Laminectomy, Surgical Therapeutical Protocol In The Medullar Compression Syndrome Type L3-L4 Discal Extrusion. Case Report

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Abstract
Medullary compression syndrome is a common disorder, especially in chondrodystrophic breeds, causing a variety of symptoms depending on the location of the compression site and the disc extrusion degree (the amount of pulp nucleus invading the medullary canal). The case presented is that of a 6 years-old female cross-breed Pekingese dog, with the symptoms of paraplegia and urinary incontinence, which had occurred 5 days previously, and current deeply painful sensitivity. Imaging Diagnosis (MRI) reveals an important L3 - L4 disc extrusion, with spinal cord reaction, from the middle of the L3 vertebral body to the middle of the L4 vertebral body. Surgical therapy consisted of decompression by dorsal approach (laminectomy) at the compression site L3 and L4. Two months postoperatively, recovery was complete, laminectomy being the surgical technique used predominantly in the therapy of diffuse spinal cord syndromes.

Keywords: condrodystrophic, discal extrusion, laminectomy, paraplegia

Introduction
The medullary compression syndrome is a common condition, especially in chondrodystrophic breeds, causing a variety of symptoms depending on the location (Fingeroth and Thomas, 2015). The surgical treatment protocol of medullary compression syndromes consists of laminectomy and hemilaminectomy, for the toraco-lumbar segment, laminectomy for the sacral segment and ventral slot for the cervical segment (Denny and Butterworth, 2000).

Condrodistrophic breeds are characterized by the fact that chondrocytes and chondroblasts are secreted by a qualitatively deficient proteoglycan (chondroitin sulfate), which is directly responsible for the mechanical resistance of the cartilaginous tissue, implicitly of the intervertebral disc (Sharp and Wheeler, 2005; Fingeroth and Thomas, 2015).

Materials and Methods
This paper presents a case study regarding a member of the canine species, a Pekingese cross-breed, female sex, 6 years old, with the following symptomatology: flaccid pelvic paralysis, abolished proprioception, deeply painful sensitivity present, urinary incontinence (Figure 1).

From the past history, the symptom emerged 5 days ago. The clinical examination was completed by the MRI examination, the latter showing an L3-L4 discal extrusion, with spinal cord reaction, from the middle of the vertebral body L3 to the middle of the L4 vertebral body (Figure 2).

Once the diagnosis was established, a reserved prognosis was presented to the owner. Finally, surgical therapy was performed, which consisted of a spinal cord decompression (laminectomy) at the compression site L3 and L4. The surgical
Figure 1. Anteoperative symptomatology (original photo)

Figure 2. MRI Exam: Presentation of the L3-L4 disc extrusion (original photo) (a) sagittal section; (b) cross section

Figure 3. Cutaneous incision on the longitudinal axis of the spine (original photo)
approach was performed through an incision that respects the longitudinal axis of the spine, taking as a reference the tip of the spiny L3-L4 (Figure 3).

The skin incision was followed by a longitudinal incision of the lumbar fascia and the underlying muscles. Subsequently, the peak of the L3-L4 spiny processes was performed by means of syringe needles and the dorsiflexion of the spinal third of the bilateral vertebral bodies (Figure 4).

After highlighting vertebral bodies and spiny processes of vertebrae L3-L4, the ectomy of the spiny processes at their base was taken (Figure 5).

Subsequently, the milling of the dorsal faces of the vertebral body was performed until progressive penetration of the medullary canal (Figure 6).

After highlighting the medullary compression site, the extruded pulp core material was removed using the Fitz elevators (Figure 7).

After removal the extruded pulp core material and providing local haemostasis, an adipose tissue graft was placed in the bones of the vertebral body. The reconstruction of the anatomic layers was done by suturing in separate threads with 2-0 resorbable monofilament of the lumbar musculature and the cutaneous tissue (Figures 8, 9).

