Unusual case of Tetra - Amelia in a Holstein- Friesian cross bred calf

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Abstract

A case of still born male calf with the congenital tetra – Amelia condition is reported in this paper. External examination of the calf revealed total absence of all the four limbs. The pedigree of the calf could not be ascertained as the dam was purchased from local shandy. On physical examination no other phenotypic anomalies could be found, while post-mortem examination revealed the fully developed visceral organs.

Key Words: *Tetra-Amelia, Calf, Congenital disorder*

Introduction

Amelia denotes total absence of one or more limbs, is a rare congenital malformation diagnosed in newborn domestic animal. In cattle, cases of hemimelia (absence of a portion of a limb) and deformities of hind limbs have been reported (Vermunt et. al. 2000). Tetra-amelia is a very rarest congenital disorder diagnosed in domestic animals with total absence of all four limbs. Report in this regard is not traceable. There are reports on tetra- Amelia in humans which pose serious medical problems; most were stillborns or died shortly after birth (Neimann et. al. 2004).

Case history and observation

A five year old cross bred Holstein-Friesian cow with the case history of difficulty in parturition was brought for treatment. Vaginal examination revealed the head of the calf in dilated cervix, with anterior longitudinal presentation and dorso sacral position. However, no limbs could be palpated to pull out the calf. Finally a still born male calf with the congenital disorder of amelia was delivered with the help of obstetric hook and snare. Physical examination of the animal revealed total absence of both the thoracic and pelvic limbs (**Fig 1 & 2**) Head, neck, thorax and trunk were normal.

Also, no other anomalies were noticed phenotypically. Development of other visceral organs was absolutely normal, which was also ascertained by the post-mortem examination of the calf (Fig 3)

Discussion

The etiology of limb malformation includes hereditary factors, environmental factors, or a combination of both. The complete absence of a limb in amelia occurs as a result of the limb formation process being either prevented or interrupted very early in the developmental stages of embryo. Amelia may be present as an isolated defect, but it is often associated with major malformations in other organ systems. In this case no other anomalies were found on gross examination.

In humans this syndrome can cause severe malformations of other parts of the body, including the face,head, heart, nervous system, skeleton, and genitalia. The lungs are underdeveloped in many cases, which make breathing difficult or impossible.

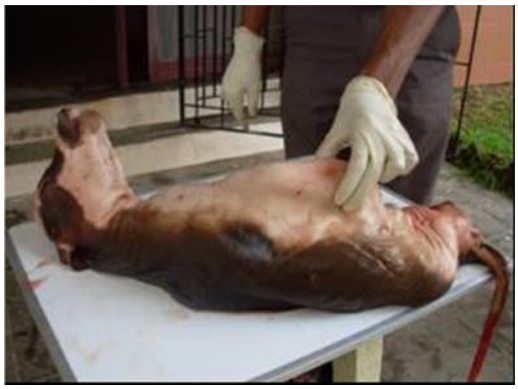

Fig. 1 & 2 Calf with tetra – amelia condition (lateral and ventro dorsal view)

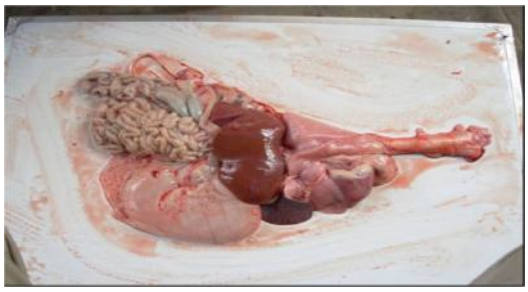

Fig.3. Fully developed visceral organs

Autosomal recessive inheritance pattern might be the cause for tetra Amelia condition. In autosomal recessive inheritance both copies of the gene in each cell attain mutations. Each parents of affected individual with tetra-amelia syndrome carry one copy of the mutated gene, but do not show signs and symptoms of the condition.

Researchers believe that unidentified mutations in WNT3 or in other genes that involve in limb development are probably responsible for the disorder in these cases. In human beings, mutations in the WNT3 gene prevent cells from producing functional WNT3 protein, which disrupts normal limb formation and leads to the other serious birth defects associated with tetra-amelia syndrome (Niemann *et. al.* 2004).

Chromosome instability was aso diagnosed in a calf affected by congenital malformation namely lack of the distal left anterior leg and right anterior leg ended with a hook-shaped, naillike structure, high rates of structural chromosome aberrations and increased yields of sister chromatid exchanges (Di Berardino *et al.*, 1983). Mutagen-induced chromosome instability was analyzed in cattle, and the most expressive fragile sites in cows were observed in chromosomes 1 and X. (Danielak and Slota 2004)

Reference

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