

## PATHOLOGICAL INVESTIGATION OF LIVER OF THE SLAUGHTERED BUFFALOES IN BARISAL DISTRICT

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### ABSTRACT

Livers (n = 80) of slaughtered adult buffaloes were examined for pathological changes during the period from July 2006 to March 2007 in two slaughterhouses of Barisal district. Livers exhibiting gross alterations were cleaned with normal neutral saline and the changes were recorded. The lesions containing tissue samples were collected in 10% buffered formalin for fixation. Grossly, *Gigantocotyle explanatum* infection (amphistomiasis) was found in 31.25% and *Fasciola gigantica* infection was in 22.5% cases. Hydatidosis (2.5%), abscesses (3.75%), and haemorrhages (2.5%) were found in the liver. Histopathologically, cirrhosis was found in 31.25% cases. Nodular hepatitis 7.5%, granulomatous hepatitis 5% and parasitic cholecystitis 15% were also recorded during the investigation. Survey showed that the severity of infection with *G. explanatum* 31.25% and *F. gigantica* 22.5% and cirrhosis 31.25% were of highest percentage.

**Key words:** Liver, amphistomiasis, hydatidosis, granulomatous, cholecystitis, cirrhosis, *Fasciola gigantica*

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### INTRODUCTION

Buffalo forms a part of the property, possession and profession of rural farmers. Not only that, they are an easily 'convertible currency' and a reliable 'living bank' to serve the immediate needs of the rural masses in several communities. More than 840 million people on earth are suffering from malnutrition. The overall food production from crops is declining. However, there has been an immense increase in the human population. Increased food production through simple, low-cost and environment-friendly farming techniques is warranted. Of all domestic animals, Asian buffalo holds the greatest promise and potential for production (Cockrill, 1994). In Bangladesh, buffaloes play an important role in domestic economy and trade. This species is useful in terms of draft power, high ecological potential on productivity and biological performances (Latif, 1994). On the contrary, the buffaloes of Bangladesh have been recognized to possess low reproductive performance (Alam and Ghosh, 1991).

The liver is one of the vital organs of the body, susceptible to various parasites and disease conditions which affect the total health status of the animal. Focal liver disease is also common as the result of the organ's acting as catchments for the vast absorptive area of the gut, with all its resident microorganisms and parasites (Kelly, 1993). Parasites and diseases damage the liver of buffaloes and make the liver unsuitable for human consumption. So, the present study has been performed to identify the pathological conditions of the liver of buffaloes by using gross and histopathological studies.

### MATERIALS AND METHODS

A total of 80 livers of slaughtered buffaloes were examined for gross pathological abnormalities during the period from July 2006 to March 2007 from two slaughterhouses of Barisal district and histopathological study was done in the Department of Pathology, BAU, Mymensingh. Livers exhibiting gross alterations were cleaned with normal neutral saline and the changes were recorded. The lesion containing tissue samples were collected in 10% neutral buffered formalin for fixation. The fixed tissues were processed following the procedure of Luna (1968). The histological sections were stained with Hematoxylin and Eosin. The pathological conditions of liver conditions were diagnosed as described by Runnels *et al.* (1965) and Smith *et al.* (1972).

Parasites present in the liver were collected and examined in fresh state and then washed with normal saline followed by with distilled water (several times) and then kept in formaldehyde - glacial acetic acid- alcohol (AFA) solution. Permanent slide of parasites were made following the standard procedures (Anon., 1979) and these were identified as described by Soulsby (1982).

## RESULTS AND DISCUSSION

Gross study was performed during collection of samples from slaughterhouses primarily and then during trimming of the samples for histopathology. The prevalence of gross and histopathological conditions of the buffalo livers are presented in Table 1.

Table 1. Pathology of buffalo liver

Findings	Affected livers (n = 80)	
	No.	%
Amphistomiasis ( <i>G. explanatum</i> )	25	31.25
Fascioliasis	18	22.5
Hydatidosis	2	2.5
Abscess	3	3.75
Haemorrhage	2	2.5
Cirrhosis	25	31.25
Nodular hepatitis	6	7.5
Granulomatous hepatitis	4	5
Parasitic cholecystitis	12	15

n = Total number of livers of slaughtered buffaloes examined

### *Amphistomiasis*

Among the livers examined 31.25% had *Gigantocotyle explanatum* infection (Table 1). Grossly there were no significant changes. Within the bile duct the parasites formed pocket and the bile ducts become hard with fibrosis (Fig. 2). Dilatation and erosions were commonly observed on the luminal surface of the large bile ducts, which are almost similar to the findings of Hafeez and Rao (1989). Microscopically, thickening of bile ducts with moderate fibrosis were found. Besides, there were infiltration of reactive cells and marked proliferation of mucosal gland with hyperplasia in mucosal epithelium as reported previously by Upadhayay *et al.* (1987).

