PATHOLOGICAL AFFECTION OF LIVER DUE TO HYDATIDOSIS AND FASCIOLIASIS IN SLAUGHTERED FOOD ANIMAL (CATTLE AND BUFFALO) IN CHITTAGONG DISTRICT, BANGLADESH.

Md. Shafiqul Islam1, Shubhagata Das1, Md. Monjurul Islam Talukdar2, Md. Ariful Islam3, Kazal Krishna Ghosh4, Md. Abdul Alim1, Md. Masuduzzaman1

1Department of Pathology and Parasitology, Chittagong Veterinary and Animal Sciences University, Khulshi, Chittagong-4202, Bangladesh.
2MS fellow Department of Microbiology, Bangladesh Agricultural University, Mymensingh, Bangladesh.
3MS fellow Department of Microbiology, Chittagong Veterinary and Animal Sciences University, Khulshi, Chittagong-4202, Bangladesh.

*Corresponding author: si.mamun@ymail.com

A 5-month comprehensive study was undertaken to explore the status of disease conditions and frequency of different pathological lesions among the affected liver of slaughtered cattle and buffaloes in Chittagong Metropolitan Area, Bangladesh. A total of 882 slaughtered animal (cattle and buffalo) were examined during the study period. Suspected livers with pathological affections were observed grossly from the carcass and collected liver sections were stained with hematoxylin-eosin and examined by light microscopy for histopathological changes. Pathological affections were found in 105 (11.90%) liver where hydatid cyst (56.16%) in cattle was significantly higher (P< 0.05) than buffalo (37.50%). On the other hand, incidence of fascioliasis was higher in buffalo (40.62 %) than in cattle (30.13%). The incidence of liver affection seems to be high in hot summer season and in buffaloes.

Key words: Hydatidosis, Fascioliasis, Liver, Pathology, Food animal, Chittagong

Bangladesh is a Muslim dominating country where the larger part of the population is non vegetarian and dependent on cattle and buffalo meat as one of the largest protein source. To meet up the increasing demand hundreds of thousands live cattle and buffaloes are imported in this country every year and slaughtered in open market places and authorized slaughter slabs by the city corporation. Food animal carcasses are a possible source of several infectious zoonotic diseases (Scott et al., 1997). The emergence of anthrax have made the society more concerned about the health issues and quality of slaughtered animal carcass (Tulayakul et al., 2008). The liver is the largest gland and one of the vital organs of the body is also the most susceptible organ for various infectious diseases and pathological affections. Several parasitic diseases like fascioliasis, amphistomiasis, hydatidosis; bacterial diseases such as tuberculosis, bacterial hepatitis, hepatic abscess and leptospirosis are very common among the different pathological affections of liver (McGavin et al., 2001). Besides, several other systemic anomalies such as hepatitis, abscess, leptospirosis, icterus, hepatic encephalopathy, cholicystitis, fibrosis, cirrhosis etc are very common in liver (Jones et al., 1997). Gross pathological examination is the most common practice to conduct slaughterhouse survey throughout the world. Hence histopathological study of the gross affections also consolidates the diagnostic precision and thereby implies positive impact on effective survey and so secure public health (Belkhiri et al., 2009). A number of studies have been conducted on pathological affections of livers in slaughtered animal carcass from different part of the world and in Bangladesh (Ahmedullah et al., 2007; Kabir et al., 2010; Basak et al., 2011). Although Chittagong Metropolitan area (CMA) is the second largest municipality and the habitation of 5.5 million people, no specific information...
found on the disease conditions of the slaughtered carcasses. The present study was therefore undertaken to explore the status of disease conditions and frequency of different pathological lesions among the affected liver of slaughtered cattle and buffaloes in CMA.

MATERIALS AND METHODS

Study area and duration
This study was carried out by 36 visits to Firingibazar slaughterhouse from January to May 2012. All the animals slaughtered in these working days were counted and demographic data like species, age, sex, origin, body condition etc was carefully recorded.

Sampling strategy
A total of 882 (660 cattle and 222 buffalo) slaughtered animals were carefully examined at the lairage (docking area) to record the demographic data. At slaughter slabs when the carcasses are bled and completely opened, the visceral organs were thoroughly examined by close inspection and palpation. Livers suspected with pathological affections were isolated from the carcass and washed with water and gross pathological lesions were detected and recorded following FAO meat inspection manual (Herenda et al., 2000). The suspected tissue samples were collected and carried to CVASU pathology laboratory for histopathological study.

