THORACOLUMBAR SPINAL CORD INJURY AND THE ROLE OF CORPECTOMY
Nick D Jeffery, BVSc, PhD, DECVS, DECVN, FRCVS
Iowa State University, Ames, Iowa

The role of surgery for thoracolumbar spinal cord injury is limited to removal of compression and, specifically in the context of intervertebral disc (IVD) lesions, removal of the relevant disc material from the vertebral canal. Traditional approaches to decompress the spinal cord for disc-associated lesions involve removal of bone from dorsal (laminectomy), dorolateral (hemilaminectomy) or lateral (mini-hemilaminectomy / pediculectomy) aspects of the vertebral canal. In the majority of IVD extrusions the material that is compressing the cord can be accessed for removal using one of these techniques. However, CT and MR scanning reveal that many dogs that have IVD nuclear extrusions (i.e. Hansen type I) have material ventral to the spinal cord causing compression. In almost all annular protrusions (i.e. Hansen type II) the cord is compressed from a ventral direction. Development of corpectomy is a response to recognition that conventional approaches cannot adequately remove ventrally-compressing material.

Corpectomy exposes the ventral aspect of the spinal cord by excising bone from the dorsal-most aspect of the vertebral bodies neighboring the disc of interest. The amount of lateral-lateral and cranial-caudal exposure can be varied to achieve exposure of the offending disc material for atraumatic removal. It is possible to extend the bone removal across the midline if required.

The surgical approach as originally described used a lateral approach to the vertebrae – dividing between the longissimus and the iliocostalis muscles. This is advantageous because positioning the animal in lateral recumbency allows the lighting to be directed into the surgical site. The disadvantage of this lateral approach is that the vertebral bone is exposed through a ‘tunnel-like’ dissection, especially in large, well-muscled dogs such as bull terriers. An alternative is to use the dorsolateral approach – dividing between the multifidus and longissimus muscles, as is traditionally used for multilevel thoracolumbar fenestration. The drawback is the difficulty in directing the surgical lights into the surgical site if the dog is positioned in sternal recumbency, although this drawback can be ameliorated by tilting the dog away at an angle of ~20° from true vertical. Tilting the dog can also aid in aiming the drill toward the dorsal limits of the ventral body, but can make orientation more difficult.

It is usually easiest to commence the approach by simply drilling into the disc and then progressing cranial and caudal, starting in the most ventral limit of the proposed corpectomy incision. The spinal nerve can be retracted (usually cranially) to prevent damage. As the dorsal limit is approached the dorsal longitudinal ligament can be appreciated as a tough band running cranial-caudal and this can be excised using scalpel and / or rongeurs. Bleeding from the venous sinus is often a pre-operative concern but is not often problematic during surgery, especially in chronic cases, perhaps because the blood flow is redirected through the contralateral sinus. In other cases, the bleeding can be stopped using diathermy, Gelfoam or Surgicel. The bone and ligament removal is continued until the compressing disc material has been loosened and can be removed. The spinal cord will expand ventrally to fill the space that was previously occupied by the compressive mass. Closure is routine.

Post-operatively there appears to be little need for concern about instability at the site. The procedure itself will only interrupt the middle of the ‘three columns’ of support in the vertebral column. If corpectomy is combined with pediculectomy this makes little difference to
stability. On occasion it has been combined with a full hemilaminectomy without apparent ill effects, but should probably be avoided.

The role of corpectomy in treating IVD extrusions might be thought questionable, bearing in mind the very high proportion of dogs expected to recover using conventional approaches. However, a major purpose in carrying out decompressive surgery for most cases of IVD extrusion is to hasten recovery and the means by which this is achieved by surgery is through decompression. Therefore if a large amount of material continues to compress the cord then recovery will be delayed to be comparable to that which would occur without surgery at all (since it is well recognized that most cases of IVD extrusion will recover without surgery).

In surgical treatment of IVD protrusions the question is whether to use corpectomy to remove the disc or to carry out a stabilization procedure such as vertebral plating to prevent further motion at the affected segment. This is a similar argument to that around treatment of disc-associated wobbler syndrome in the cervical area. The advantage of direct decompression is that the recovery is rapid, there is no risk of implant failure and the ‘domino’ effect may be less likely. [Although the vertebrae will (likely) fuse following corpectomy, the increased stiffness at the site is not instantaneous, allowing the neighboring spaces time to adjust to the increased load.

References