Dicephalous in a bunaji calf

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Abstract
The present study depicts a rare case of a dicephalic conjoined anomaly in a bunaji calf. In this case report, we describe a dicephalic female twin calf from a pregnant bunaji cow (Bos indicus) during the post-mortem examination. Detailed external anatomical characteristics were assessed through a detailed macroscopic examination. The two heads were joined at the level of the ramus of the mandible, extending from the ramus of the mandible to the point of the mandibular condyles. The external features comprised of a single thorax, two heads, with the right head slightly bigger than the left head, four eyes, two ears, four nostrils, two forelimbs and two hindlimbs. There was a duplication of the tongue with a common base. A foramen magnum was present at the cervical region for the passage of the spinal cord. In conclusion, the case report describes a unique case of female dicephalic conjoined twinning congenital abnormally.

Introduction
Congenital abnormalities have been documented in all species of domestic animals and are believed to arise when there is a disturbance during early embryonic development (Sharma et al., 2013). These disturbances may be genetic or environmental in nature. When disturbances occur during duplication in a twinning embryo, they can give rise to congenital faetal abnormalities with partial duplication of body structures. A congenital anomaly where there is incomplete separation of the skull in twinning animals may result in duplication of the facial structures (diprosopus) or the entire cranium (dicephalous), depending on the extent of separation (Salami et al., 2011). Dicephalic monsters are the most common form of body duplication reported in domestic species (Roberts, 2002). These abnormalities were previously assumed to be very rare in ruminants (Leipold et al., 1972) but are
becoming more common, especially in cattle, than other domestic animals (Ahmed et al., 2015). In Nigeria, only a few cases of dicephalous in cattle appear to have been documented (Ate et al., 2011; Salami et al., 2011; Ajayi et al., 2012). This may be because they were initially misinterpreted as bad omens by livestock farmers (Gyang et al., 1984). However, with increasing awareness, more of these cases may be documented. This report presents a case of dicephalus parapagus in a Bunaji calf encountered at post mortem inspection in the Wurukum abattoir, Makurdi, Benue State.

Case Presentation
A 4-year-old pregnant bunaji cow was presented for slaughter in the Makurdi Abattoir, Benue State, due to unresolved dystocia. After slaughter, a double-headed calf was seen by the butchers, and subsequently, the attention of the veterinarian was drawn. Upon physical examination, a fully developed apparently healthy female foetus weighing 12.5 kg with two separate heads was noticed. The monster calf had a single thorax and four legs with well-developed hoofs (Plate I).

Physical and Post mortem examination
From the macroscopic examination, it was observed that the calf had two heads, and each of the heads had one mouth (oral cavity), two nostrils, one ear (the left ear for one head and the right ear for the other head (Plate II), and two eyes. The dicephalic

Plate I: Dicephalic calf showing faulty developed hoof (HF)

Plate II: The dorsal view of the heads showing the left ear (E1) on the left head and the right ear (E2) on the right head

Plate III: Photograph of the tongue of the dicephalic calf showing a duplicated tongue with a common base

Plate IV: The ventral view of dicephalic heads showing the points of fusion (PF), where the right mandible (RM) of calf 1 meet with the left mandible (LM) of calf 2 at the mandibular angles of both heads. The dicephalic skull had two jaws, lower jaw of calf 1 (LJ1) and lower jaw of calf 2 (LJ2) with a single trachea (TR)
The calf had abnormal dentition on both heads. The middle incisors were fused (Plate V) on both heads. The two skulls were joined at the mandibular angles of both heads. The heads had a common neck (Plate VI and VII). The rump length of the calf from the mid head to the base of the tail was 26.5 inches in both skulls. In contrast, the length between the nostrils to the medial canthus of the eye was 4.0 inches and 4.5 inches for the left and right heads, respectively.

**Discussion**

Dicephalus beasts have been reported in various breeds of cattle worldwide with high incidence in female as also seen in this case. The gross anatomical observations reported in this case are similar to those reported by Ate et al. (2011). Most reported cases of dicephalus in cattle in Nigeria are associated with the Bunaji breed of cattle (Ate et al., 2011; Ajayi et al., 2012; Salami et al., 2011). This is probably because this breed is the most common and widespread breed of cattle found in Nigeria. The true incidence of these birth defects in this breed of cattle is unknown as only cases that attracted veterinary attention were reported.

There is a lot of ongoing debate on the aetiopathogenesis of these dicephalic monsters among various scientists but the most prominent theories are those of “partial fission” and “secondary fusion” of embryos (Boer et al., 2019). In this report, the cause of the anomaly could not be determined but as suggested by Ajayi et al. (2012), teratogenic plants might have played a significant role. This is because the Bunaji cattle are predominantly reared by Fulani herdsmen who practice nomadic farming and also ethno-veterinary practices (Leeflag, 1993) for disease management. Leipold et al. (1972) reported that identical twins are rare in cattle, with conjoined twins occurring approximately once in every 100,000 births. However, Ajayi et al. (2012) reported two dicephalic
anomalies in one abattoir within seven months, where an average of 200 head of cattle were slaughtered per day. This suggests that with increased surveillance, more of these cases may be identified, and scientists may be able to trace their triggers.

This cow was obviously salvaged due to unresolved dystocia. Animals that are sold for salvage slaughter are disposed at ridiculous amounts in addition to loss of the calf with resultant economic impacts on the owner. However, Salami et al. (2011) recommended that culling of the parent stock may be the best way to avoid future occurrence of these abnormalities in a livestock farm especially if the cause is genetic.

Acknowledgement
The authors wish to acknowledge the contribution of the butchers at Wurukum cattle abattoir, Makurdi, in reporting this unusual case.

Conflict of Interest
The authors declare that there is no conflict of interest.

References


