An Abattoir Study on Hepatic Tumors of Sheep

D. Mohajeri, A. Rezaie and Gh. Mousavi
Department of Pathobiology, Faculty of Veterinary Medicine, Islamic Azad University-Tabriz Branch, Iran
Department of Clinical Sciences, Faculty of Veterinary Medicine, Islamic Azad University-Tabriz Branch, Iran

Abstract: The aim of this present study was to assess the incidence and age distribution of hepatic tumors of sheep as well as study of their histopathologic characteristics. For this purpose, 3000 slaughtered sheep, consisting of 284 rams with approximate age of 7 to 20 months and 2716 ewes with approximate age of 3 to 7 years, were inspected during a routine postmortem examination. This study was conducted at Tabriz abattoir in the East Azerbaijan province of Iran, in a course of 8 months from March to November 2006. In this survey, two livers were encountered tumoral. Representative sections of the tumors were stained with hematoxylin and eosin. Gross and microscopic features of these tumors supported diagnosis of hepatocellular carcinoma and cholangiocellular carcinoma for a seven-years-old crossbreed ewe and a five-years-old native breed ewe respectively. In this survey, 0.074% of slaughtered ewes had hepatic neoplasia. That is, the prevalence of hepatocellular carcinoma and cholangiocellular carcinoma in aged ewes was equally 0.037% in this study.

Key words: Sheep, hepatic tumors, hepatocellular carcinoma, cholangiocellular carcinoma, histopathology, abattoir

INTRODUCTION

Hepatic neoplasms can be of epithelial or mesenchymal origin (Cullen and Popp, 2002). These tumors tend to occur in older animals, with an average age of 10 to 12 years (Thamm, 2001). Hepatic epithelial tumors may arise either from the hepatic cells or from the bile ducts. The former are called hepatomas or carcinoma hepatocellular and the latter cholangiocellular adenomas or carcinoma cholangiocellular (Sundarasiva, 2002). Hepatocellular carcinomas are uncommon in all domestic animals but occur more frequently in ruminants, particularly sheep (MacLachlan and Cullen, 2002; Sundarasiva, 2002). This tumor has been recorded in a Holstein cow (Jeong et al., 2005). It also has been described in a heifer (Braun et al., 1997). Cholangiocellular carcinoma is an uncommon neoplasm of sheep (Lofstedt et al., 1988). However, hepatocellular and cholangiocellular carcinomas have been reported in sheep (Watt, 1970; Braun et al., 1997; Lofstedt et al., 1988). Cholangioma and cholangiocarcinoma also have been diagnosed in goats (Puette and Hafner, 1995; Rodriguez et al., 1996). Besides, cholangioma, hepatic biliary cystadenoma, a relatively uncommon benign tumor, has been identified in some domestic animals, including sheep, pigs, dogs and cats (Popp, 1990; Adler and Wilson, 1995; Nyland et al., 1999). It also has been recorded in a 10-year-old horse as the first case in Equines (Salvaggio et al., 2003). A Combined hepatocellular carcinoma and cholangiocellular carcinoma has been described in an 18-year-old Thoroughbred mare (Kato et al., 1997). It has been revealed that hepatic and biliary neoplasms account for 10% of all neoplasms in cattle and 31% in sheep (Anderson and Sandison, 1967). Information from abattoir by these authors (Anderson and Sandison, 1967) indicates that hepatocellular and biliary neoplasms are 4 times more common in cattle than sheep. It also has been reported that 80% of hepatocellular tumors in cattle are carcinomas (Bettini and Marcato, 1992). Primary hepatic neoplasms are rarely seen in dogs, accounting for only 0.6 to 1.3% of all canine neoplasms (Magne and Withrow, 1985). Results from another study indicate that hepatocellular carcinomas are more common in dogs than cholangiocellular tumors (Patnaik et al., 1980). A combined hepatocellular and cholangiocellular carcinoma has been diagnosed in a 12-year-old male Yorkshire terrier dog though, this primary hepatic tumor is extremely rare in dogs (Shiga et al., 2001). It also has
been revealed that hepatocellular carcinoma is a common cause of morbidity and mortality in captive prairie dogs (Garner et al., 2004). Frequency of different types of hepatic neoplasms in cats varies from that seen in dogs and human beings, but the morphologic features are comparable (Putnak, 1992). There are relatively fewer reports on bovine and sheep hepatic tumors at all (Kither et al., 1974). However, this abattoir study represents the incidence data of primary hepatic neoplasms in sheep. We also describe the gross and histopathologic findings of the tumors.

