Segmental Syringomyelia in a Holstein-Friesian Calf

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Abstract

A 1-year-old, male Holstein-Friesian calf presented to the University of Glasgow in good body condition with an abnormal hypermetric “hopping” gate and bilateral hypertonicity of his hindquarters since birth. Analgesia did not visibly improve lameness. Serum biochemistry, hematology, and parasitology were unremarkable. Serum was antibody negative for bovine herpesvirus 1, but positive for bovine viral diarrhea virus (BVDV). Due to the poor prognosis, the calf was humanely euthanized. On gross examination, the spinal cord at the level of the thoracolumbar intumescence (T8 to L4) was markedly enlarged by an intramedullary, soft linear swelling. On cut section, the central canal and grey matter were segmentally replaced by a large, well-demarcated cyst filled with fluid. Additionally, this spinal cord was markedly dilated by a large, central syrinx that merged with the central canal. The syrinx was intermittently lined with remnants of ependyma of the central canal. The grey matter was markedly compressed and distorted on either side of the cavity; the white matter tracts were multifocally pale and loosened by clear spaces of myelin degeneration and edema, but did not communicate directly with the central canal. A post-mortem fluid sample was antigen negative for BVDV. The segmental nature of the syringomyelia in this case is highly suggestive of a segmental, focal dysraphism. Given the lack of notable vertebral column abnormalities, morbidity in this calf likely resulted from a segmental syringomyelia as a result of dysraphism or, less likely, a dynamic spinal cord compression at the thoracolumbar intumescence.

Introduction

Signalment & Presentation

A 1-year-old, intact male Holstein-Friesian calf presented to the Scottish Centre for Production Animal Health & Food Safety at the University of Glasgow School of Veterinary Medicine in good body condition with an abnormal hypermetric “hopping” gate and bilateral hypertonicity of his hindquarters since birth.

Clinical Examination

Revealed harsh chest sounds, wide placement of the hind feet and mild muscular atrophy over the hindquarters. Analgesic treatment with 0.6 mg/kg of meloxicam did not visibly improve lameness.

Clinical Pathology

Serum biochemistry, hematology, and parasitology results were unremarkable. A focal cellular reaction was negative for Salmonella spp., and serological analyses were antibody negative for bovine herpesvirus 1 (hemagglutination inhibition) and antibody positive for bovine viral diarrhea virus (BVDV; serology; 142 % positivity).

Materials & Methods

Given a poor prognosis, the calf was humanely euthanized and transported to the Scottish Centre for Production Animal Health & Food Safety at the University of Glasgow in good body condition with an abnormal hypermetric “hopping” gate and bilateral hypertonicity of his hindquarters since birth.

Results

Gross Examination

Spinal cord

• At the level of the thoracolumbar intumescence (T8 to L4), the cord was markedly enlarged by an intramedullary, soft linear swelling (Figure 1B).

• On cut section, a large, well-demarcated cystic cavity filled with roughly 5 mL of clear, mildly viscous fluid segmentally replaced the central canal and grey matter (Figure 1C).

Histopathology & Immunohistochemistry

Spinal cord

The grey matter was markedly compressed and distorted on either side of the cavity. The white matter tracts were multifocally pale and loosened by clear spaces of myelin degeneration and edema, but did not communicate directly with the central canal. Sections cranial and caudal to the lesion were unremarkable (Figure 1C).

The ear notch was antigen negative for BVDV.

Discussion

Syringomyelia is an uncommon tubular, cystic cavitation of cerebrospinal and extracellular fluid extending over several segments of the spinal cord (and possibly medulla).2,3 It is often associated with dysraphism, it presents with bilateral hindlimb deficits and a “hopping” gate in which the pelvic limbs move together (these common in young lambs). However, segmental lesions within the thoracolumbar region, depression of the sternum, and abnormal hair growth in the dorsal cervical region may also occur.

Clinical signs do not change with age and signs poorly correlate with the extent of the lesion. Syringomyelia also frequently occurs in the dysraphic spinal cord of arthrogryposis multiplex congenita.1 Similarly, approximately 50% of segmental syringomyelia in humans has been attributed to a Chiari malformation.1,2 Historically, syringomyelia is not visibly present until ≥ 8 month of age; the spina bifida C2 to C7 is an abnormality of the lumbosacral region. In the lumbar region of the spine, cavitation generally occurs later in the central grey matter dorosalateral to the central canal, but the white matter may be affected in the white commissures if the space extends from one side to another; the edematous tissue around the cavity stumps poorly and its communication with the central canal is difficult to demonstrate.1 Lesions generally occur throughout the spinal cord and possibly including the medulla, yet localized or segmental lesions surrounded by healthy spinal cord have not been reported.

Conclusions

• The clinical history of this calf points to a congenital lesion: an abnormal hypermetric “hopping” gate with bilateral hyperekstension of his hindquarters with the possibility of arthrogryposis since birth.

• This spinal cord lesion is suggestive of intermittent compression and periodic blockage of cerebrospinal fluid drainage.

• Given the lack of notable vertebral column abnormalities, morbidity in this calf likely resulted from a highly unusual segmental syringomyelia as a result of dysraphism.

References


Figure 1. Segmental syringomyelia in a calf. (A) The spinal cord was markedly dilated by a large, central, cystic space that merged with and replaced the central canal at the level of the thoracolumbar intumescence (T8 to L4; Figure 2A).

• On cut section, the central canal and grey matter of the spinal cord were segmentally replaced by a large, well-demarcated cystic cavity filled with roughly 5 mL of clear, mildly viscous fluid (Figure 1C).

Figure 2. Segmental syringomyelia in a calf. (A) The spinal cord was markedly dilated by a large, central, cystic space that merged with and replaced the central canal at the level of the thoracolumbar intumescence (T8 to L4; Figure 2A).

• On cut section, the central canal and grey matter of the spinal cord were segmentally replaced by a large, well-demarcated cystic cavity filled with roughly 5 mL of clear, mildly viscous fluid (Figure 1C).


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Figure 2. Segmental syringomyelia in a calf. (A) The spinal cord was markedly dilated by a large, central, cystic space that merged with and replaced the central canal at the level of the thoracolumbar intumescence (T8 to L4; Figure 2A).

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