

*Original Research***Occurrence of Hepatocellular Carcinoma in Ducks: A One-Year Prospective Study****Nikhil S. Rao, Pradeep, M.\*, Hamza, P., Prasanna, K. S., Anoopraj, R., Ajith Jacob George, Naik Madhura and Vidyarani, H. B.**

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<b>Rec. Date:</b>	Aug 29, 2019 17:20
<b>Accept Date:</b>	Sep 27, 2019 10:35
<b>DOI</b>	<a href="https://doi.org/10.5455/ijlr.20190829052029">10.5455/ijlr.20190829052029</a>

**Abstract**

Duck carcasses brought to the department of veterinary pathology at the College of Veterinary and Animal Sciences, Pookode, Kerala, India for post mortem examination were examined for liver lesions for a period of one year from April 2018 to March 2019. During the study period, 112 duck carcasses were examined that included 53.57 per cent Kuttanad ducks and 46.43 per cent White Pekin ducks and all the birds except one were above 6 months of age. Hepatomegaly was observed in 72.32 per cent cases in which hepatocellular carcinoma was identified in one (0.89%) White Pekin duck. Grossly, the liver was twice enlarged, firm, and the surface had multiple dark red to grayish nodules. The cut surface showed multiple lobulations. Histopathologically, the liver was characterised by pseudolobulation, various regions showing solid or adenoid pattern of hepatocytes and multiple hematoma formation. Hepatocellular carcinoma with cirrhosis was identified. The study revealed very low occurrence of hepatocellular carcinoma in ducks.

**Key words:** Duck, Hepatocellular Carcinoma, Liver, White Pekin**How to cite:** Rao, N., Mampillikalam, P., Palekkodan, H., Subhadra, P., Nair, A., George, A., Naik, M. & Boraiah, V. (2019). Occurrence of Hepatocellular Carcinoma in Ducks: A One-Year Prospective Study. *International Journal of Livestock Research*, 9(11), 204-208. doi: 10.5455/ijlr.20190829052029**Introduction**

A variety of hepatic tumours has been documented in ducks such as cholangioadenoma, liver cell adenoma, hepatocellular carcinoma and cholangiocarcinoma (Ling *et al.*, 1993). Even though, reports of hepatocellular carcinoma in ducks were found to be frequent in China (Sun *et al.*, 1985), reports from India are very few (Rajan *et al.*, 1989). In China, hepatocellular carcinoma was found to be associated with duck hepatitis B virus (DHBV) infections and aflatoxin B1 exposure (Cova *et al.*, 1994). The current study was intended to study the occurrence of hepatocellular carcinoma in ducks over a one-year period.

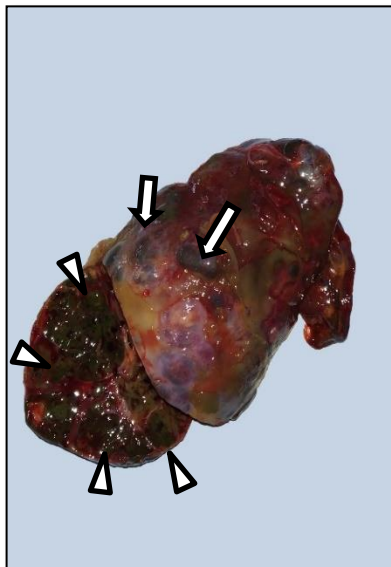
## Materials and Methods

A total of 112 duck carcasses were examined during the period from March 2018 to April 2019. Detailed necropsy was conducted and gross lesions were documented. Representative tissue samples of liver were collected and fixed in 10 per cent neutral buffered formalin for a minimum period of 48 hours. After fixation, the tissues were washed overnight under running tap water before being processed by routine paraffin block embedding technique for histopathological study. The tissues were sectioned at 5-micron thickness and stained by routine haematoxylin and eosin staining. Special stains such as Masson's trichrome and Congo red were used to demonstrate relevant tissue components wherever necessary (Suvarna *et al.*, 2018).

