



Case Report

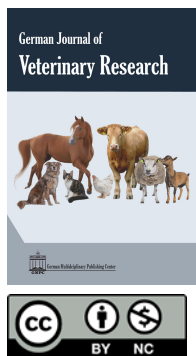
Hepatocellular adenoma in a goat: An incidental abattoir finding in Oman

Haytham Ali^{1,2*}, Abeer Alhamrashdi¹ and Mahmoud El-Neweshy³

¹ Department of Animal and Veterinary Sciences, College of Agricultural and Marine Sciences, Sultan Qaboos University, Muscat 123, Oman

² Department of Pathology, Faculty of Veterinary Medicine, Zagazig University, Zagazig, 44511, Egypt

³ Department of Pathology, Faculty of Veterinary Medicine, Kafrelsheikh University, Kafrelsheikh, 33516, Egypt



Abstract

In the present study, a hepatic mass measured 9×11×5 cm in the right hepatic lobe was detected incidentally in a less than two years old male Somali goat during routine meat inspection at the Central Muscat Municipality Slaughterhouse, Oman. Gross and microscopic examination revealed a hepatocellular adenoma, a rare finding in goats.

Keywords: Hepatocellular adenoma, Goat, Abattoir, Tumor

Citation: Ali, H., Alhamrashdi, A. and El-Neweshy, M. 2022. Hepatocellular adenoma in a goat: An incidental abattoir finding in Oman. Ger. J. Vet. Res. 2 (2): 8-10. <https://doi.org/10.51585/gjvr.2022.2.0030>

Article History:

Received: 19-Feb-2022

Accepted: 22-Feb-2022

*Corresponding author:

Haytham Ali

h.ali@squ.edu.om

Introduction

Primary hepatic tumors are quite rare in goats. One survey reported an incidence of 8.7% out of 1146 necropsied or biopsied goats had tumors, none of which was a primary hepatic tumor (Löhr, 2013). In sheep, the primary hepatic tumors had an overall estimate of (7 tumors per million animals) and of (28 tumors per million animals) in cattle (Anderson and Sandison, 1968). In caprine, the most commonly reported tumors were melanomas and squamous cell carcinomas (Bastianello, 1983). Hepatic neoplasms are rare in goats. Hepatocellular carcinoma was reported only two times in goats (Rousseaux, 1984; Lairmore et al., 1987). Bile duct carcinomas were described in goats by Paikne (1970) and (Domínguez et al., 2001), while a case of cholangioma was described by (Puette and Hafner, 1995) in an apparently healthy goat during meat inspection.

The case

A hepatic mass measured 9×11×5 cm in the right hepatic lobe was incidentally detected in a less than two years old, apparently healthy, male Somali goat during routine meat inspection in November 2021, at the

Central Muscat Municipality Slaughterhouse, Oman. Grossly, the solitary mass was firm, well-demarcated, slightly bulging from the capsular surface, and had a thin capsule (Figure 1 A). The sectioned mass had a pink, greyish surface with multiple lobules separated by thin reddish to grayish septae. Necrosis and hemorrhages were evident in the center of the mass (Figure 1 B).

Microscopically, no central veins, hepatic triads, or bile duct systems could be observed through the tissue of the mass. The cells composing the tumor were well-differentiated and resembled normal hepatocytes, with normal nuclei and nucleoli. Mitotic figures could not be detected throughout the examined sections. The cells showed a rosette pattern in some sections and pseudoglandular formations with faint pink secretions in other sections (Figure 2 C & D).

Infiltration of the stroma with few lymphocytes and macrophages was recorded (Figure 2 E & F). Picrosirius red stain (Abcam, cat. no. 150681, USA) showed a positive reaction for the portal triads in the non-tumor tissues and the thin capsule surrounding the tumor (Figure 2 B). In contrast, no reaction was observed in the tumor mass, indicating the lack of hepatic triads.

