Case Report

Congenital cervical scoliosis in a Holstein Friesian calf

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An abnormal vertebral development that results in a lateral curvature of the spine is classified as congenital scoliosis. The type and region of the malformation determines severity of the scoliosis. The name "scoliosis" comes from the Greek word meaning curvature (Lonstein, 1999). As with the other congenital spinal abnormalities, the defects appear to be sporadic, and studies have suggested a multifactorial basis, involving genetic and environmental contributions (Moore et al., 1999; Winter et al., 1996); Moore et al, (1999) attributes the failure of formation to an embryological absence of one or more of the primary chondrification centers. As a result of the failure of cleavage of a primary center, part of the vertebra or growth plate will be unable to form and subsequent normal growth on the contra lateral side will create the lateral curvature (Moore et al., 1999; O’Rahilly, 1996; Moore and Persaud, 1998).

INTRODUCTION

An abnormal vertebral development that results in a lateral curvature of the spine is classified as congenital scoliosis. The type and region of the malformation determines severity of the scoliosis. The name "scoliosis" comes from the Greek word meaning curvature (Lonstein, 1999). As with the other congenital spinal abnormalities, the defects appear to be sporadic, and studies have suggested a multifactorial basis, involving genetic and environmental contributions (Moore et al., 1999; Winter et al., 1996); Moore et al, (1999) attributes the failure of formation to an embryological absence of one or more of the primary chondrification centers. As a result of the failure of cleavage of a primary center, part of the vertebra or growth plate will be unable to form and subsequent normal growth on the contra lateral side will create the lateral curvature (Moore et al., 1999; O’Rahilly, 1996; Moore and Persaud, 1998).

The most common form of scoliosis is called idiopathic, which means that the cause is unknown. Rarely, scoliosis is a congenital abnormality of the vertebrae, or spinal bones, and occasionally, an injury such as a disk prolapse or a sprained ligament in the backbone can cause temporary scoliosis (Moore et al., 1999).

Scoliosis is not always easy to diagnose, especially if it does not hurt or have visible signs. A physical examination of the spine, hips, and legs is the first step, followed by an x-ray if needed. The severity of scoliosis is diagnosed by determining the extent of curvature of the spine. The curvature is the angle of slant of the spinal bones measured in degrees. In idiopathic scoliosis, however, the choice of treatment depends largely on the severity of the condition (Moore et al., 1999).

Case report

In November 2012, an 8-day-old, first parturition, male Holstein Friesian calf was referred to the Teaching and Research Hospital of Veterinary Medicine Faculty, Shahid Bahonar University of Kerman, Kerman province, Iran. The calf, which weighed approximately 50 kg, had a S -shaped scoliosis (Figure 1) that occurred in the neck vertebrae and not associated with trauma, and we did not identify any evidence of trauma or fractures on radiographs (2 and 3). The general condition and demeanor were normal. On physical examination, the
animal was found to be alert, there is no neurologic damage and breathing difficulties. The rectal temperature, heart and respiratory rate were 38.9 °C, 88 and 22 pulses / min, respectively.

To the best knowledge of the authors, this is the first documented case of scoliosis in cervical vertebrae in a Holstein Friesian calf in Iran. As suggested Abnormal vertebral conformation should be carefully examined and characterized, and affected animals should be submitted to a reference laboratory for thorough evaluation and further research.

**DISCUSSION**

The American Academy of Orthopedic Surgeons, in cooperation with the Scoliosis Research Society, describe three different types of scoliosis; congenital, neuromuscular, or idiopathic. In most cases, the cause of scoliosis is unknown; this is called idiopathic scoliosis.
Other causes of scoliosis may include; hereditary conditions, injuries, infections and tumors.

Results of study of Ishibashi et al, (1994) showed that antibodies to Aino virus were detected in sera from calves with congenital scoliosis.

According to Jaskwhich et al, (2000), 64% of cases of congenital scoliosis involve the thoracic vertebrae, whereas 20% involve the thoracolumbar region. Eleven percent of the cases are seen in the lumbar region, with the remaining 5% in the lumbosacral region. Although unusual, congenital scoliosis does occur in the cervical or cervico-thoracic regions as well (Smith, 1994).

The natural history of congenital scoliosis plays a vital role in the prognosis and treatment of the defect. McMaster (1994) demonstrated that the majority of curves are progressive, whereas only 25% are non-progressive. Curves involving the thoracic vertebrae show the poorest prognosis with the most severe anomaly being a unilateral unsegmented bar with a contralateral single or multiple hemi vertebrae (McMaster, 1998).

In addition, curves in the cervico-thoracic and lumbosacral regions are severe because there is a diminished ability for compensation by the rest of the spine (Keim, 1982). McMaster stated further that the poorest prognosis involves the thoracolumbar region with a curve greater than 50 degrees by age 2 years (Lonstein, 1999). Defects that are more severe tend to progress and usually require treatment. The curves that are less severe may not progress and present a greater challenge to the physician treating the patient. Observation over a period of time may be the best solution in these cases. In addition, most physicians agree that a general rule regarding congenital abnormalities is to monitor carefully significant curve progression (keim, 1982).

Various anomalies may be associated with congenital scoliosis. Special consideration should be given to abnormalities associated with the spinal cord, because they may require surgical treatment as well (Jaskwhich et al., 2000).

CONCLUSION

Congenital scoliosis presents a major challenge to the Veterinarian as a result of the possibility of a wide variety of primary and secondary abnormalities. These abnormalities develop during fetal life, and thus treatment of these patients often necessitates numerous tests and thorough repetitive examination by the Veterinarian.

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REFERENCES