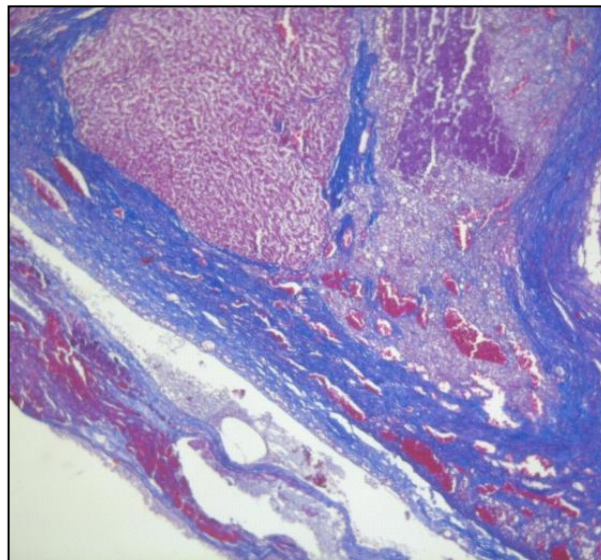
Molecular detection of duck hepatitis B virus (DHBV) was attempted by polymerase chain reaction (PCR). For molecular detection, liver samples were collected in sterile 1.5ml Eppendorf tubes and stored at -20°C until further processing. Total DNA was extracted from liver tissues using conventional phenol-chloroform method (Köchler *et al.*, 2005). Polymerase chain reaction (PCR) was carried out targeting a 128 base pair region of the DHBV *polymerase* gene using the primers DCD03 ACTAGAAAACCTCGTGGACT and DCD04 GGGAGAGGGGAGCCCGCACG (Wang *et al.*, 2002). Visualization of the PCR products was carried out using gel documentation system (Syngene, USA).

## Results and Discussion

Hepatomegaly was observed in 72.32 per cent (81/112) cases. Nodular growths on the liver surface were seen in 8.64 per cent (7/81) of enlarged livers. Histologically, one case (0.89 per cent, 1/112) was identified as hepatocellular carcinoma. Previously, Rajan *et al.* (1989) observed an incidence of 1.84 per cent of hepatocellular carcinomas in ducks exposed to aflatoxins. The major reason for liver enlargement in other cases were due to amyloidosis (61.61%, 69/112). Other frequent histological lesions noticed in enlarged livers were multifocal hepatocellular necrosis, severe congestion and fatty change. The hepatocellular carcinoma was identified in an 18-month-old White Pekin duck. Grossly, the both liver lobes had 0.5 to 1 cm diameter sized multiple dark red to greyish nodules projecting out from the parenchyma. Further, the cut surface of the liver parenchyma showed multiple lobulations separated by greyish areas (Fig. 1). No gross metastasis was observed in other organs. Microscopically, there were chord-like fibrous tissue bundles proliferating from the capsule, invading the parenchyma creating pseudolobulations (Fig. 2).

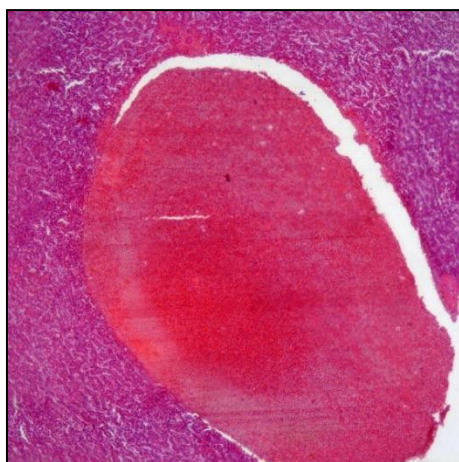


**Fig. 1:** Pseudolobulation of hepatic parenchyma on cut surface (arrowheads) and raised dark nodules on the liver surface (arrows)



**Fig. 2:** Hepatocellular carcinoma. Pseudolobulation due to fibrous tissue proliferation (blue fibres) Masson Trichrome 40X