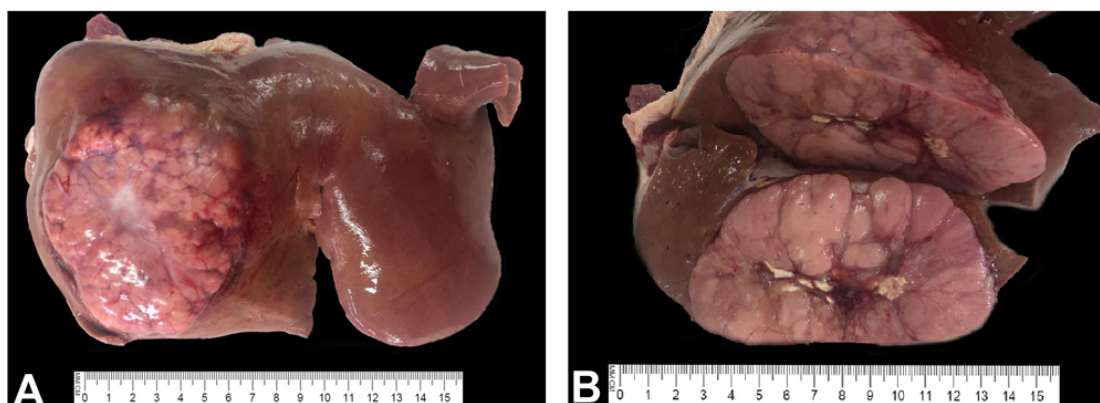


Figure 1: Hepatocellular adenoma from a goat; (A) A well-demarcated pink mass with a thin capsule located in the right hepatic lobe; (B) Sectioned mass showing a pink greyish surface with multiple lobules separated by a thin reddish to greyish septae and presence of necrosis and hemorrhages in the center of the tumor.

Caseous necrosis and hemorrhages with hemosiderin pigments were noticed in the central sections of the mass (Figure 2 G & H). Adjacent to the margin of the tumor, surrounding hepatocytes suffered from pressure atrophy and microvesicular steatosis (Figure 2 A).

Discussion and conclusion

This tumor was diagnosed as hepatocellular adenoma based on the gross and histopathological evaluation. The animal had passed the antemortem inspection as an apparently healthy animal, which indicates unaltered hepatic functions and the lack of clinical significance of the tumor. It is not common to find hemorrhage and necrosis in hepatic adenomas (Meuten, 2016) in contrast to our findings of necrosis and hemorrhages in the center of the mass, which could be a premalignant lesion.

Although no specific etiological agent has been linked to hepatocellular tumors, predisposing factors including several chemical and natural carcinogens such as chlorinated hydrocarbons and aflatoxins can experimentally induce hepatic carcinomas (Anderson and Sandison, 1968). Differential diagnosis of hepatocellular adenomas can be challenging and includes hepatic nodular hyperplasia, usually composed of multiple lesions rather than solitary hepatic adenomas, and hepatocellular carcinomas that can be distinguished by its ability to metastasize along with the abundant mitotic figures. Primary hepatic tumors that were previously described in goats include hepatocellular carcinoma, bile duct carcinoma, cholangioma, and fibrosarcoma (Paikne, 1970; Rousseaux, 1984; Higgins et al., 1985; Lairmore et al., 1987; Puette and Hafner, 1995; Domínguez et al., 2001; Mohajeri et al., 2008). To the best of our knowledge, this is the first report of hepatocellular adenoma in goats.

Article Information

Acknowledgments. We would like to thank the veterinarians at the Central Muscat Municipality Slaughterhouse for their support.

Funding. This study was funded by Sultan Qaboos University grant number RF/AGR/ANVS/18/02.

Conflict of Interest. The authors have no conflict of interest to declare.

