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A Rare Case of *Diprosopus* Buffalo Calf in a Non-Descript Buffalo

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ABSTRACT

A case of *diprosopus monauchenos* is described in a non-descript buffalo. A 6 year old buffalo with single parity was presented along with a live defective male calf was presented to the clinic. The congenital defective male calf was delivered normally by the dam. The major gross anatomical malformations were restricted to the head only. Physical examination revealed two oral cavities and both of them fused medially forming a single epiglottis and oesophagus. The male calf survived only for a week on hand-feeding of milk. This is the first *diprosopus* case report in buffalo calf from Jammu and Kashmir, India.

Key words: *Diprosopus*, Non-descript buffalo, buffalo calf, Dystocia.

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INTRODUCTION

Congenital defects in calves are frequently reported in all breeds of cattle with varied frequency. The congenital malformations in calves may enhance perinatal mortality, decrease maternal productivity, and reduce the value of defective neonates (Rousseaux, 1994). Developmental defects and anomalies in calves include functional as well as morphological defects (Rousseaux, 1988). Cranial duplications is one of the morphological defects, can be either *diprosopus* or *dicephalus* (Roberts, 1986). Congenital head abnormalities involving duplications such as *diprosopus* and *dicephalus* occur more frequently in cattle than in sheep,pigs and rarely in goats (Hiraga and Dennis, 1993). The *diprosopus monauchenos* condition involves varying degree of duplication of facial parts, and the neck remains common. A similar case involving non-descript buffalo calf that survived for only one week. To the best of authors' knowledge, this is the first documented report of *diprosopus* case in buffalo from Jammu and Kashmir, India.

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CASE HISTORY AND OBSERVATIONS

The buffalo aged 6 years with single parity having previous history of normal pregnancy and parturition was presented along with a defective calf. The clinical parameters of the animal *viz.,* rectal temperature, respiratory rate and heart rate were within the physiological range. The animal had been raised semi-intensively by the nomads with some other buffaloes in hilly areas and meadows. A live male buffalo calf was delivered without any obstetrical assistance at highland pasture in Poonch area of Jammu and Kashmir. The calf was feeding normally, but its hind limbs were very weak.

TREATMENT AND DISCUSSION

The detailed morphological examination of the calf revealed duplicate facial structures (*Diprosopus*) connected with a single neck (*Monauchenos*) to the rest of the body (Figure 1). The two completely fused heads appeared identical in size and colour markings. The two medially indistinct mandibular bones appeared completely fused with a single hole in the middle. Though the cloven hooved calf had two mouths, and tongues with two pairs of noses, one normal pair of eyes and ears were observed. Two normal-sized ears and eyes were placed laterally on either side of the two heads, while one small hole was observed medially with no clear demarcation of medially located ears and eyes between the heads. Thorough examination of each oral cavities revealed the presence of tongues both of which shared a common root, thereby giving it a "Y"-shaped appearance at their base. The calf had a very heavy head that required assistance to held up high while fee**.** ding or walking.

Fig.1. Diprosopus buffalo calf showing two fused heads. The calf had two mouths and tongues, but with pair of eyes and ears

The male calf moved both the mouth and tongue simultaneously when he drank from the bottle. The animal also had defect in its gait and walked in circles. The calf was on hand-fed milk with normal urination and defecation. There was a common opening for both the oral cavities with a single epiglottis, oesophagus, stomach, intestines, anal opening and urinary tract. The appearance of the contents of the thoracic, abdominal and pelvic cavities was normal. After milk feeding, the meconium passed normally. The forelimbs were very weak and the calf died eventuallyone week after birth.

Congenital defects include functional and morphological imperfections present at birth and account for high percentage of calf mortality in the neonates (Smolec *et al.,* 2010). The congenital defect in this case (*diprosopus*) was initially compatible with life, as the calf was born alive and survived for one week. The *diprosopus* condition ranges from having two fully formed faces to the varying degree of duplication of facial structures. The exact cause for these kinds of anomalies still remains obscure, but they are either inherited or caused by environmental teratogens (Dennis and Leipold, 1979). Similar cases of *diprosopus monauchenos* has been reported in cross-bred cow calf (Sumena and Lucy, 2016; Jhamb *et al.,* 2021) and in buffalo calf (Sharma *et al.,* 2010).

Genetic and environmental factors or both have been implicated in formation of congenital defects in the foetus. Toxic plants (*Veratrum californicum*, Lupins), trace elements, infectious agents and physical agents such as hyperthermia, stress during rectal palpation in early pregnancy and irradiation have also been identified as teratogens in the cow (Saperstein, 2002). Other causes include nutritional deficiencies, endocrine disturbances, high temperature during pregnancy, chemicals and drugs (Smolec *et al.,* 2010). In cases where teratogenic agents are not implicated, abnormal development may be due to failure of gene control, failure of cellular and tissue interactions or local environmental effects on gene expression (Smolec *et al.,* 2010). The etiology of the abnormality in this particular case could not be ascertained, but may be due to certain environmental factors, infectious agents and feeding of toxic plants or a combination of any of these, since the buffalo was allowed to graze freely before and during pregnancy at highland pastures where mixture of flora and fauna are found. However, there was no previous history of the occurrence of a similar type of case in the entire area. Embryonic duplications are of great economic importance in the livestock since they are usually associated with dystocia and reproductive wastage (Dennis, 1975). Abnormal duplication of the germinal region throughout embryogenesis of the monozygotic fetus will give rise to partial

duplication of body structures (Sharma *et al.,* 2010). Severe cranio-facial dysmorphogenesis in developmental duplication inadequacy results in *diprosopus* ('two faces') or possibly even *dicephalon* ('two heads'). The errors in the process of forming monozygotic twins have been seen as a factor in the formation of duplicated defects (Riccardi and Bergman, 1977). Either anyone of all the above described factors coupled with the errors in forming monozygotic twins may be the reason for the developmental defects in the present buffalo calf.

CONCLUSIONS

It was concluded that embryonic duplications are of great economic importance in the livestock since they are usually associated with dystocia and reproductive wastage and could lead to dystocia. This case depicted first documented report of *diprosopus* case in buffalo from Jammu and Kashmir, India.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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