

CRANIOSCHISIS AND MENINGOCELE IN A BUFFALO CALF: A CASE REPORT

S.P. Manjunath, V. Prasanna Kumar, C.T. Chandre Gowda and V. Pradeep Kumar

Veterinary Dispensary, Anathi, Channarayapatna, Hassan, Karnataka, 537202

Received 11-1-2015 Accepted 20-2-2015

Corresponding Author : drctchandra@gmail.com

Genetic and non-genetic defects associated with recessive genes are primarily responsible for fetal developmental abnormalities (Roberts, 1986). Cranioschisis refers to failure of fusion of cranial bones, which results in herniation of meninges. Meningocele is the herniation of meninges filled with cerebrospinal fluid but does not contain neural tissue, whereas meningoencephalocele is the herniation of meninges along with brain tissue through the defect in skull (Hoogmoed et al., 1999). Determination of factors leading to development of cranioschisis and meningocele is difficult since they are numerous such as malnutrition, exposure to diseases, use of medicines and growth conditions (Yaman et al., 2013). A little information is known about cranioschisis and meningocele in buffalo calves and only few cases related to these defects are reported till date (Ayyappan et al., 1996; Manda et al., 2007 and Pandey et al., 2012). In the present study, an unusual case of buffalo calf with cranioschisis and meningocele is discussed.

CASE HISTORY AND OBSERVATIONS

A five year old pregnant buffalo with a history of rupture of water bag about an hour before was presented to Veterinary dispensary, Anathi, Channarayapatna, Hassan, Karnataka in the month of January 2014. Animal was in first parity with normal appetite and clinical examination revealed normal temperature and respiration rate. Per vag fetus in an anterior longitudinal presentation with it. A dead buffalo calf was delivered normally within an hour.

Physical examination of calf revealed a large sac like protrusion on dorso-caudal aspect of the cranium, filled with approximately 250 ml of fluctuating fluid. The protruded sac was not covered by skin. For further detailed inspection, the sac was punctured and fluid was drained out. Liquid was clear with few stains of blood resembling cerebrospinal fluid. Congenital defects similar to the present case were not known to the owner. Examination of the calf showed incompletely fused skull bone and protrusion of meninges (Fig 1). It had a single opening at occipital region through which brain tissue was visible (Fig 2). Based on the above observations, the case was diagnosed as cranioschisis and meningocele. These teratological defects have been described in detail by Roberts, (1986).



Fig 1. Buffalo calf showing naked (no skin) protrusion of meninges (meningocele)

DISCUSSION

Meningocele and meningoencephalocele are herniation of meninges or brain substance through defects or malformations of skull during the embryological development. These herniation can occur in frontal parietal or occipital regions of the cranium (Yaman et al., 2013). In addition to skull,

meningocele may also occur in cervical, thoracic and lumbar vertebrae (Rivas et al., 1996). In meningocele and meningoencephalocele cases the herniated pouch may or may not be covered with the skin (Yaman et al., 2013). In the present case the herniated pouch was not covered by skin.

Cranioschisis and meningocele can form separately or can be accompanied with certain other malformations within the same site or in some other part of the body. The present case report is diverse in its findings and seems to be a unique report on monsters with both cranioschisis and meningocele occurring together in buffalo calf. Similarly, Shivaprakash and Usturge, (2004) reported a case of bovine calf with both defects. Detailed examination of buffalo calf does not reveal any other congenital deformities.

In contrast, few earlier findings reported potential anomalies that can be accompanied with meningocele like cranioschisis, spina bifida (Ohba, 2008), bilateral cryptorchidism (Lapointe et al., 2000) and kyphoscoliosis (Zani et al., 2010). Also, Pandey et al., (2012) reported cranioschisis associated with anophthalmia in a buffalo calf.

Lapointe et al., (2000) reported meningocele in 3 calves, in which 2 calves showed two meningoceles one either side of the forehead, whereas the present calf showed single meningocele on the dorso-caudal aspect of the head.

It is difficult to detect the possible cause of this condition. Environmental factors along with the congenital factors are considered to be critical in etiology and development of meningocele and meningoencephalocele. (Kohli, 1998). Fetal developmental anomalies occur due to genetic and nongenetic defects associated with recessive genes (Roberts, 1986). Autosomal recessive genes are known to control the formation of congenital defects (Hoogmoed et al., 1999). In a study on pedigree analysis and breeding trials in the Galloway cattle, authors opined that combination of anomalies was inherited as a simple autosomal recessive trait (Lapointe et al., 2000).

Genetic factors, certain medicines used during pregnancy and abnormal interventions during rectal examinations can play a role in the development of cranial defect and malformations. In this case report, medical history revealed that the dam was healthy in gestation period, received no medical treatment and not exposed to any kind of toxicants. Therefore, genetic factors are considered to have played role in the formation of cranioschisis and meningocele in buffalo calf.

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Fig 2. Opening at dorso-caudal region (occipital) of cranium through which brain tissue is visible

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