### *Fascioliasis*

In this study 22.5% of buffalo livers were found to be affected with fascioliasis (Table 1) irrespective of seasonal variations and sex. But Ross (1966) and Henrikson and Pilegaard-Anderson (1980) showed occurrence of more adult flukes during the winter months. Phiri *et al.* (2005) also reported seasonal variation of *Fasciola gigantica* and the pattern of distribution of *F. gigantica* was significantly higher in areas of high rainfall than in those of relatively low rainfall. Sharp seasonal variation was found as described by (Soulsby, 1982) which might be due to the different climatic conditions in Bangladesh. Phiri *et al.* (2005) studied prevalence and factors influencing occurrence of fascioliasis. Female animals got significantly higher percentage (59.3%) than male (44.5%) they reported. In some cases, the affected liver was slightly swollen and appeared pale in color with round edge, the capsule was thick, rough with whitish or reddish discoloration and fibrosis of the bile ducts which indicated subacute form of infection. Similar observations were made by Dawes (1963), Ross (1966) and Dow *et al.* (1967). Numerous small and large patches scattered over the parietal surface could be the indication of transperitoneal route of migration of young flukes. The damage of hepatic cells near these tracts might have resulted from feeding habit of these premature parasites (Kulkarni, 1982; Khalilov and Namosov, 1983). Some parts of bile ducts had cystic appearance due to dilatation. In some other cases, the liver was greatly enlarged with presence of a few small irregular whitish areas indicating fibrosis over the parietal surface and parenchyma was hard due to fibrous tissue which was thought to be due to healing of migratory tracts of immature parasites.

In cross section of liver we also recorded pipe stem appearance of the liver caused by the migration of the parasites (Fig. 1). Mahdi and Al-Baldawi (1987) and Ansari-Lari and Moazzeni (2006) also reported more or less same result on the prevalence of liver condemnations due to fascioliasis. Microscopically, there were lymphocytic infiltrations with few reticuloendothelia cells. Considerable fibrous connective tissue proliferations were noted at the portal areas. In chronic cases, the areas of infiltration with lymphocytes and mononuclear cells and proliferation of fibroblasts represented the haemorrhagic tracts. Heavy accumulation of lymphocytes and proliferation of fibrous connective tissues in the portal areas distorted lobular architectures. There were hyperplastic changes of the epithelial cells of the bile ducts with periductal connective tissue proliferation were found. In most advanced stages these hyperplastic bile ducts appeared like granular structures as recorded in the study of Upadhyay *et al.* (1987). Hepatic siderosis (Gupta, 1982) was also observed in this study. Wiedosari *et al.* (1991) studied comparative pathological study of hepatic changes induced by *Fasciola gigantica* and *Gigantocotyle explanatum* in Javanese thin-tailed sheep and reported pathological changes in the liver induced by *Fasciola gigantica* and *Gigantocotyle explanatum* were readily distinguishable from each other.

#### ***Hydatidosis***

In the present 2.5% livers were affected with hydatidosis but Sundaram and Natarajan (1960) recorded 11.61% cases. Sheikh and Hussain (1968) recorded that 35% buffaloes were infected with hydatid cysts in Bangladesh. Multiple cysts found in most of the cases. Some affected livers were found with severe damage of the parenchyma. The size hydatid cysts varied from 3 to 5 cm. The parenchyma around the cyst was hard due to fibrous capsule. Around the hydatid cyst there was marked cellular reaction characterized by proliferation of fibroblasts, infiltration of mononuclear cells and eosinophils as reported earlier by Dhote *et al.* (1992).

#### ***Cirrhosis***

A total of 31.25% cases showed partial or complete cirrhosis. The liver was constricted in many cases. Numerous newly formed bile ducts in cirrhotic liver have been observed in the present study as described by previous researchers (Balasingam, 1962; Dawes, 1963; Gupta, 1983; Khalilov and Namosov, 1983). Considerable proliferation of fibrous connective tissue was marked mainly in the portal areas (Fig. 4). There was little lymphocytic infiltration of fibrous strands. Portal veins were dilated and irregular in shape.

#### ***Abscess***

Abscess was found in only 3.75% cases. Grossly, whitish foci on the surface of the liver were found. Size varied from 0.5 to 1.5 cm in diameter. Polymorphonuclear leukocytes at the center surrounded by a thin fibrous capsule were seen microscopically. Similar histopathological changes have been reported in earlier studies (Runnels *et al.*, 1965; Uzoukwu and Ikeme, 1978).

#### ***Hemorrhage***

Sub-capsular hemorrhage was also observed in the peripheral surface of the livers in 2.5% cases which might be due to trauma.

