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**ORIGINAL ARTICLE**

## **Bovine hepatocellular Carcinoma: A case report**

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### **ABSTRACT**

Hepatocellular carcinoma occurs in numerous species, including cats, dogs, cows, Sheep, pigs and the horse. The precise incidence in the various species is unclear because the incidence data reported are based on selected populations, usually from a small geographic area. In dogs and cats, the clinical signs associated with hepatocellular carcinoma are nonspecific. They include anorexia, vomiting, ascites, lethargy, and weakness. Other, less common, signs include jaundice, diarrhea, and weight loss. Other, less common, signs include jaundice, diarrhea, and weight loss. Some affected dogs may have seizures, presumably due to hepatoencephalopathy or hypoglycemia, since hepatic metastases to the brain are rare. Hepatocellular carcinomas can be massive, nodular, or diffuse. Massive hepatocellular carcinomas are usually a single neoplasm that involves one or contiguous liver lobes. The histological appearance of hepatocellular carcinomas varies considerably, depending on the degree of differentiation of the individual hepatocytes and the histological arrangement of the cells. Hepatocellular carcinoma progressively invades the adjacent hepatic tissue.

**Key words:** hepatocellular Carcinoma, cattle, Tabriz.

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### **Introduction**

#### *Clinical Characteristics:*

In dogs and cats, the clinical signs associated with hepatocellular carcinoma are nonspecific. They include anorexia, vomiting, ascites, lethargy, and weakness [2,4,10,12,16]. Other, less common, signs include jaundice, diarrhea, and weight loss. Some affected dogs may have seizures, presumably due to hepatoencephalopathy or hypoglycemia, since hepatic metastases to the brain are rare [16]. During the physical examination of cats and dogs, hepatomegaly causing abdominal enlargement and a palpable mass in the cranial abdomen is often evident [4,12]. Dogs with hepatocellular carcinoma frequently have increased serum activities of alkaline phosphatase, aspartate aminotransferase, alanine aminotransferase, and gamma glutamyltransferase [4,10,16,22]. Increased levels of fasting bile acids alone or in combination with increased levels of serum alkaline

phosphatase have been shown to be indicative of hepatic neoplasia, but did not distinguish primary neoplasia from metastatic disease or other hepatobiliary disease [22,23].

#### *Gross Morphology:*

Hepatocellular carcinomas can be massive, nodular, or diffuse. Massive hepatocellular carcinomas are usually a single neoplasm that involves one or contiguous liver lobes. Nodular hepatocellular carcinoma forms scattered nodules, often within multiple liver lobes. Diffuse hepatocellular carcinomas are characterized by minute indistinct masses spread throughout the liver parenchyma. The massive form is more common in dogs than the other forms [4,15]. Hepatocellular carcinoma can be found in all lobes of the liver, but the left lateral lobe is reported to be affected most often [15].

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*Histological Features:*

The histological appearance of hepatocellular carcinomas varies considerably, depending on the degree of differentiation of the individual hepatocytes and the histological arrangement of the cells [3,4,15]. This wide spectrum of histological appearance has led to different classification systems for the carcinoma [3,15]. Some systems are complex, while others have fewer categories.

