

Case Report of a Congenital Defect (Dicephalus) in a Lamb

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Abstract: Dicephalus or duplication of the head is a kind of conjoined twinning by which two animals have been partially separated in the head region. This anomaly has been observed extremely rarely in horse, occasionally in dog and cat and not uncommonly in cattle and sheep. From a four-year-old pregnant ewe a dicephalic malformed male lamb with 2.19 kg weight and crown-rump length of 37 cm was born with caesarian operation. The lamb died shortly after birth and was dissected for gross anatomical or histopathological studies and also the peripheral blood smears was taken for blood cell morphology and parasite infestation. The Lamb had a single body with duplicated heads (Dicephalus) and the two heads were connected by the occipital, temporal and hyoid bones regions. No gross or pathological lesions in different organs of the lamb as well as no hematologic disorder in the peripheral blood smears were observed. In conclusion, study of congenital defects is an important branch of comparative pathology, which is infrequently reported in veterinary practice.

Key words: Congenital Defects · Dicephalus · Lamb · Gross Anatomy · Histopathological

INTRODUCTION

Congenital defects are structural or functional abnormalities and can affect on isolated portion of a body system, entire system or parts of several systems and may cause obstetrical problems [1]. It has been demonstrated that the majority of human and animal malformations are due to multifactorial etiology [2]. Congenital defects are induced by genetic or environmental factors (infectious diseases, viruses, drugs, poisonings, plants, mineral salts and vitamin (A, D, E) deficiency), hormonal factors and physical reasons or by their interactions [3-5].

Many congenital abnormalities affecting different species are widely described in the literature [6]. Congenital defects are recognizable before birth (prenatally), at birth, or years later. Conjoined twins and embryonic duplication can be defined as a progressive series of malformations, ranging from a partial duplication

of a part of the body to the almost total formation of 2 individuals. Classifications of these abnormalities are named differently according to the location of duplication and its geometrical shape [2, 7-9]. Conjoined twins have been reported in farm animals such as sheep and cattle [10, 11]. The incidence of conjoined twins is reported from 1 in 50,000 to 1 in 100,000 births [12, 13].

It is thought that conjoined twins are more common in cattle than in other domestic animals. In addition, incidences of craniofacial defects are higher in sheep than in other domestic animals.

Dicephalus is described as an abnormality of incomplete separation of heads resulting from twinning in humans and animals [10, 14]. The reported incidence of dicephalus is 2 in 27 anomalous twin lambs [15]. The aim of the present study was to describe some gross anatomical abnormalities in a neonatal dicephalus lamb.

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Case History: A 4-year-old pregnant ewe belonging to a flock with 210 sheep and 97 goats was referred to the local veterinary clinic located in Sirvan city of the Ilam Province.

The delivery could not be completed normally and so cesarean section was carried out and a dicephalic malformed male lamb with 2.19 kg weight and crown-rump length of 37 cm was born. Two heads were joined together at the occipital, temporal and hyoid bones area of the cranium and the distance between two heads was 5 cm. Lamb was suffering from respiratory distress and lethargy and died one hour after birth.

The dead lamb was dissected for gross anatomical studies and also the peripheral blood smears was taken for blood cell morphology and parasite infestation. In addition, for microscopic investigations, some histopathological specimens were obtained from all visceral organs and after staining by Hematoxyline and Eosin stain, the specimens were studied under light microscope. There was no history of congenital abnormalities in the flock.

RESULTS AND DISCUSSION

No gross or pathological lesions in different organs of the lamb as well as no hematologic disorder in peripheral blood smears were observed. The lamb had a single body with duplicated heads and was classified as Dicephalus. The two heads were joined from the temporal region (Figure1).



Fig. 1: View of the single body with duplicated heads of the lamb



Fig. 2: Morphologic view of the heads

The neonate had two separate heads and two brains with a single neck. There was no bony joint between the heads, but they were joined together by muscular tissue at occipital and temporal regions. The lamb had a single body with duplicated heads and was classified as a cranial duplication (Dicephalus).

Both brains and medulla spinalis were normal. The dicephalus lamb had four eyes, four ears; two mandibles, two maxillae, two forelimbs, as well as a single nasopharynx, oropharynx, laringopharynx and normal tongue were present in each head. The widened common larynx and pharynx opened into a single trachea and esophagus, respectively. However, its trunk and hind limbs were normal single (Figure 2).

The abdomen and other body systems were normal. The central nervous system had a normal anatomical appearance.

There are two hypotheses for the causes of concrete twins; the first refers to the twins being separated from a single embryo and second to hang the two fetuses in uterus [16].

All conjoined twins are monozygotic in origin and represent incomplete division of 1 embryo into 2 components, usually at some time during the primitive streak stage. It is also possible to have duplication of one part of the future axial (and adjacent) structures. These usually arise during primitive streak elongation or regression [17].

Many conditions that are related to most of the congenital defects in human and animals have been reported.

Teratogens including toxic plants, infectious agents, drugs, trace elements deficiencies and physical agents such as radiation, hyperthermia and embryo manipulations, are in the scope of possible other factors that may cause this congenital defect [3]. They induce alterations in oocyte structure, maturation and organogenesis probably as a result of some metabolic or circulatory disturbances, on the basis of a not well-known mechanism. Genetic defects are conditions caused by abnormalities in genes or chromosomes. These pathological or pathophysiological defects result from mutant genes or chromosomal aberrations. The best known genetic defect in sheep results from autosomal recessive genes [2,3]. Ewes have the highest incidence of craniofacial defects in mammals, including man [3]. Congenital defects in sheep are probably more common than reported in the literature. Cranial defects are the most common congenital duplication [2, 14, 18].

It means that congenital defects, especially in sheep, are probably more common than reports indicate. In fact, because of the method of husbandry prevailing in most sheep [19] and other species breeding, many defective animals are not observed.

In the present study with the limited information available, causes of this sporadic case cannot be determined. However, although it is not known if the duplication in this case is caused by genetic or environmental factors, genetic factors are more suspected.

In conclusion, study of congenital defects is an important branch of comparative pathology, which is infrequently reported in veterinary practice.

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