Modification of the ventral approach to the caudal cervical spine by resection of the manubrium in a dog

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Introduction
Access to the ventral aspect of the canine caudal cervical spine is usually required for the surgical management of caudal cervical intervertebral disc disease and cervical spondylomyelopathy (1). Several surgical techniques are currently employed in the management of these conditions (1, 2). Regardless of the technique chosen, a frequently encountered problem with caudal cervical spinal procedures is the limited access to the vertebræ concerned, particularly when the C7-T1 intervertebral disc is affected. This case report details the modification of the standard ventral approach to the canine cervical spine, by excision of the manubrium of the sternum (3). The modification greatly improved the visualisation of the caudal cervical and cranial thoracic vertebrae to facilitate a ventral slot procedure.

Case report
A five-year-old, neutered female Bassett Hound, weighing 29 kg was presented with a two-day history of paraparesis. Neurological examination and magnetic resonance imaging confirmed the presence of extruded disc material ventral to the spinal cord, from the C7-T1 intervertebral disc. A ventral slot was performed to decompress the cord. In making the approach to the caudal cervical spine, the cranial aspect of the manubrium of the sternum was resected. This improved the exposure of a region normally difficult to expose via a conventional ventral approach to the cervical spine. The successful performance of the ventral slot procedure was greatly facilitated by this adaptation, which was quick and simple to perform, without any apparent adverse affects to the animal.
brium. The mastoid parts of the paired sternoccephalicus muscles were identified. They were elevated from their origin on the cranial aspect of the manubrium to a point just cranial to the articulation of the first ribs, using a periosteal elevator and bipolar diathermy. This exposed the deeper sternohyoideus-sterno-thyroides muscles. The midline of the sternohyoideus muscle was identified and incised. The muscle was divided and lateralised, exposing the trachea. The sternohyoideus muscle was elevated from its origin on the cranial aspect of manubrium as already described (Fig. 1). A pair of Liston bone cutters was used to excise the cranial portion of the manubrium at a point just cranial to the articulation of the first ribs. The approach to the ventral aspect of the cervical spine was continued in the standard manner (3). A ventral slot was performed using a pneumatic burr, lavage and suction (4). Visualisation of the slot was excellent throughout the procedure (Fig. 2). The extruded disc material was retrieved manually from ventral to the cord. Following decompression of the spinal cord, the longus colli muscle fibres were sutured closed using 2-metric glycomer 631 monofilament suture material in a continuous pattern. The sternohyoideus muscles were sutured to the remaining soft tissue on the first sternebra using 3-metric glycomer 631 monofilament suture material in a locking loop pattern. The mastoid portion of the sternoccephalicus was similarly re-attached to the soft tissue of the first sternebra. The subcutis and skin were closed using 3-metric polyglytone 6211 monofilament synthetic suture material in a continuous pattern.

The animal recovered uneventfully from the anaesthetic. The following day, voluntary motor function had returned to the pelvic limbs, and the animal was weakly ambulatory with severe paraparesis. Analgesia was provided with methadone1 (0.25 mg/kg I.M QID) and meloxicam6 (0.1 mg/kg P. O. SID). The patient appeared comfortable and it was discharged from the hospital two days after surgery with a short course of meloxicam6 (0.1 mg/kg P. O. SID) and instructions for ac-

Fig. 1 Exposure of the manubrium prior to its resection, following elevation of the paired sternoccephalicus and sternohyoideus-sterno-thyroides muscles from their origins.

Fig. 2 View of ventral slot near completion at C7-T1 disc space. This view is taken vertically from above the slot, demonstrating the exposure of the surgical site.

Discussion

Cervical intervertebral disc disease is a commonly encountered condition in dogs. Cervical intervertebral disc disease occurs most frequently in small breed dogs as a result of chondroid metamorphosis of the nucleus pulposus, and its subsequent extrusion through the annulus fibrosis (1, 4–6). The C2–3 disc is most frequently affected, and incidence progressively decreases with each disc space caudally (1).

Cases of intervertebral disc disease can be treated with conservative or surgical management. Surgical management is typically recommended for intervertebral disc disease when marked neurological signs are present or progressing, pain is uncontrolled, or if conservative management is deemed to have failed (4). The surgical procedure chosen is dependent on the nature of the disc disease. Hansen Type I extrusions of the cervicothoracic spine are often managed with decompression via a ventral slot. Reported success rates range from 83–100% (5, 7, 8).

Poor outcome following a ventral slot is often the result of a failure to adequately evacuate the extruded material (9). Ventral access to the C7-T1 disc space can be challenging: difficulty in access to this disc space can impede attempts to sufficiently decompress the spinal cord, to the extent that dorsal laminectomy has been recommended as the procedure of choice for lesions at this site (4, 8). Dorsal laminectomy is associated with a higher level of postoperative morbidity than a ventral slot and does not allow direct access to the ventral aspect of the vertebral canal (1, 10).

In the clinical case described in this report by the elevation of the origins of the sternoccephalicus and sternohyoideus-sterno-thyroides muscles and excision of the manubrium, access to the caudal cervical spine was greatly improved. To the authors’ knowledge, this modification of the standard surgical approach has not been previously described in the literature. It facilitated the performance of a ventral slot at the C7-T1 intervertebral disc space, leading to a successful outcome in this patient.
References