#### ***Hepatitis***

Granulomatous hepatitis (Fig. 3) of buffalo liver characterized by presence of RE cells, plasma cells, lymphocytes and there was also presence of haemosiderin pigment which is in agreement with the report of Upadhyay *et al.* (1987). Nodular appearance and infiltration of inflammatory cells were also found which indicated nodular hepatitis (Fig. 6).

#### ***Parasitic cholecystitis***

Parasitic cholecystitis of a buffalo liver was characterized by parasite within gall bladder surrounded by fibrous connective tissue and infiltration of inflammatory cells (Fig. 5).

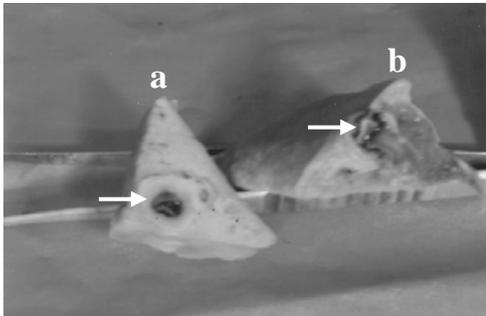


Fig. 1a. Cross section of buffalo liver showing *Fasciola gigantica* with migratory tract, b. Pipe stem appearance in the cross section of buffalo liver caused by *Fasciola gigantica*

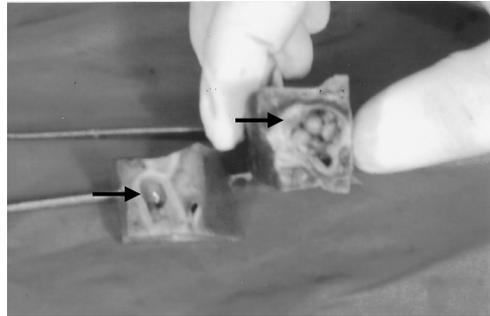


Fig. 2. Cross section of buffalo liver showing *Gigantocotyle explanatum* with migratory tract.

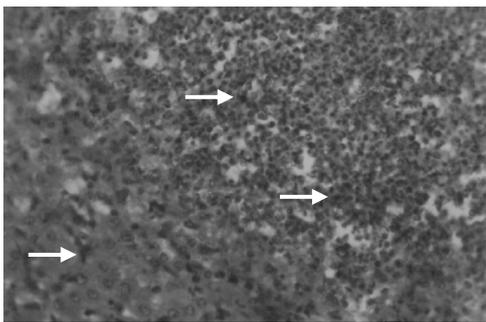


Fig. 3. Microscopic figure showing granulomatous hepatitis of buffalo liver characterized by presence of RE cells, plasma cells and lymphocytes.

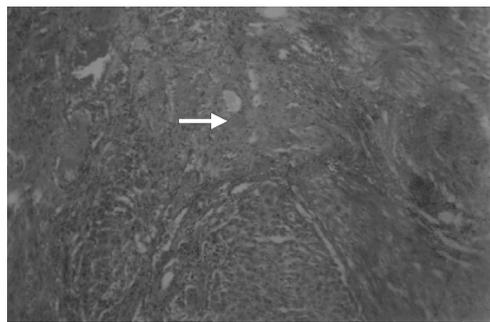


Fig. 4. Microscopic figure showing extensive proliferation of fibrous connective tissue in buffalo liver indicating cirrhosis.

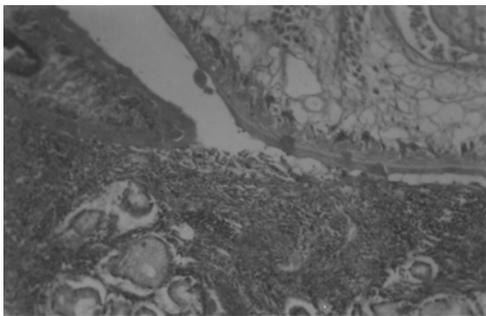


Fig. 5. Microscopic figure showing parasite within gall bladder and infiltration of inflammatory cells indicating parasitic cholecystitis of a buffalo liver.

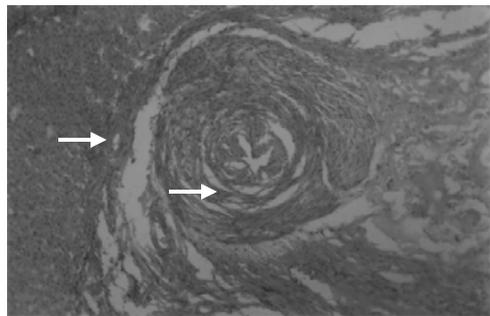


Fig. 6. Microscopic figure showing nodular appearance and infiltration of inflammatory cells indicating nodular hepatitis of a buffalo liver.

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