



Diagnostic Exercise

From the Latin Comparative Pathology Group and the Davis-Thompson Foundation

Ultimobranchial body cyst in a neonatal goat

Tatiana Paz^{1*}, Eileen Henderson², Javier Asín², Francisco A. Uzal²

¹Veterinary Microbiology and Molecular Biology Laboratory, Veterinary Medicine Faculty, Federal University of Mato Grosso, MT, Brazil. ²California Animal Health and Food Safety Laboratory System, San Bernardino Branch, School of Veterinary Medicine, University of California-Davis, San Bernardino, CA, USA.

*Corresponding Author: tpazc@unal.edu.co

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History and clinical signs:

A two-day-old black and white pygmy goat kid was presented to the California Animal Health and Food Safety Laboratory – San Bernardino Branch, for euthanasia and necropsy with a history of what appeared to be a fluctuant mass under the skin of the ventral side of the neck. On clinical examination, an approximately 10 cm in diameter, fluid-filled structure was palpated under the skin along the ventral aspect of the neck (Fig 1). The goat kid had pronounced dyspnea and distress particularly during palpation. Euthanasia was performed with an overdose of barbiturate and a full necropsy was performed.

Autopsy findings:

Autopsy was performed after euthanasia with an overdose of barbiturate. Dissection of the neck revealed a cyst that was compressing the adjacent esophagus and trachea. The cyst contained approximately 200 ml of tan cloudy fluid. Upon sectioning the cyst, a soft white material was observed, loosely adhering to the inner wall of it (Fig. 2).

- Histological findings:
- Pathological condition
- Most likely differential diagnoses:

ANSWERS

Ancillary test results: samples were collected using sterile swabs from the contents of a cyst located in the cervical region of a goat, under aseptic conditions for subsequent microbiological analysis. The samples were cultured on appropriate

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media, and after the corresponding incubation period, colonies compatible with *Streptococcus* spp. and *Escherichia coli* were observed.

Follow-up questions:

(1) Histological findings: The cyst was lined by keratinized, stratified squamous epithelium surrounded by scattered thyroid follicles (Fig 3 A). The epithelium lining

the cyst was multifocally eroded to ulcerate, and coated by neutrophils, fibrin, and bacteria. Additionally, scattered lymphocytes and plasmatic cells were observed infiltrating the wall of the cyst (Fig 3 B).

(2) Pathological condition: Ultimobranchial body cyst.

(3) Most likely differential diagnoses: Thyroid and/or parathyroid neoplasia, lymphoid and/or thymic neoplasia, abscess.

Comments:

Branchial cysts are congenital malformations that occur during the formation of the branchial arches, characterized by hollow areas filled with fluid and desquamated cells. They are generally painless, slow-growing structures in the cervical region, and are more common in young individuals than in adults. When they originate from the fifth branchial arch, they are known as ultimobranchial body cysts (5).

In goats, the only recorded congenital anomaly in the thyroid lobes has been ultimobranchial cyst. Ultimobranchial cysts in goats are predominantly located in the hilar region and are spherical to oval, appearing as either solitary or multiple cysts within the parenchyma (3).

Clinical findings are often unspecific, as the presence of swellings in the neck, which appear spontaneously, are usually reported. In humans, these cysts appear to be more common in children or neonates, similar to the case presented here. However, in horses, these cysts may also occur in adult animals. These swellings tend to grow considerably over time, but they generally do not cause discomfort or pain. However, they may exert pressure on adjacent structures such as the trachea, leading to difficulty swallowing or breathing.



Figure 1. An approximately 10 cm in diameter, fluid-filled structure was under the skin along the ventral aspect of the neck.

