

- Case report -

## Craniofacial Duplication (Diprosopus) in a Domestic Lamb (*Ovis aries*)

Omobowale, T.O.<sup>1</sup>, Igado, O.O.<sup>2\*</sup>, Abiola J.O.<sup>1</sup>, Adeniji, S.A.<sup>3</sup>  
Omirinde, J.O.<sup>2</sup>

<sup>1</sup> Department of Veterinary Medicine, University of Ibadan, Ibadan, Nigeria.

<sup>2</sup> Department of Veterinary Anatomy, University of Ibadan, Ibadan, Nigeria.

<sup>3</sup> Department of Animal Science, University of Ibadan, Ibadan, Nigeria.

With 2 figures

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### Abstract

A case of craniofacial duplication is described in a West African Dwarf lamb. The major gross anatomical malformations were only observed in the head. Physical examination revealed two heads which were joined laterally at the region of the angle of the mandible, resulting in the name diprosopus (dicephalus monopygus dibrachius). This is probably the first documented report of this particular type of congenital duplication in Nigeria.

**Keywords:** Dicephalus, dibrachius, diprosopus, sheep, Nigeria.

### Introduction

Congenital defects have been described as abnormalities present at birth, which result from errors arising during development (Noden and de Lahunta, 1985) and they have been

widely reported in different species. Congenital duplication (synonyms: conjoined twins, Siamese twins or anomalous twinning) is an interesting form of congenital defects, since it involves two individuals. It is as a result of monozygotic twins which are imperfectly separated, and have the same mode of origin as identical twins. It has been reported to occur in different forms, ranging from slight duplication to two virtually separate individuals, and may be seen as free or attached symmetrical or free or attached asymmetrical (Dennis, 1975). It is most commonly reported in cattle (Corbera *et al.*, 2005), but has also been reported in the dog (Nottidge *et al.*, 2007), goat (Corbera *et al.*, 2005), and sheep (Dennis, 1975; Cazabon and Adogwa, 2003).

The report presents an anomalous duplication of the head (dicephalus unipagus dibrachius) in Uda sheep.

## Case Description, Radiological Findings and Necropsy

A stillborn female lamb, which was delivered without obstetrical assistance, was presented to the Veterinary Teaching Hospital, University of Ibadan, Nigeria. The mother had lambled uneventfully about a year previously without any obstetrical assistance and was raised semi-intensively with some other ewes, and allowed to wander and graze for feed.

External physical examination of the lamb revealed duplication of the head, which was connected by a single neck to the rest of the body. The two heads appeared identical in size and colour markings. Two distinct mandibular bones were observed, which appeared fused medially at the angle of the mandible. Two normal sized ears were placed laterally, on either side of the two heads, while one small ear was placed medially, between the heads. The small ear did not possess a patent auditory meatus (Figure 1).

Necropsy revealed a single vertebral spine with a single enlarged atlas (first cervical bone). It revealed also two tongues, which possessed a common root thereby giving it a 'Y'-shaped appearance (Figure 2). There was a single enlarged epiglott-

is, a single trachea and a single thyroid gland. The appearance of the contents of the thoracic, abdominal and pelvic cavities appeared normal and consistent with that of a normal female lamb. Dissection of the brain revealed the two cerebral hemispheres joined at the temporal and the occipital lobes. The brain possessed a single enlarged cerebellum. Ventrally, the brainstem was 'Y'-shaped, bifurcating rostral to the cerebellum (rostral to the rhomboid fossa), to bear the two cerebral bodies. The cerebral basilar artery was single at the origin, but bifurcated into two, rostrally.

## Discussion

Congenital anomalies, defects and abnormalities include functional and morphological imperfections. They may be compatible with life but are lethal, thereby responsible for great neonatal mortality (Smolec *et al.*, 2010). The congenital anomaly in this case report (craniofacial duplication) was probably incompatible with life as the lamb was stillborn. Conjoined or fused symmetric twinning describes a condition where each component is complete but conjoined at several body regions (for example, thoracopagus, pygopagus, cranio-pagus and ischiopagus). Incomplete conjoined twins may result in a duplication of the cranial region (diprosopus or

dicephalus) (Corbera *et al.*, 2005). A double head can be classified as dicephalus diprosopus.

Based on the gross anatomical findings, this malformation was classified as dicephalus monopygus dibrachius. As in this case, embryonic duplications are of great importance since they are usually associated with dystocia and reproductive wastage (Dennis, 1975). Embryonic duplications have been most commonly reported in cattle (1 in every 100,000 births), but less commonly in other ruminants (Roberts, 1986). The specific aetiology is usually not known, but genetic factors or environmental factors or both have been implicated. Toxic plants, trace elements, infectious agents and physical agents such as hyperthermia, undue pressure during rectal palpation in early pregnancy and irradiation has also been identified as teratogens in the cow (Saperstein, 2002). Other possible aetiological agents include nutritional deficiencies, endocrine disturbances, extremes of temperature during pregnancy, drugs and chemicals (Smolec *et al.*, 2010).

The formation of a normal foetus is dependent on complex intracellular, intercellular and tissue temporal-spatial interactions. In cases where no teratogenic agent is 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 aetiology of the abnormality in this particular case could not be ascertained, but it is speculated to be due to environmental factors, toxic plants and infectious agents (or a combination of any of these) since the ewe was allowed to graze freely before and during pregnancy, and there was no previous history of a similar occurrence on the farm.

There has been a recent increase in the reporting of birth anomalies in sheep (Spiers *et al.*, 2010; Samuel *et al.*, 2013). To the best of the authors' knowledge, this is probably the first report of dicephalus monopygus dibrachius in sheep in Nigeria. The manager of the farm was advised to introduce a new male into the farm for breeding, reduce indiscriminate roaming by the animals for feed and also against using this ewe for future breeding purposes.

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#### Corresponding Author

Dr. Olumayowa O. IGADO  
Comparative Anatomy, Neuroscience and Environmental Toxicology Unit,  
Department of Veterinary Anatomy,  
University of Ibadan, Nigeria.  
+23408035790102  
mayowaigado@yahoo.com



Figure (1): Craniofacial duplication in lamb. Note the single, non-patent medially placed ear (arrow). Full length of the lamb is shown as inset. Note that duplication was only observed in the head region.



Figure (2): The conjoined tongues, possessing a common root (arrow)

## Animals of this issue

### Sheep (*Ovis aries*)



Kingdom: Animalia & Phylum: Chordata & Class: Mammalia & Order: Artiodactyla & Family: Bovidae & Subfamily: Caprinae & Genus: *Ovis* & Species: *O. aries*

**Sheep (*Ovis aries*)** are quadrupedal, ruminant mammals typically kept as livestock. Like all ruminants, sheep are members of the order Artiodactyla, the even-toed ungulates. Although the name "sheep" applies to many species in the genus *Ovis*, in everyday usage it almost always refers to *Ovis aries*. Numbering a little over one billion, domestic sheep are also the most numerous species of sheep. An adult female sheep is referred to as a *ewe* (*/juː/*), an intact male as a *ram* or occasionally a *tup*, a castrated male as a *wether*, and a younger sheep as a *lamb*.

Depending on breed, domestic sheep may have no horns at all (i.e. polled), or horns in both sexes, or in males only. Most horned breeds have a single pair, but a few breeds may have several.

Another trait unique to domestic sheep as compared to wild ovines is their wide variation in color. Wild sheep are largely variations of brown hues, and variation within species is extremely limited. Colors of domestic sheep range from pure white to dark chocolate brown and even spotted or piebald.

Source: Wikipedia, the free encyclopaedia