

Pulmonary Sequestration and Bronchogenic Cyst in a Calf

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Two-day-old, Simmental calf was presented with a pediculated subcutaneous mass arising from midline of lower cervical region. The mass covered by the skin was removed surgically. Histological features of the mass were of underdeveloped lung tissue containing bronchogenic cyst. The bronchioles had excessive in number and the bronchi were hypoplastic and had no cartilaginous ring. The concurrent occurrence of a subcutaneous pulmonary sequestration and a bronchogenic cyst was noted as bronchopulmonary foregut malformation in a calf. As a result, this case report indicated that pulmonary sequestration and bronchogenic cyst have common embryonic pathogenesis.

Key Words: Pulmonary sequestration, bronchogenic cyst, calf,

Bir Buzağıda Rastlanan Akciğer Sekestrasyonu ve Bronkojenik Kist Olgusu

İki günlük Simental ırkı bir buzağıda boyun bölgesinin alt kesimlerinde deri altında orta hat boyunca yerleşim gösteren kitle cerrahi olarak uzaklaştırıldı. Histolojik özellikleri bakımından kitlenin bronkojenik kist içeren ve gelişimini tamamlamamış bir akciğer dokusundan oluştuğu ortaya kondu. Bronşların hipoplastik oldukları ve kıkırdak içermedikleri, bronşçukların sayıca aşırı miktarda oldukları saptandı. Bu olgu sunumuyla ön bağırsak yapılış bozukluğu olarak buzağılarda akciğer sekestrasyonu ile birlikte bronkojenik kist olgusu bir arada ilk kez ortaya konmuş olup, bu bulgu akciğer sekestrasyonu ve bronkojenik kist oluşumunun benzer bir mekanizmaya dayandığını da göstermesi bakımından önemli bulundu.

Anahtar Kelimeler: Akciğer sekestrasyonu, bronkojenik kist, buzağı,

Introduction

The prevalence of congenital bronchopulmonary malformations is unknown in animal species, but they generally are thought to occur rarely. Probably, the most commonly reported bovine bronchopulmonary abnormality is abnormal mass of nonfunctioning lung tissue development apart from the original site of lung including abdominal, thoracic or subcutaneous locations. The term of 'ectopic or accessoric lung' has been used to describe to this lesion in standard veterinary pathology textbooks (1, 2, 3), however various terms such as heterotopic lung, ectopic lung, bronchopulmonary foregut malformation or pulmonary sequestration have been used interchangeably to describe this abnormality in separate bovine case reports (4, 5, 6, 7).

In human medical literature, the same term 'accessory lung or accessory lobe' was renamed as pulmonary sequestration to define abnormal mass of nonfunctioning development of lung tissue anywhere in the body (8). Bronchogenic cysts are another congenital anomalies resulting from anomalous development of the ventral foregut; they are usually single but may be multiple. They have been found all along the tracheoesophageal course, pulmonary parenchyma, neck, abdomen, and lumbar regions (4). To the best of authors' knowledge, as a lung bud malformation, no concurrent occurrence of pulmonary sequestration and bronchogenic cyst is available in veterinary literature, whereas in human medicine, concurrent occurrence of bronchogenic cyst and pulmonary sequestration was reported in only 3 among the approximately 900 cases of pulmonary sequestrations (9). This case report describes morphologically a subcutaneous lung sequestration enmeshed with bronchogenic cyst in a calf.

Case Report

Two-day-old, Simmental crossbred calf was presented with a pediculated subcutaneous mass situated on the midline of lower cervical region at aperture thoracis cranialis. The calf was fully developed female and born at full term.

The mass which had initially been noted on the day of parturition was not associated with dysphagia, airway obstruction or previous trauma. It was ovoid appearance with 5-6 cm in diameter and freely movable and was covered and well protected by the skin. Cytological examination of the needle aspiration revealed the presence of scattered macrophages and a few neutrophil leucocytes. Ventro-dorsal and latero-lateral chest radiographs showed that the mass located in sternal manubrium. After injection of contrast medium, the mass did not showed enchancement. On request of surgical removal of the mass by the owner, the operation site on the lower neck was prepared and after premedication and local infiltration anesthesia, a 15 cm straight incision was made centered over the mass, attached to apertura thoracis cranialis by a fibrovascular pedicle containing an artery and a ligamentous structure.

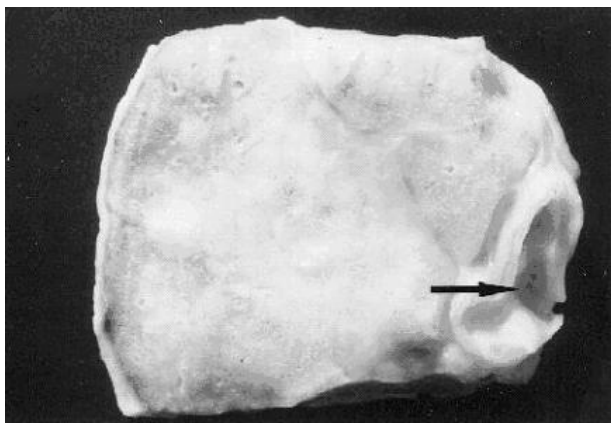


Figure 1. Section across pulmonary sequestration with a bronchogenic cyst (arrow).