MATERIALS AND METHODS

For determining the incidence and age distribution of hepatic tumors of sheep as well as study of their histopathologic characteristics, 3000 slaughtered sheep, consisting of 284 rams with approximate age of 7 to 20 months and 2716 ewes with approximate age of 3 to 7 years, were inspected during a routine postmortem examination at Tabriz abattoir in the East Azerbaijan province of Iran, in a course of 8 months from March to November 2006. The age and sex of these animals were recorded simultaneously. Among these slaughtered animals, grossly, on external and cut surface observations, two livers were encountered tumoral. For identification of those tumors histopathologically, representative sections of the tumors were fixed immediately in 10% neutral buffered formalin, processed routinely and embedded in paraffin. Tissue sections were cut to 4 μm thickness and stained with hematoxylin and eosin (Lee and Luna, 1968).

RESULTS

One of these livers belonged to a seven-years-old crossbreed ewe. The sheep was of normal appearance at the time of slaughter, without any preceding medical conditions. At postmortem examination, a single well-demarcated large neoplasm that had involved contiguous liver lobes was encountered. Its diameter was recorded (D1: 23 and D2: 45 mm). On cut surface tumor mass had been subdivided into lobules by multiple fibrous bands and the general appearance of neoplastic mass was light tan to yellow with dark red areas of hemorrhage (Fig. 1). Hepatic lymph node was enlarged and hemorrhagic, with a white-gray nodule on its surface. The lungs and other tissue and organs at the vicinity of the affected liver appeared grossly normal. In the affected liver, microscopically, aggregates of neoplastic cells were seen as crude acini with scant connective tissue stroma between them. Invasion of malignant cells at the margin of the compressed normal hepatocytes was indicator of malignancy (Fig. 2). In higher magnification, pleomorphic cells, mitotic figures and bizarre forms were more often (Fig. 3). Besides, macroscopic and microscopic characteristics of the lesion in the hepatic lymph node were in agreement with metastasis to it. These findings suggest a poorly differentiated adenoid hepatocellular carcinoma in the ewe.

Another case belonged to a five-year-old native breed slaughtered ewe so, with the signs of unthriftiness and cachexia. Postmortem inspection of the carcasses revealed rounded shaped, multiple firm, often umbilicated pale grayish colored small-sized (3 mm in greatest diameter) nodules which scattered randomly throughout the liver (Fig. 4). Infrequently masses of coalescing small
nODULES were observed. The same nodules were confirmed in the lungs, also. Inspection of other tissues and organs were grossly normal. Microscopic examinations of the liver and lungs revealed unencapsulated well-differentiated carcinoma in which neoplastic cells had been arranged in an acinar and tubular pattern and retained a resemblance to biliary epithelium. Scanty connective tissue stroma existed between acini (Fig. 5). Higher magnification showed acini lined by tall cuboidal epithelium with infrequent papillary projections. The nuclear crowding and occasional nests of epithelial cells in the stroma were seen. Mitotic figures were numerous (Fig. 6). Pathologic gross and microscopic features of this neoplasia support a diagnosis of cholangiocellular carcinoma.

DISCUSSION

In this limited study the incidence data, macroscopic and then microscopic features of the hepatocellular carcinoma and cholangiocellular carcinoma as the most important hepatic tumors in sheep, was described. 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. The three major diagnostic categories of hepatocellular carcinomas are trabecular, adenoid, and solid (Cullen and Popp, 2002). Also the trabecular pattern is the most common...
histological form of the tumor in domestic animals (Patnaik et al., 1981) adenoid pattern has been recognized in this survey. Based on this abattoir survey, we propose that the primary hepatic neoplasms can be found occasionally in sheep, although they are comparatively rare and relatively common in old females (0.037% for each of them). In the fact, the precise incidence of these hepatic tumors is unclear because the incidence data reported are, based on a selected population specially, from a small geographic area. Comparison of the incidence of these neoplasms in this study is unreliable for similar reasons. Since, the data from this study have been derived from an abattoir survey and relatively few animals at the earlier stages of their life expectancy have been studied, creates another challenge in estimating the real tumors incidences. Because of failure in getting a precise history of the affected animals, it is not known if the incidence of these tumors depends on some predisposing factors. In any way, the results of this study may be in contradictory with other information, but it seems that the incidences of neoplastic diseases are alarming on the rise. Although, these tumors do not have a recognized cause in domestic animals, however, various chemical carcinogens, naturally occurring carcinogens and chronic viral, bacterial and parasitic infections may play a role in liver cancer in domestic animals (Cullen and Popp, 2002). Therefore, it is strongly recommended that to perform other comprehensive studies in this connection.

ACKNOWLEDGMENT

The research presented in this paper was supported by Islamic Azad University Tabriz Branch, in 2006. We wish to thank the laboratory coworkers for preparing the pathologic sections and veterinary meat inspectors, who collected the materials.

REFERENCES