



Case Report

Biliary cystadenoma in a lion (*Panthera leo*)

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Abstract

Animals in human care often exceed the life expectancy of animals in the wild when they have veterinarian follow-ups, no competition for space or food, and continuous care. Advanced age favors the development of mutations that often trigger cancer, which sometimes causes death. There are reports in the literature on neoplasms in lions in the liver, which are one of the main organs affected. A 20-year-old lion specimen was received for necropsy at the Federal University of Paraná, Curitiba, Brazil. Multiple cystic dilations were observed in the liver. Histologically, they were internally covered by a simple cuboidal epithelium, similar to that observed in the bile ducts, without cellular atypia. The adjacent liver parenchyma presented with mild disorganization of the hepatocyte cords. Biliary cystadenomas are benign growths formed by a thin opaque capsule filled with a slightly yellowish translucent fluid compressing the adjacent liver parenchyma, as highlighted in this case. The epithelium of the cysts was positive for anti-cytokeratin (CK) (EIA/A3E) and anti-CK7, confirming histogenesis in the bile ducts. This study reports a case of biliary cystadenoma in a *Panthera leo* specimen.

Key words: Neoplasia, zoological pathology, liver

Introduction

Remarkable improvements in nutrition, handling, and veterinary follow-up have increased the life expectancy of wild animals kept in conservation and research institutions, and degenerative and neoplastic diseases have been reported to be increasing (6). The occurrence of neoplasms in domestic and wild felids is frequently reported, and studies have shown that they are one of the main causes of morbidity in these animals in human care (8).

Liver primary neoplasms comprise 0.8–2.3% of neoformations in dogs and cats (3). In lions, both malignant and benign liver neoplasms have been reported (2, 5). Biliary cystadenomas can be classified as extra and/or intrahepatic, characterized by isolated or coalescent cystic growth that can be confused with malignant liver lesions (1).

However, the exact origin of this lesion remains unclear. It is suspected that this may have originated from aberrant congenital bile ducts. In humans, there is a high prevalence of this neoplasm in women, suggesting a hormonal influence on histogenesis (7). Cystadenomas appear to precede malignant lesions (adenocarcinomas),

which is important in the assessment of a patient's prognosis.

Previous studies have demonstrated the occurrence of this lesion in lions (8); however, literature on this species is scarce and sporadic. This study aimed to report the *post-mortem* diagnosis of a hepatic biliary cystadenoma in a 20-year-old lion, emphasizing the importance of necropsy in wild animals and the consequent histological and immunohistochemical analysis of the lesions.

Case description

A 20-year-old specimen of *Panthera leo* from the Municipal Zoo of Curitiba was received for necropsy at the Veterinary Hospital of the Federal University of Paraná, Curitiba, Paraná, Brazil. The animal showed progressive weight loss, without any other clinical signs. During the gross evaluation, multifocal cystic areas were observed in the liver parenchyma, which ranged from 3 to 20 cm in diameter (Fig. 1). These cysts had a thin whitish capsule <0.1 cm (Fig. 2) and demonstrated a slightly greenish liquid and translucent substance at the cut surface. Fragments were sectioned and fixed in 10% buffered formalin solution for

subsequent routine histological processing, embedded in histological paraffin, sectioned (4- μ m thick), and stained using hematoxylin and eosin stain for evaluation under a routine optical microscope. Histologically, the cysts were coated with simple cuboidal epithelium, similar to bile ducts, and showed no cell atypia, expanding and replacing the liver parenchyma (Fig. 3). No significant changes were observed in the other organs. Histological sections were subjected to immunohistochemistry to evaluate cytokeratin expression. Anti-cytokeratin (CK) (AIE/A3E) and anti-CK7 antibodies were used for this purpose. Pancytokeratin confirmed the epithelial origin of the lining epithelium of the cystic structures, and CK7 confirmed the origin of the biliary epithelial markers of these cells (Fig. 3).

Discussion

Reports of neoplasms in large cats, such as lions, are scarce, with no exact data on the frequency of these lesions, and the liver is one of the most affected organs (3).

In humans, cystadenomas account for approximately 5% of cystic liver lesions (4), which may or may not be histologically covered by a mesenchymal stroma similar to that observed in the ovary. The cystic lesions observed in this case were exclusively covered by a simple cuboidal epithelium.

These cystic lesions must be differentiated from malignant liver neoplasms, which may have similar macroscopic characteristics and require histological evaluation to confirm the diagnosis. Cellular atypia or dysplasia was not observed in the histological sections of this animal. Likewise, biliary cystadenomas must be

differentiated from peribiliary cysts, as previously described for this species (10). The latter are formed in the connective tissue of the hepatic hilum, whereas cystadenomas are formed in the middle of the hepatic parenchyma.

Clinical pictures associated with this lesion are rarely observed and are associated with compression of the hepatic parenchyma adjacent to the cysts, which hinders the drainage of the biliary tract. Depending on the extent of the lesion and area of the liver parenchyma occupied by the cysts, problems secondary to liver failure and alterations caused by compression of the abdominal vena cava can be observed (4). In this case, since the animal did not present clinical evidence of alterations in liver function, the lesion was a necropsy finding.

The measurement of carbohydrate antigen-19-9 as a marker of tumor proliferation has been performed in human medicine, with an increase in serum levels (7). In veterinary medicine, there is still variation in the results, and more information is needed regarding the efficiency of this marker (9).