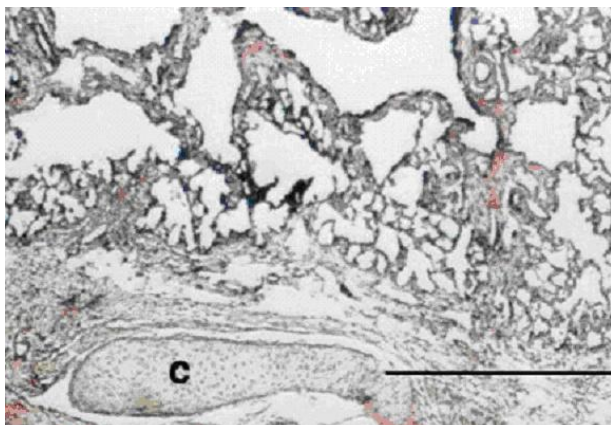


Figure 2. Small island of hyaline cartilage (c) within the interstitial tissue of the lung tissue, H&E, Bar:20µ.m

The artery was approximately 5-6 mm in diameter. There was apparently no communication with gastrointestinal tract. Following the proper ligation, the mass was completely removed. It weighed 350 g, had fleshy and edematous appearance and measured 5x6x6 cm. Serial sectioning of the specimen revealed a multicystic cyst, approximately 1 cm in diameter, its inner surface was separated and white, containing

serous and clear fluid (Fig-1). Formalin fixed tissue samples were processed routinely and paraffin embedded tissue samples were stained with hematoxyline-eosin.

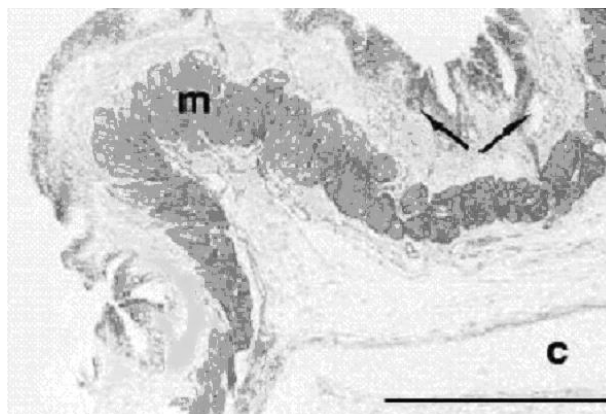


Figure 3. The bronchogenic cyst containing respiratory epithelium, muscular layer (m) and cartilage (c) and mucous glands (arrows), H&E, Bar:50 µ.

Histological examination of the tissue specimens revealed that the mass was underdeveloped lung tissue which was rich in loose connective tissue along with bronchioles and alveolar structures. The lung tissue was covered by both pleura and the skin. Microscopically, the bronchioles were present in excessive number and dilated appearance containing simple columnar or cuboidal epithelium. The bronchi were hypoplastic and had no cartilagenous ring. The alveoli were also not fully developed and some alveoli and respiratory bronchioles were dilated. Alveolar spaces contained focally hemosiderin laden macrophages. Focal irregular lymphoid aggregates in paranchymal tissue were also present. Mild to moderate peribronchial fibrosis and isolated cartilagenous tissue were the additional findings detected (Figure-2). The cyst wall was composed of ciliated pseudostatified columnar epithelium, hyaline cartilage and mucous glands (Fig-3).

Discussion

There are 31 cases of bovine pulmonary sequestration in the literature. Sixteen of the cases (52.41%) are intra-abdominal sequestration, whereas 3 (9.68%) and 12 cases (38.71%) showed intrathoracic and subcutaneous locations, respectively. Two of the cases were fetus, one was 2-years-old and 5 were 2-5 weeks of age, and the remaining 23 calves were newborn. Subcutaneous sequestrations were located on neck, sacrum, shoulder (3 cases), thoracic inlet, head, left side of sternum, lumbar (2 cases), anus and unknown (4, 5, 6, 7). Referring particularly to subcutaneous sequestrations, the overall good prognosis is determined by only few secondary congenital skeletal defects due to pressure of the sequestered lung and difficulty in delivery (5, 7). Histological features of the sequestered lung was similar to those previously reported that bronchial hypoplasia and poorly developed alveoli

were co-existent findings in almost all of bovine pulmonary sequestrations cases (7). Both pulmonary sequestration and bronchogenic cyst are considered as foregut malformation. The theory concerning how foregut malformation arise is that they are formed by extranumary lung bud that arises caudal to normal lung bud, and migrates caudally along with growing esophagus (8). The cyst was apparently fulfilled to the histological criteria of the bronchogenic cyst such as

pseudostratified epithelium, hyaline cartilago and muscular layer (8, 9). Although, small island of hyaline cartilage within the interstitium has not been reported in bovine sequestration cases, it was reported in pulmonary sequestration cases in man (10). The findings of present study showed that pulmonary sequestration and bronchonic cyst have common embryonic pathogenesis.

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