What Is Your Diagnosis?

History

A 3-month-old Friesian colt was referred for evaluation of severe ataxia and inability to rise unassisted since birth. The colt appeared bright and alert, and its temperature (38.2°C [100.8°F]), heart rate (68 beats/min), and respiration rate (32 breaths/min) were within expected ranges for an excited foal. Examination of its cranial nerves did not reveal any abnormalities, but proprioceptive deficits were evident in all 4 limbs, especially the pelvic limbs. The colt would repeatedly knuckle in all 4 limbs and had episodes of pelvic limb spasticity. The colt was restricted in its ability to flex its neck laterally and ventrally, although deep palpation of the neck did not elicit signs of pain. Cutaneous sensation was evident in all areas, including the distal portions of the limbs and the anus, and muscle atrophy was not detected. A spinal cord lesion was localized to the level of C1 through T3 vertebrae. Lateral radiographic images of the skull and cervical region were obtained while the colt was standing (Figure 1).

Determine whether additional imaging studies are required, or make your diagnosis from Figure 1—then turn the page →

Figure 1—Lateral radiographic view of the skull and cranial cervical vertebrae of a 3-month-old Friesian colt with ataxia since birth.
Radiographic Findings and Interpretation

The body of C1 is decreased in size with hypoplastic transverse processes, and there is a lack of occipital condylar development. The C1 vertebra appears partially fused to the occipital bone, resulting in an indistinct appearance of the atlanto-occipital (C1 and C2) articulation. The vertebral canal is poorly demarcated and has excessive angulation as it extends cranially through the atlanto-occipital region, inducing a step deformity between the floor of the cranial vault and the ventral portion of the vertebral canal. Articulation between the ventrocaudal portion of the body of C1 and the ventral aspect of the dens of C2 is not evident, and the cranial portion of C2 is malformed (Figure 2). The radiographic findings are consistent with occipitotralantoaxial malformation (OAAM).

Comments

Myelography has been used in some cases of OAAM to further characterize the lesion.1 In addition, cross-sectional imaging of the C1-C2 articulation by use of computed tomography can provide supplemental information regarding the severity of these malformations.3 However, as determined with the colt of this report, survey radiography, which can be performed in the field, is sufficient to establish an ante-mortem diagnosis. Correct radiographic positioning is essential because small degrees of obliquity can confound proper radiographic interpretation of the region.

Because of the poor prognosis, the owners elected to have the colt euthanized. The diagnosis of OAAM was confirmed at necropsy on the basis of gross findings and histologic lesions of the spinal cord consistent with spinal cord compression, including axonal degeneration with swollen myelin sheaths, evidence of intranodal macrophages, and mild diffuse astroglisis.

Occipitotralantoaxial malformation has been described in horses as well as cattle, sheep, a camel, dogs, humans, and a cat.1 Although OAAM is classically a finding in horses of Arabian breeding, it has also been reported infrequently in other breeds, including a Quarter Horse, an Appaloosa, and a Miniature Horse.1,2,8 Differential diagnoses for a foal with comparable clinical signs would be cervical trauma, vertebral osteomyelitis or abscess, cervical stenotic myelopathy (dynamic or static), equine degenerative myelonecephalopathy, and equine protozoal myeloencephalitis. This case illustrated the importance of radiographic imaging in establishing a diagnosis in a foal with neurologic signs typical of OAAM.


Figure 2—Same radiographic view as in Figure 1. There is occipitalization of C1 (arrow 1), malformation of the cranial portion of C2 (arrow 2), and a step deformity between the base of the skull (arrow 3) and vertebral canal (arrow 4).