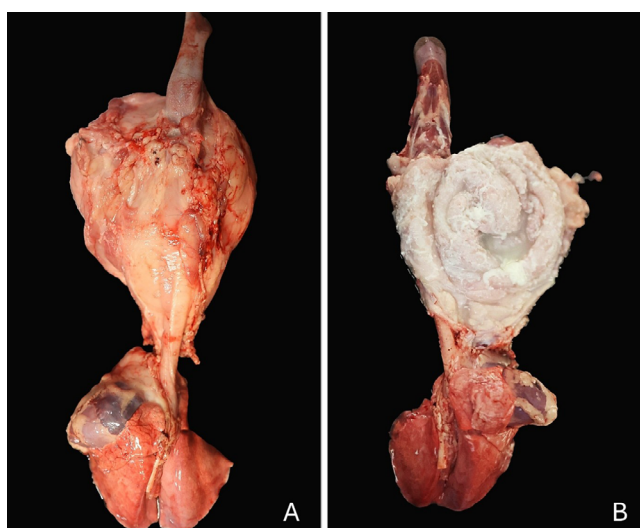


Figure 2. Subcutaneous cyst. A. There is a cyst attached to the esophagus and trachea. B. On cut section, the fluid-filled cyst contains tan, cloudy fluid and soft, friable, white material loosely adhered to its wall.

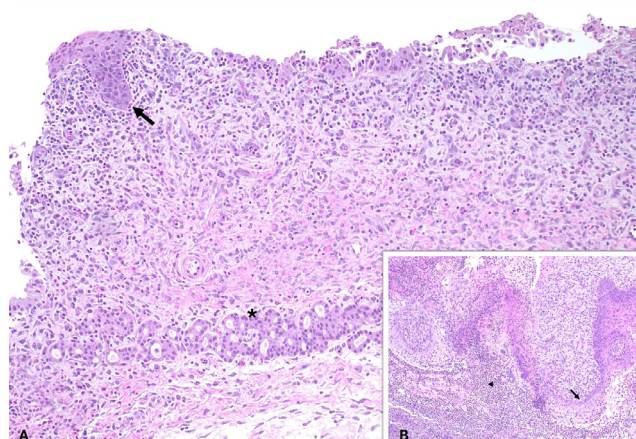


Figure 3. Wall of the cyst. A. The cyst is lined by stratified, keratinized squamous epithelium (arrow) and is peripherally surrounded by the remaining thyroid tissue (asterisk). B. The stratified squamous epithelium lining the cyst is multifocally ulcerated (arrow) with abundant leukocytes, mainly neutrophils (arrowhead) with bacterial colonies infiltrating the subepithelial stroma and extending into the lumen of the cyst. HE.

This is like what was observed in this goat kid, where marked dyspnea was noted during the physical examination (2-5).

Grossly, branchial cysts typically contain amber to brown fluid, with low cellularity and high protein concentration, and may show mineralization. Numerous cholesterol crystals and calcium deposits are often observed. The fluid obtained from the cyst in this goat kid was cloudy and turbid; additionally, soft white to tan fibrillar material was adhered to the cyst wall. These changes can likely be attributed to a secondary bacterial infection, with *E. coli* and streptococci isolated in aerobic culture (2-5).

Histological evaluation typically provides key diagnostic clues that help exclude other potential masses in the neck, the presence of thyroid tissue in the margins of the lesion also supports this diagnosis. These structures are characterized by fibrous, thick capsules lined by stratified, keratinized squamous epithelium (2-5). In this case, the cystic structure had the described epithelium, although neutrophils, fibrin, and bacteria were also identified, covering the ulcerated subepithelial stroma.

The main differential diagnoses for ultimobranhial cysts include other congenital anomalies, such as duplication of the thyroglossal duct, tracheal, bronchial, or esophageal anomalies. However, the exclusion of these diagnoses is made through macro and microscopic characterization of the lesion, where the location of the cyst in the thyroid gland and the presence or absence of C-cells must be demonstrated, confirming that the accessory thyroglossal tissue does not

contain these cells (1). Cholesterol crystals also appear to be a characteristic finding of cysts, as they are associated with the degenerative squamous epithelial cells of the cysts. However, they can also be linked to sites with old hemorrhage or tissue necrosis (2,4).

References:

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