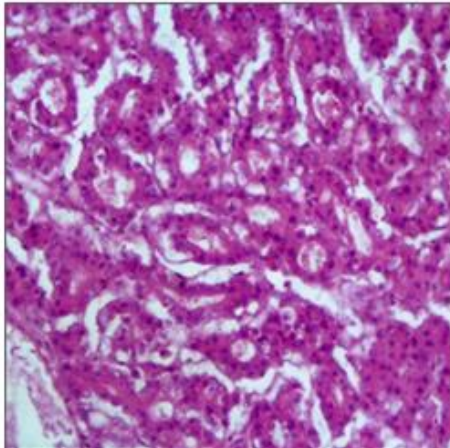
The central veins and portal tracts were absent in the areas of pseudolobulation. In a few areas, severely dilated sinusoids containing erythrocytes, giving appearance of hematoma were observed (Fig. 3). Oval to round eosinophilic, proteinaceous fibrin deposits (Fig. 4) of varying size along with ballooning degeneration of hepatocytes were observed in multiple areas. A few areas showed acinar pattern of hepatocytes (Fig. 5) while others had severely proliferating hepatocytes with solid pattern (Fig. 6) with a few vascular lumens showing invasion of proliferating cells (Fig. 7). The histological patterns observed in this case are similar to those reported by Ling *et al.* (1993), with the exception of vascular invasion.



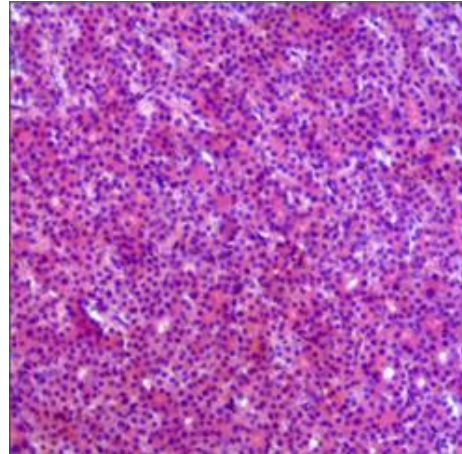
**Fig. 4:** Hepatocyte necrosis and proteinaceous fibrin-like deposits (arrow). Liver H&E 100X



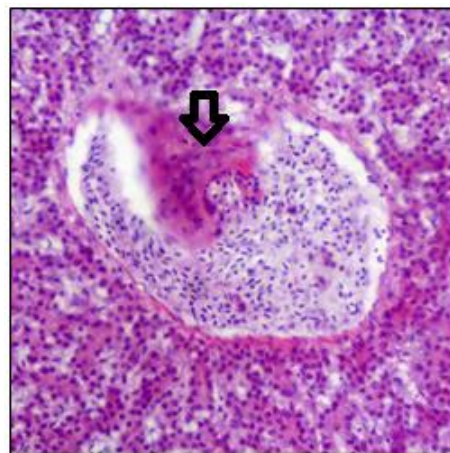
**Fig. 3:** Hepatocellular carcinoma. Severely dilated sinusoids containing erythrocytes. H&E 100X



**Fig. 5:** Hepatocellular carcinoma. Adenoid pattern of hepatocellular arrangement. H&E 400X



**Fig. 6:** Hepatocellular carcinoma. Solid pattern of hepatocellular arrangement. H&E 400X



**Fig. 7:** Hepatocellular carcinoma. Vascular invasion (arrow). H&E 400X

A few studies were reported from China to identify the cause of development of hepatocellular carcinoma in ducks. In Qidong area of China, both aflatoxin B1 and hepatitis B viruses were considered predisposing risk factors for the development of hepatocellular carcinomas in humans as well as ducks (Sun *et al.*, 1985).

### Conclusion

However, in the present study, duck hepatitis B virus (DHBV) could not be detected from the liver with hepatocellular carcinoma. However, previous experimental studies by Cova *et al.* (1990) have shown that aflatoxin alone is capable of inducing hepatic neoplasms in White Pekin ducks. The present report of hepatocellular carcinoma in the present White Pekin duck could also be due to aflatoxin exposure, supported by the history of feed contamination. The study reveals that hepatocellular carcinoma is infrequent in ducks and the role of aflatoxin need to be further studied to alleviate the problem.

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