves a partial mandibulectomy. The quality of life is usually good post operatively. However, certain problems can occur:
• The remaining mandible is less stable, and the canine tooth may not properly occlude with the maxilla, potentially striking the incisors or palate and causing pain
• The tongue may protrude from the mouth.
• Dermatitis secondary to saliva leaking from the mouth may occur, necessitating cheiloplasty

So, for benign tumors originating from the periodontal ligament (acanthomatous ameloblastoma, fibrous epulis, or ossifying epulis) resection of the dorsal portion of the involved mandible may be performed, preserving the ventral cortex. This preserves mandibular stability and occlusion, allowing a normal quality of life post op.

Next month, we shall present our surgical protocol for Dorsal Partial Mandibulectomy.

See you then!

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.

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