References

- Anderson, L.J., Sandison, A.T., 1968. Tumors of the liver in cattle, sheep and pigs. *Cancer* 21, 289–301. [10.1002/1097-0142\(196802\)21:2<289::AID-CNCR28202102193.0.CO;2-C](https://doi.org/10.1002/1097-0142(196802)21:2<289::AID-CNCR28202102193.0.CO;2-C).
- Bastianello, S.S., 1983. A survey of neoplasia in domestic species over a 40-year period from 1935 to 1974 in the republic of south africa. III. tumours occurring in pigs and goats. *The Onderstepoort Journal of Veterinary Research* 50, 25–28. URL: <https://www.ncbi.nlm.nih.gov/pubmed/6877789>.
- Domínguez, M.C., Chávez, G., Trigo, F.J., Rosales, M.L., 2001. Concurrent cholangiocarcinoma, peritonitis, paratuberculosis, and aspergillosis in a goat. *The Canadian Veterinary Journal* 42, 884–885. URL: <https://www.ncbi.nlm.nih.gov/pubmed/11708210>.
- Higgins, R., Rae, A., Abraham, A., 1985. Primary hepatic fibrosarcoma in a toggenburg goat. *Veterinary Record* 116, 444–444. [10.1136/vr.116.16.444](https://doi.org/10.1136/vr.116.16.444).
- Lairmore, M., Knight, A., DeMartini, J., 1987. Three primary neoplasms in a goat: Hepatocellular carcinoma, pheochromocytoma and leiomyoma. *Journal of Comparative Pathology* 97, 267–271. [10.1016/0021-9975\(87\)90090-9](https://doi.org/10.1016/0021-9975(87)90090-9).
- Löhr, C.V., 2013. One hundred two tumors in 100 goats (1987–2011). *Veterinary Pathology* 50, 668–675. [10.1177/0300985812471544](https://doi.org/10.1177/0300985812471544).
- Meuten, D.J. (Ed.), 2016. *Tumors in domestic animals*. John Wiley & Sons, Inc., Hoboken, NJ, USA. [10.1002/9781119181200](https://doi.org/10.1002/9781119181200).
- Mohajeri, D., Rezaie, A., Mousavi, G., 2008. An abattoir study on hepatic tumors of sheep. *Pakistan Journal of Biological Sciences* 11, 1477–1481. [10.3923/pjbs.2008.1477.1481](https://doi.org/10.3923/pjbs.2008.1477.1481).
- Paikne, D.L., 1970. Cholangiocellular carcinoma with pulmonary metastasis in goat. *Indian Veterinary Journal* , 1043–1045.
- Puette, M., Hafner, S., 1995. Cholangioma in a goat. *Journal of Veterinary Diagnostic Investigation* 7, 574–575. [10.1177/104063879500700433](https://doi.org/10.1177/104063879500700433).
- Rousseaux, C.G., 1984. Hepatocellular carcinoma in a goat. *Australian Veterinary Journal* 61, 193–193. [10.1111/j.1751-0813.1984.tb07241.x](https://doi.org/10.1111/j.1751-0813.1984.tb07241.x).

