DECISION-MAKING IN SURGERY FOR DEGENERATIVE LUMBOSACRAL STENOSIS SYNDROME

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Degenerative lumbosacral stenosis syndrome (DLSS) is a term that can be applied to the clinical signs associated with compression of neural tissue at the level of the lumbosacral junction and associated with degenerative processes occurring within the intervertebral disc, the articular facets and synovial joint, or a combination of these structures. The clinical signs are thought to arise from compression and irritation of various components of the cauda equina. The syndrome has been recognized for decades, yet decision-making remains dominated by opinions rather than good evidence for efficacy. Here the clinical signs have been divided into categories so that the decision points can be highlighted and the evidence regarding specific approaches can be discussed.

1. **Severe pain or neurologic deficits affecting the sacral, caudal and lumbar nerve roots.**

   Dogs affected by these clinical signs are candidates for rapid progression to surgery. There is evidence that such affected dogs may be less likely to recover, and especially less likely to recover continence if they are left without surgery for prolonged periods. The choice for these cases is usually between direct decompression via a traditional dorsal laminectomy and removal of offending degenerate soft tissue or to enlarge the intervertebral foramina by moderate flexion (or linear traction) of the lumbosacral junction and fix the vertebrae in this position. Results of these approaches are favorable in cases that are treated early, although the late effects of fixation-fusion approaches are unknown and the likelihood of complete fusion is low in the absence of deliberate scarification (and perhaps bone grafting) of the vertebral endplates. Force plate analysis of dorsal laminectomy demonstrates that there is not a return to full weight-bearing on the pelvic limbs following dorsal laminectomy at the lumbosacral junction, suggesting a large placebo effect for dogs considered normal enough to return to work after this surgery.

2. **Mild or intermittent pain with poor localization.**

   This type of case appears to predominate in the caseload of most veterinarians, and has many similarities with the non-specific ‘back pain’ commonly encountered by human physicians. Dogs are typically presented with signs of mild or inconsistent, poorly-defined pain in the caudal lumbar region or with intermittent lameness in either or both pelvic limbs. Such cases are at risk of being erroneously diagnosed with orthopedic disorders such as HD, CCLR, iliopsoas muscle injuries etc. The primary problem is making an accurate diagnosis, especially since many individuals will have more than one lesion. How can the relative importance of the lumbosacral degeneration be distinguished from the other differential diagnoses, especially since lumbosacral disc protrusion is a very common incidental finding on MRI scans?

   Here the use of electrodiagnostics is promising; there is evidence that simple EMG can be helpful, and more recent preliminary investigations suggest that examination of F-waves may be more discriminatory. Also, use of specific planes of view, or sequences, on MRI can be helpful to examine the foramina between L7 and S1.

   Several treatment options have been described, and the problem in decision-making is that there have been no systematic comparisons of outcome between these approaches. In human
medicine the controversy regarding relative efficacy of conservative and surgical intervention still exists despite numerous comparative studies and meta-analyses.

Conservative therapy using restricted exercise and analgesics (predominantly NSAIDs) have been used for many years and often appears to be satisfactory to resolve short-lasting cases of mild pain. However, it is unclear because of a lack of systematic follow-up whether these cases truly recover or whether the owners give up pursuing treatment.

Local injection of corticosteroids has been used in a small study in dogs and is commonly used in human medicine. In dogs the success rate of this treatment was high, although many dogs required repeated therapy and some dogs were eventually treated by surgery.

Laminectomy has been used for many years and can clearly be helpful for removal of tissue that is compressing the nerves in the vertebral canal. However, frequently this technique appears to be used on its own without pre-operative decision-making about what tissue will be removed during surgery. Discectomy as an adjunct may be useful, but it is important to clearly document pre-operatively where the nerve compression actually is; removal of the disc will collapse the disc space and could exacerbate nerve compression in the foramina.

Foraminotomy has been used as an adjunct to laminectomy for many years, but a medial approach to foraminotomy (through the laminectomy incision) risks weakening of the articular process and can predispose to fracture. A recent modification minimizes the risk by using a limited lateral approach. A major limitation of foraminotomy is the need to demonstrate that the lesion is definitely affecting the L7 nerve in the foramen and so is dependent on careful diagnosis through electrodiagnostics and MRI.

Fixation-fusion is widely practiced, often with the rationale that enlarging the foramina by fixing the joint space in (slight) flexion will allow more space for the nerves in both the vertebral canal and the foramina. The original report used cross pins but the technique has been greatly modified by using screws, or locking plates to augment fixation strength. A limitation of these approaches is that true fusion is unlikely unless the vertebral endplates have been eroded and a graft placed between them. In human patients incomplete vertebral fusion is associated with considerable morbidity. A recent variation on the fixation-fusion approach has used a screw inserted into the intervertebral space from a dorsal approach. This approach, similar in essence to many surgical treatments for wobbler disease in dogs, also suffers from the same limitations, that the forces acting through the interspace may well cause collapse of the space around the metal implant. With all fixation-fusion techniques there is also the potential that a ‘domino lesion’ could be created because of the instantaneous transfer of bending forces from the lumbosacral joint to the neighboring spaces.

Decision-making for DLSS is therefore currently dependent on close examination of the precise causes of the deficits that are detected in each specific dog. This is a slightly unsatisfactory state of affairs since it means that it is difficult to compare the efficacy of treatments (similar to a homoeopath’s approach to treatment). A further difficulty in examining outcome is the lack of well-defined endpoints – there are few objective markers of success or failure of treatment – the majority of cases are assessed by the veterinarian who did the surgery and the owner’s comments. Both of these are highly biased since the outcome after conservative therapy is likely to be regarded as an interim step, whereas the outcome after surgery is easily perceived to be the ‘best that can be done’ since it is a definitive intervention. To overcome these problems it will be essential in future to place greater reliance on objective outcome measures.