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MANAGEMENT OF DYSTOCIA DUE TO ARTHROGRYPOSIS MULTIPLEX FOETUS IN A HOLSTEIN FRIESIAN COW

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Abstract: Arthrogryposis, is one of the congenita anomalies reported in cattle and other domestic animals, is an extreme form of contracted tendons in which many joints are in flexed state. The present report about a rare case of dystocia due to Arthrogryposis multiplex foetus in a HF cross cow which was relieved per vaginally by traction.

Keyword: Dystocia, traction, pervaginal, Arthrogryposis, HF cross cow.

Introduction

Arthrogryposis is a congenital defect described as an extreme form of contracted tendons in which many joints are flexed or extended and is considered to be secondary to a primary neuromuscular malformation. It was reported in horses, cattle, sheep and pigs (Latshaw, 1987). This malformation may involve in two or three or all four limbs. Arthrogryposis Multiplex Congenital (AMC) is a rare sporadic non progressive congenital disorder that is characterized by multiple joint contractures and can incorporate muscle weakness and fibrosis. The disease name derives from Greek, meaning "curved or hooked joints." Research has shown that anything that inhibits normal joint movement before birth can result in joint contractures since tendons connecting to the joint are not stretched to their normal length. Arthrogryposis multiplex congenita (AMC) consists of several conditions of different etiology and mixed clinical features, including multiple congenital contractures in multiple body areas. The etiology still remains unclear but generally any cause that leads to reduced foetal movement may guide to congenital contractures and in severe cases to foetal akinesia deformation sequence (FADS) because proper foetal growth is dependent on foetal movement, starting by 8 weeks' gestation [Navti et al.,2010 and Witters et al., 2002]. It may or may not be heritable (Gholap et al., 2014).This calves are generally still birth or die shortly after birth. The present communication record a rare case of foetal arthrogryposis multiplex (AM) in a HF cross cow which causes dystocia.

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Case history and Observation

A full term HF cross 2nd calving cow aged 5 years was brought to veterinary dispensary with the history of dystocia since last 6 hours. The general clinical examination of the animal recorded rectal temperature of 38.5^0C, respiration rate 30/min, heart rate 85/min and pink mucus membrane. Per vaginal examination revealed that a fully dilated cervix with moist birth canal. The foetus was in anterior longitudinal dorsal vertex presentation with both fore limbs of knee and fetlock joints were severely contracted and not movable which struck at pelvic inlet and the foetus was dead.

Treatment and Discussion

Attempt made for relieving the calf with controlled traction was futile. Hence, following epidural anaesthesia (10ml of 2% Lignocaine), birth passage was well lubricated using cetrimide cream. After assessing the foetus a snare was applied on both fore limbs and repulsion was performed to bring the head (using obstetrical hook on the left eye) from the vertex presentation to pelvic inlet. There after a successful traction was applied to delivered a still born female dead foetus per vaginally. The cow was discharged with the routine prescription of broad spectrum antibiotics and supportive therapy.

Compared with the normal birth weight of a full term foetus (51.4+_3.5 kg Madgwick et al., 2005), the body weight of affected calf in this present case was 27.3 kg. This confirmed that growth of the foetus affected with arthrogryposis is usually retarded (Bahr et al., 2004). There was about 20 degree flexure of both carbal / Tarsal and metacarbal/metatarsal joints were observed.

Mechanisms of arthrogryposis development in foetuses include a reduction in number of motor neurons resulting in paresis (Van Huffel *et al.,*1988) and alkaloids being agonists to acetylcholine receptors leading to paralysis. This gives a reduced locomotor capacity of the foetus and a fibrosis of the joints, leading to fixation i.e.arthrogryposis (Green *et al.,* 2010; 2012).

The aetiology for this anomaly appears multifactorial, with varying symptoms including physical limitation of inutero movement causing fetal akinesia/hypokinesia syndrome, maternal illness, intrauterine viral infection (Schmallenberg virus, Akabane virus, or Aino virus), toxin exposure, and genetic disorders affecting the foetus [Agerholm ,2015].

In cattle arthrogryposis multiplex congenita has been associated with a genomic deletion encompassing ISG15, HES4, and AGRN genes in the American Angus breed [Beever and Marron 2011]; and in Red Dairy cattle it is associated with a deletion in the first exon of

CHRNB1 [Agerholm et al.,2016]; furthermore, Iannuzzi et al., in a Piedmont calf affected by arthrogryposis, found the duplication of the SMN gene on BTA20q13.1 [Iannuzzi et al., 2003].

Arthrogryposis due to 3 gene mutation causing failure of normal neuromotor development in uterus and also caused by decreased foetal movements, low fluid volume, defect in foetal blood supply hyper thermia, fever and viral infection during pregnancy (or) foraging of pregnant animals an plant containing toxic alkaloids (Lannuzzi et al., 2003). These multiple factors affect CNS (or) cause muscle degeneration thus leading to loss of muscle mass with imbalance of muscle power at the joint & collagenous thickening of the joint capsule result in joint fixation.

Nawrot et al. (1980) documented this defect in calves of Charolais breed and its crosses, due to autosomal recessive gene with complete penetration in homozygous state.

Jones (1999) described persomus elumbis as vertebral agenesis and arthrogryposis in a still born Holstein calf and he opined that chromosomal aberrations within the homeobox gene family were the contributory factor. Inherited ovine arthrogryposis has an autosomal recessive mode of inheritance (Murphy et al., 2007).

Viruses like akabane virus in cows (Kurogi et al., 1977), cache valley virus in lambs (Bermejello, 2003) and aino virus in neonatal calves (Tsuda et al., 2007), were also attributed to be the cause of arthrogryposis. The wide spread use of semen from sires of different pedigrees of affected calves made several countries to transmit this anomaly.

The present calf was small sized and did not show any other associated congenital defects. Contrary to these findings, calves borne with arthrogryposis were small sized with a dome shaped head, scoliosis, maxillary retraction, sunken eyes, cataracts and irregularities of teeth (Kitano et al, 1994) and growth retardation (Agerholm, 2004).

Agerholm (2001) indicated genetic aetiology for arthrogryposis, as the genetic causes appeared to be responsible for the present case as the dam was a known inbred and no reports of viral aetiology were available.

To avoid this problem, it is necessary not only to set up breeding plans that avoid the increase in inbreeding, but also to know genetic conditions underlying the diseases and exclude carriers from mating.

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