In cases where the lesion is visualized through image, a therapeutic possibility is a lobectomy when there is a single cyst or cysts concentrated in a lobe. Surgical removal with a margin is efficient and allows samples to be sent for histopathological examination, thus confirming the diagnosis while the animal is still alive (7). In the case of wild animals, routine imaging tests are infrequent, making diagnosis challenging before the appearance of clinical signs.

Positive immunohistochemical staining for pan cytokeratin confirms an epithelial origin of the tumor; however, it does not allow differentiation between bile duct cells and hepatocytes. Therefore, exclusive positive staining in the cyst's epithelium for CK7 confirms its origin in the bile duct.



Figure 1. Lion, liver. Multifocal cystic areas ranging from 3 to 20 cm in diameter, with a thin capsule and slightly yellowish liquid content.



Figure 2. Lion, liver, cutting surface. Fixed liver parenchyma showing whitish opaque capsule compressing and replacing adjacent tissues.

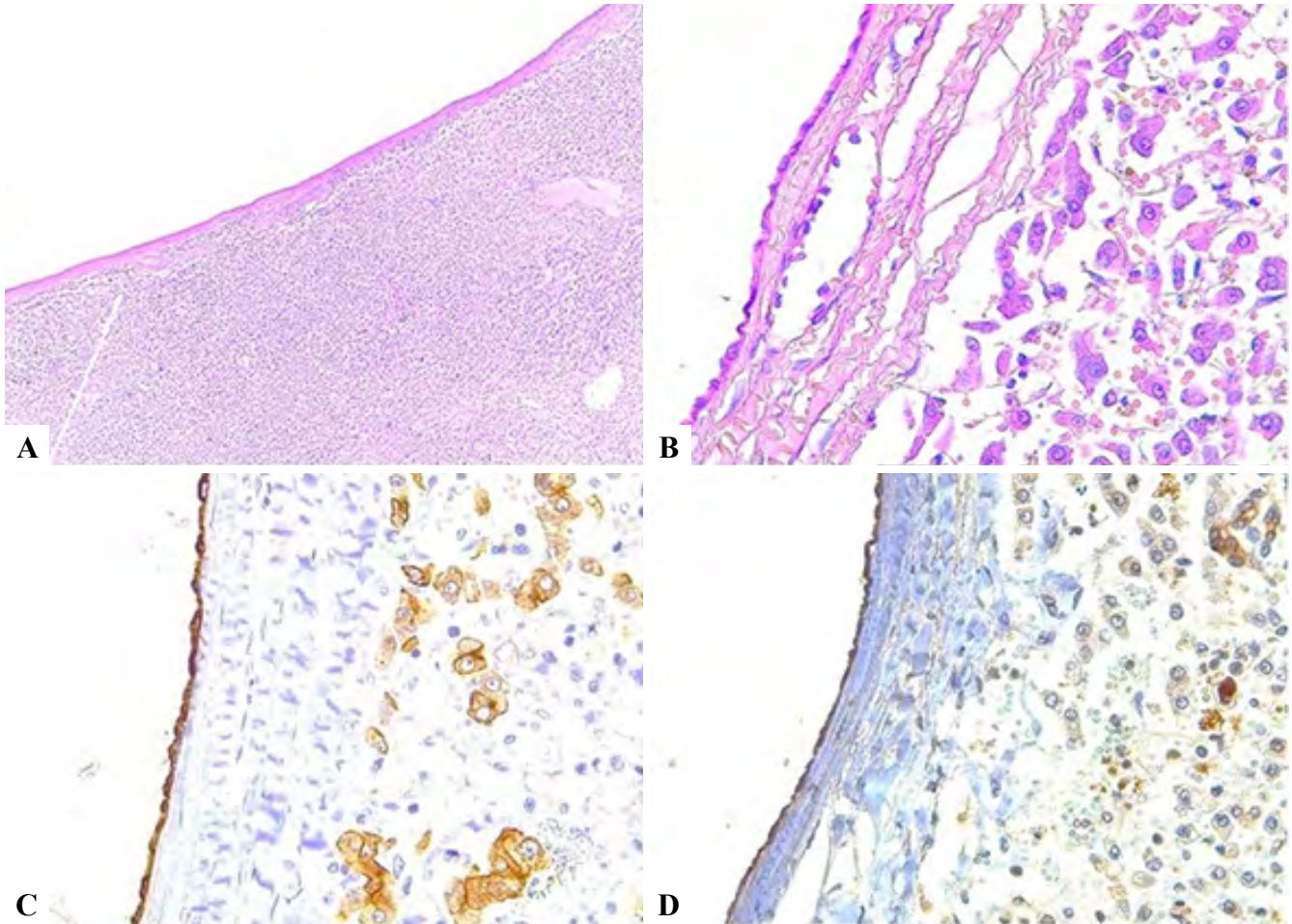


Figure 3. Lion, liver. A. Cystic dilation compressing the liver parenchyma (HE, 40x). B. Greater magnification showing simple cuboidal epithelium similar to biliary epithelium (HE, 400x). C. Positive immunohistochemistry staining anti-CK (EIA/A3E) (400x). D. Positive immunohistochemistry staining anti-CK-7 (400x).

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