Persistant Cloaca and Atresia Ani in a Calf

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Abstract

A full-term phenotypic female Friesian-Holstein calf with a history of passing faeces and urine from the same opening was referred for evaluation to the Faculty of Veterinary Clinic, University of Zambia. On examination, the calf was found to have a single perineal orifice which corresponded in appearance to the vulvar opening. The calf had no anal opening. It died later and was necropsied. Autopsy findings are presented. This condition appeared to have been unique within the herd and represents the first reported anatomical description of such a condition in our region. The developmental events that may have lead to this anomaly are discussed.

Introduction

Cloacal malformation is a complex and rare entity that occasionally occurs in infants and newborn animals. In most instances, this anomaly is exhibited in a more complicated form where there is involvement of other organ systems. Persistent cloaca in higher mammals, can be defined as a developmental anomaly (malformation) in which the rectum, vagina and urethra meet, fuse and open into a single common chamber. In lower mammals (e.g. monotremes and marsupials) and birds, this expression is normal since the terminal portions of these organs combine to form a cloaca (Jarcho, 1946). Every case of persistent cloaca presents unique anatomical variants which include associated anomalies of the urogenital system as well as caudal spinal column lesions. Amongst the domestic animals, this condition has been reported in foals (Furie, 1983), cat (Noden and De Lahunta, 1985), calves (Dean *et al.*, 1996) and in humans (Sotolongo *et al.*, 1983; Karlin *et al.*, 1989; Cohen, 1991; Greene *et al.*, 1991). This report documents the first case of persistent cloaca and atresia ani in East and Central Africa.

Materials and Methods

A three-day old Friesian-Holstein calf full of vigour and good appetite was referred to the Faculty of Veterinary Medicine Clinic, University of Zambia because she was passing faeces (meconium) and urine from the same opening. The calf was born to a 3 year old heifer. She was naturally serviced by a stud bull of the same breed. The owner indicated that this was the first time he had experienced an abnormality in the progeny of the same bull. Clinical examination revealed a single perineal vulva-like orifice with a diverticulum (about 5 cm x 8 cm in diameter) on the ventral surface of the tail. This suboccygeal slit-like diverticulum had a pinkish mucosa that appeared moist. The calf did not exhibit any urinary and faecal incontinence. The animal was subsequently radiographied and this revealed a normal vertebral column (including the sarco-coccygeal vertebrae) and spinal cord. A barium sulphate enema administered via the single perineal orifice demonstrated a normal urinary bladder, a large pelvic chamber and absence of fistulae within the pelvic organs/cavity. The calf died two days after admission to the clinic and anatomical dissection was subsequently performed.

Results

The gross external features of the calf were essentially normal for a calf of this age apart from the findings in the perineal area indicated, there was a single vulvar-like opening ventral to the level of the ischial arch. There was no anal opening below the tail. Internally, the thoracic organs appeared to have developed normally as the heart revealed a patent foramen ovale and a patent ductus arteriosus which are normal findings in a calf at this stage. Components of the digestive as well as urogenital organs including the remnants of umbilical vessels and associated ligaments appeared normal, except for their terminal portions which emptied individually into a large common chamber or cloaca (6 x 5 x 5 cm). The cranial wall of this chamber had three openings; dorsally, there was an opening to the distended descending colon/rectum (megacolon);

ventrally, at about the same level, there was an opening to the urethra; between the opening of the urethra and the colon, there was a large recess (3 cm in diameter) that was continuous with the large and spacious vagina. The uterus and ovaries were normal. Further examination of the diverticulum revealed that it had no communication with the spinal column.

Discussion

The most important element in the development and separation of the intestinal and urogenital system is provided by the urorectal septum among other adjacent structures including the position and presence of the cloacal plate. In early fetal life, the foetal gut terminates in a coalescence with the bladder to form a primitive cloaca (Noden and De Lahunta, 1985). The separation of the cloaca requires the coordinated behaviour of three mesenchymal folds (Touneux and a pair of Rathke folds) and end-up forming the urorectal septum (Larsen, 1993). A portion of urorectal septum arises from the angle between the allantois and hindgut tube. This mesodermal mass/wedge migrates caudally towards the cloacal membrane. Initially, it divides the cloaca into a dorsal primitive rectum and a ventral urogenital sinus. Later, the septum meets and fuses with the mesoderm/endoderm of the cloacal membrane giving rise to the rectal/anal and urogenital sinus parts of the cloaca. The zone of fusion between the cloacal membrane and the septum forms the perineum. Cell loss in the caudal cell mass prior to the migration of the mesoderm has been suggested as a possible explanation for the incomplete development of the urorectal septum (Dean *et al.*, 1996). In females, this anomaly is usually accompanied by atresia ani (Furie, 1983: Vaughan, 1974). A similar situation was evident in our case. In summary, the specimen has demonstrated the failure of: 1. – the urorectal septum to develop and/ or migrate leading to the non-cleavage of the cloaca into a urogenital sinus and rectum, 2. The anal membrane to perforate. Based on the embryological timing of the urorectal septum, indications are that this failure occurred at the very early stage of development, almost immediately after the formation of the cloacal plate. The relation of the diverticulum to this defect could have something to do with the misplacement of portion of the cloacal plate. Unlike most reported cases where caudal spinal dysraphism have been concurrently observed, our case did not show any caudal spinal anomaly. However, an occult spinal form cannot be ruled out.

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