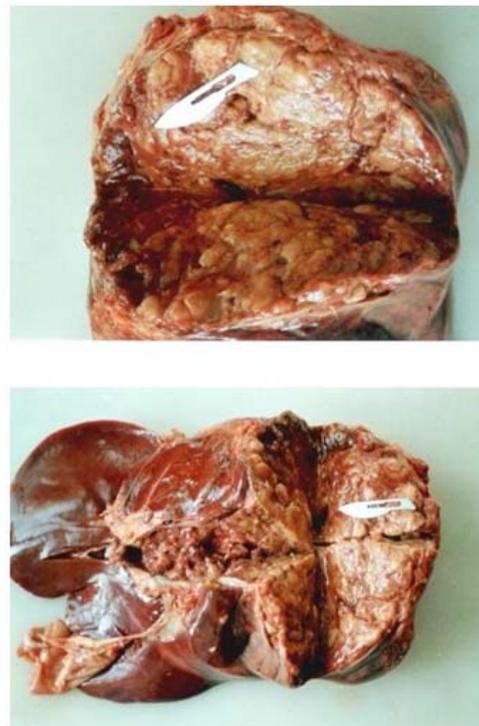
*Differential Diagnosis:*

A diagnosis of this carcinoma is based on first finding histological evidence that the neoplasm is of hepatocellular origin. While hepatocellular characteristics are easy to recognize in more differentiated neoplasms, this distinction is often difficult in poorly differentiated tumors. Fortunately, most neoplasms will have at least some areas with hepatocellular characteristics. The distinction between well-differentiated hepatocellular carcinoma and hepatocellular adenoma is also difficult [3]. When tumor cell invasion is lacking, the diagnosis is based on the overall size of the tumor, the degree of cytological alteration, and the variable thickness of hepatocellular plates. Invasion into adjacent hepatic parenchyma is the most certain way to identify a carcinoma. Vascular invasion is rarely seen, but when present, it clearly identifies the malignant varieties. Difficulty may arise in distinguishing hepatocellular carcinoma with an adenoid pattern from cholangiocarcinoma. In this case, a distinction can be made by examining the cytological characteristics as well as the general histological pattern. The neoplastic acini of adenoid hepatocellular carcinomas may contain proteinaceous material, while cholangiocarcinomas are more likely to have PAS positive mucin within neoplastic acini [15]. In addition, the cholangiocarcinoma usually has an extensive collagenous stroma compared to the modest or absent stromal elements in adenoid hepatocellular carcinomas. At the ultrastructural level, biliary epithelial cells can be recognized by the presence of a basement membrane, a feature that is absent in hepatocytes. Special techniques have been used to characterize hepatocellular carcinoma in animals. Immunohistochemistry may be useful to distinguish adenoid hepatocellular carcinomas from biliary malignancies. In cats, neoplastic biliary epithelial cells may be distinguished from hepatocytes because most biliary epithelial cells contain a population of cytokeratins, while normal, and presumably neoplastic, hepatocytes do not [13,25]. Although hepatocellular carcinomas and cholangiocarcinomas in dogs contained similar cytokeratins, this approach may be useful in other species. Hepatocellular carcinomas in dogs have been separated from

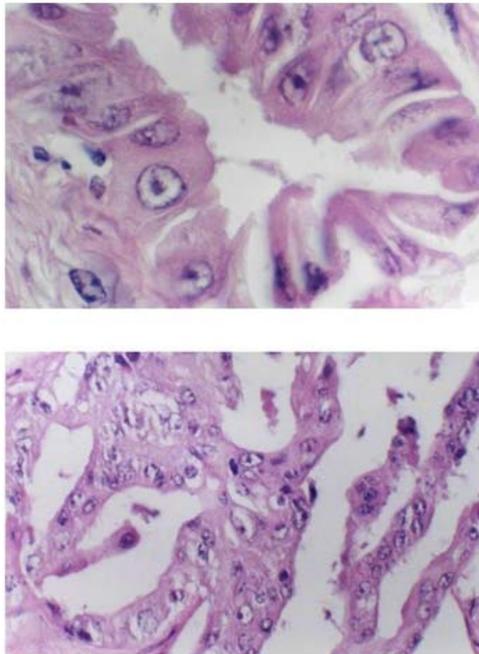
cholangiocarcinomas on the basis of their immunohistochemical staining patterns for oncofetal antigens in one report [24]. The hepatocellular carcinomas could be stained for the presence of alpha-fetoprotein, and the cholangiocarcinomas contained carcinoembryonic antigen. However this observation may require clarification, since other authors report increases in serum alphafetoprotein for both hepatocellular carcinoma and cholangiocarcinoma in dogs.<sup>50</sup> Hepatocellular carcinoma must also be distinguished from primary hepatic carcinoid on the basis of histological appearance and the use of silver impregnation stains that demonstrate secretory granules in carcinoid cells [3,26]. Immunohistochemical detection of neurosecretory products in the cytoplasm of carcinoids is also a useful technique for identification of these tumors.

*Description of observations:*

This case report is established based on observation of hepatocellular carcinoma in a cow after slaughter. After slaughter, sample to preparation of pathological sections sent to pathology laboratory of Islamic Azad university, veterinary faculty, Islamic republic of Iran. After processing, with observation hyperplastic cells and ducts this report was proved (Fig. 2). Macroscopic (Fig. 1) and microscopic features illustrated in below.



**Fig. 1:** macroscopic view of hepatocellular carcinoma in cattle.



**Fig. 2:** microscopic view of hepatocellular carcinoma in cattle. H&E staining. The appearance of mitotic cells is obvious.

*Discussion:*

Hepatocellular carcinoma occurs in numerous species, including cats [11,14] dogs [1,4,9,10,15,16] cows [5,6,15] Sheep [7,8,17] pigs [5,19] and the horse [20,21]. The precise incidence in the various species is unclear because the incidence data reported are based on selected populations, usually from a small geographic area. Comparisons of the incidence of hepatocellular carcinomas among species are unavailable for similar reasons. The failure to distinguish benign from malignant hepatocellular neoplasms in many reports creates another challenge in estimating tumor incidence. However, information from abattoirs in the United Kingdom indicates that hepatocellular and biliary neoplasms are 4 times more common in cattle than sheep and nearly 18 times more common in cattle than pigs [5].

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