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Figure 6. Milling of the vertebral body after the ectomy of the spiny processes (original photo)

Figure 7. Elimination of extruded pulp material with Fitz elevator (original photo)

Figure 8. Suture of muscle layers (original photo)
**Results and discussions**

Medullary compression syndrome due to disc extrusion in the thoraco-lumbar region has a variable frequency depending on the compression site. In Table 1 (Denny and Butterworth, 2000), varying percentages are highlighted of incidence of disc extrusion in the dorso-lumbar segment of the spine are highlighted.

The medullary compression was determined by an extrusion of the L3-L4 intervertebral disc. For the case presented, the anteoperative therapy was performed with Famotidine: 0.5 mg/kg at 12 h, Cefalexin: 20 mg/kg at 12 h and Prednisolone: 0.5 - 1 mg/kg (Sharp and Wheeler, 2005).

The anesthetic protocol was performed as follows:

- Premedication: Dexdomitor 3:10 μg/kg + Butorphanol 0.2 - 0.4 mg/kg;
- Induction - Propofol 2-5 mg/kg, i.v. slow to effect;
- Maintenance - Isoflurane: 1.5-2% + Dexdomitor CRI - 0.25 - 2 μg/kg /h.

Postoperative treatment consisted of analgesic therapy with of 100 mg lidocaine in 500 ml of NaCl, CRI and Metacam 0.2 mg/kg/day, subcutaneously. Antibiotics consisted of administration of Amoxicillin with clavulanic acid 12.5 mg/kg at 12 hours for 10 days. The therapy for stimulating the function of the nervous system was performed with Milgamma-N 1 caps/day and Ganoderma 1/2 cp/day.

Physiotherapy is an adjunctive method of postoperative recovery of patients who have undergone surgery to perform medullary decompression of the spinal cord.

**Table 1. Relative incidence of disc extrusions in the thoracolumbar spine (Denny and Butterworth, 2000)**

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<tbody>
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<td>11</td>
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<td>Gage (1975)</td>
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<td>9</td>
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<tr>
<td>McKee (1992)</td>
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<td>2</td>
<td>8</td>
<td>33</td>
<td>25</td>
<td>17</td>
<td>5</td>
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<tr>
<td>Scott (1997)</td>
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<td>6</td>
<td>4</td>
<td>32</td>
<td>20</td>
<td>8</td>
<td>4</td>
<td>4</td>
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<td>9</td>
<td>27</td>
<td>23</td>
<td>15</td>
<td>8</td>
<td>7</td>
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Note: Disc extrusions at T11-12 to L3-4 inclusive represent 89% of the total in this region.
pression and is performed in some specialized clinics with specialists in this field.

Physiotherapy sessions consist of stimulation of movement both in the waist and in the water basin to stimulate the progressive functions of the limbic and sensory limb functions.

During the first 3 days postoperatively, the patient presented decubitus sterno-abdominal, difficult, ataxic walking and widening of the support base.

14 days postoperatively, the patient had a partial motor dysfunction.

21 days postoperatively, the patient walked almost normally, showing a slight dysmetricity on the pelvic limbs.

Six weeks postoperatively functional recovery was complete (Figure 10).

It is obvious that the rapidity of surgery in the case of medullary compression syndromes makes a significant contribution to the prognosis. Thus, the shorter the time elapsed between the onset of the symptomatology and the time of the surgery, the greater the chance of recovering the motor and sensory function of the patient.

The technique of laminectomy is a suitable surgical method for reducing medullary compression, with a diffuse character, because the dorsal approach of the medullary canal is a technique that allows the surgeon accessibility over a larger area on the medullary cord.

**Conclusion**

1. Condrodystrophic breeds have a significant predisposition for medullary compression syndromes, and laminectomy is the surgical technique used predominantly in the therapy of diffuse medullary compression syndromes.
2. Diagnosis of medullary compression has a complex character, involving the clinical and imaging exam (radiological, MRI, CT).
3. The fastest diagnosis in medullary compression is a favourable prognosis for the patient.
4. Anteoperative spastic paralysis is a favourable prognosis for the patient after surgery.
5. Anteoperative flaccid paralysis is an unfavourable prognosis for the patient after surgery.

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**References**