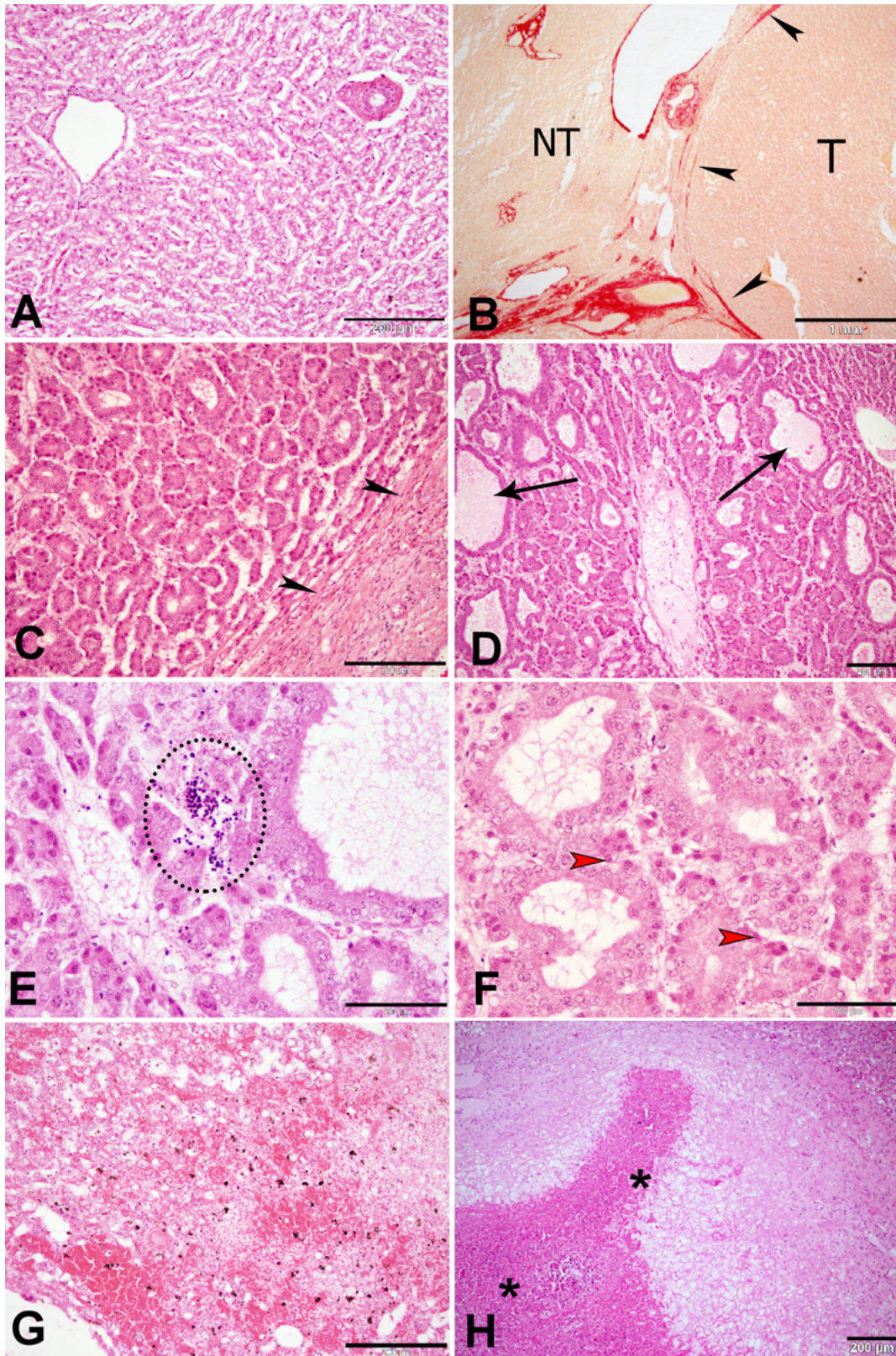


Figure 2: Photomicrograph, hepatocellular adenoma and adjacent tissue from a goat; (A) Non tumor tissue (NT) showing microvesicular steatosis; (B) Picosirius red positive red staining of collagen fibers in the thin capsule (arrowheads) separating the tumor tissue (T) from the NT; (C) Tumor cells resembling hepatocytes arranged in a rosette pattern with complete lack of central veins, hepatic triads of bile system and surrounded by a fibrous capsule (arrowheads); (D) Tumor cells showing pseudoglandular formations with faint pink secretions (arrows); (E, F) Infiltration of the tumor stroma with lymphocytes (dotted circle) and macrophages (red arrowheads); Central areas of the tumor mass showing (G) hemorrhages and hemosiderin pigments and (H) caseous necrosis (asterisks). Stain: H&E except (B) Picosirius red stain.