

Cranial Duplication (Dicephalus) in a Lamb

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Abstract: A case of cranial duplication (Dicephalus) was described in a newborn lamb. The radiographic and macroscopic examination was performed after the cesarean section. The lamb's heads were not completely separated. A complete nasopharynx, oropharynx, laringopharynx, and normal tongue were present in each head. The lamb died shortly after birth.

Key Words: Conjoined twins, dicephalus, lamb

Bir Kuzuda Kranial Duplikasyon

Özet: Bu çalışmada yeni doğan bir kuzuda kranial duplikasyon (Dicephalus) tanımlanmaktadır. Sezaryen operasyonundan sonra makroskopik ve radyografik muayenesi yapıldı. Kuzunun başları tam olarak ayrılmamıştı. Her kafa bir nazofarinks, bir orofarinks, bir laringofarinks ve normal bir dile sahipti. Kuzu, operasyondan kısa bir süre sonra öldü.

Anahtar Sözcükler: Yapışık ikiz, disefalus, kuzu

Introduction

Many congenital abnormalities affecting different species are widely described in the literature (1). Congenital defects are abnormalities of structure and function that are recognizable before birth (prenatally), at birth, or years later. They may affect a single anatomic structure or function, whole system, or part of several systems. 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 (2-5).

Congenital duplications are a subject of interest because they can form a graded series from slight duplication to near separation of 2 individuals (1). Shojaei et al. (6) postulated that conjoined twins are imperfectly

separated monozygotic twins. 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 (7,8). To contribute to the knowledge of congenital defects, the morphological features of cranial duplication (dicephalus) are described in this case report.

Case History

A 3-year-old Akkaraman sheep was brought to the Department of Obstetrics and Gynecology, Faculty of Veterinary Medicine, Dicle University, Diyarbakır, Turkey. A dicephalic lamb was detected after vaginal examination. The delivery could not be completed normally and so cesarean section was carried out. A malformed newborn female lamb was born at term. A 2-headed lamb was

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delivered. The dam had given birth to 1 normal lamb previously. There was no additional maternal history or pedigree information about the sire. The lamb died a few minutes after being born. The dam and lamb were not examined for viruses known to induce congenital anomalies.

Results and Discussion

Anatomic and pathologic examinations were performed for detecting anomalies in the lamb. The lamb had a single body with duplicated heads and was classified as a cranial duplication (Dicephalus) (Figure 1).



Figure 1. View of the 2-headed lamb.

The dicephalic lamb had 4 eyes, 4 ears, 2 mandibles, 2 maxillae, 2 forelimbs, and 2 hindlimbs. A complete 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 (Figure 2). The skulls of the lamb had a single wide cervical vertebra column and one pair of occipital bones. The paired and unpaired bones of the skulls, which had a single skullcap, were formed, resulting in a Y-shaped figure (Figure 3). After the skull was opened, the central nervous system was found to be edematous with incipient post-mortem changes. The lamb had 2 separate brains and 2 cerebella. The remaining body tissues and organs were visually within normal limits.



Figure 2. Morphologic view of the 2-headed lamb. L: Larynx, E: Esophagus, T: Trachea, S: Sternum.



Figure 3. Radiographic view of the dicephalic lamb. RS: Right Skull, LS: Left Skull, CV: Cervical Vertebrates.

Numerous teratological developments are described in the literature regarding all species of domestic animals. The most severe ones among them may even cause premature death of the conceptus, abortion, mummification, and stillbirth. Less severe aberrations lead to varying degrees of structural abnormalities that may cause dystocia (8). 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 (2,9). Congenital defects in sheep are probably more common than reported in the literature. Cranial defects are the most common congenital duplication (2,8,10).

In conclusion, many conditions that are related to most of the congenital defects in human and animals have been reported. Teratogens include toxic plants, infectious agents, drugs, trace elements deficiencies, and physical agents such as radiation, hyperthermia, and embryo manipulations, which are in the scope of possible other factors that may cause this congenital defect (9). Since there is no recorded history about the mother of the lamb and due to the inability to detect a causative agent, it is not possible to ascertain the cause of this anomaly. 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 suspected.

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