Histopathological study
For histopathological study formalin fixed tissue samples were washed and dehydrated in graded ethanol and embedded in paraffin wax. Fixed tissues were sectioned at 5 μm thickness and stained with hematoxylin and eosin as per standard method (Luna 1968). The tissue slides were dried at room temperature and the sections were stained with hematoxylin-eosin and examined by light microscopy.

Statistical analysis
The obtained data form gross and microscopic examination was imported, stored and coded accordingly using Microsoft Excel-2007. Chi Square test was done for determination of association between the variables by using statistical software STATA/IC-11. A significant difference was considered to be $p<0.05$.

RESULTS

Incidence of pathological affections in Liver in slaughtered carcasses:
Form 36 visits over 5 month period a total of 882 (660 cattle and 222 buffalo) carcasses were examined where different types of pathological affections were found in 105 (11.90%) liver (Table 1). The incidence of liver affections was found in higher rate

Table: 1. Incidence of pathological affections of liver over the study period:

<table>
<thead>
<tr>
<th>Month of Visit</th>
<th>No. of Visits</th>
<th>No. Animal Slaughtered</th>
<th>Observed Liver lesions</th>
<th>Overall Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>8</td>
<td>272</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>February-March</td>
<td>15</td>
<td>463</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>April-May</td>
<td>13</td>
<td>147</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>882</td>
<td>73</td>
<td>32</td>
</tr>
</tbody>
</table>

Table 2: Comparative frequency of liver affections in cattle and buffalo

<table>
<thead>
<tr>
<th>Pathological Affections</th>
<th>Cattle (N= 73)</th>
<th>Buffalo (N=32 )</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>95 % CI</td>
<td>No (%)</td>
</tr>
<tr>
<td>Hydatid Cyst</td>
<td>41</td>
<td>56.16</td>
<td>44.56-67.76</td>
</tr>
<tr>
<td>Fascioliasis</td>
<td>22</td>
<td>30.13</td>
<td>19.41-40.86</td>
</tr>
</tbody>
</table>

* Significance was determined in 95% confidence interval when $P<0.05$. 
April-May (20.40%) month compared to that of 12.86% in January and 8.63% in February-March. About 73(12.08%) cattle and 32(27.56%) buffalo liver showed different pathological affections. The most common pathological affections found in cattle liver was hydatid cyst (56.16%) which is significantly higher than buffalo (37.50%) but no significant variation was observed with the incidence of Fascioliasis (Table 2)

**Gross Lesions:**

The gross features of the pathological affections of liver have been demonstrated in *Figure 1*. Hydatid cysts of varying size were found on the surface of liver. The average diameter of the hydatid cysts were 3-5 cm in diameter, but in some cases large cysts exceeding 20 cm diameter containing large quantity of fluid was also observed. Polycystic liver with multiple number of yellowish fluid filled viable cysts were most common liver affections. Often abscess was formed on the edge of the liver surface following cystic lesion. Suppurative lesion was observed in many degenerated cysts. Distinct grey-white migratory tract was observed at the visceral surface of the liver lobes as evidence of fascioliasis. Large liver flukes were seen expelled out in high pressure around the gall bladder and large bile ducts. Moreover the capsular surface of fasciola affected liver showed grayish discoloration. Marked necrosis and fibrosis was evident around the affected bile ducts where gritty cut sound was found.

**Microscopic Lesions:**

The microscopic features liver affection has been demonstrated in Figure 2. Microscopically Cross section of large liver fluke in the stretched bile duct with massive biliary fibrosis and cirrhosis of the affected liver section was associated with fascioliasis.
Along with the hepatic fibrosis the hyperplasia of bile ducts and pipe stem liver were also common with chronic fascioliasis. Around the hydatid cyst there was marked cellular reaction characterized by proliferation of fibroblasts, infiltration of mononuclear cells.

**DISCUSSION**

In this study about 11.90% carcasses showed different types of pathological affections in liver and incidence of liver affections was relatively higher in buffalo carcasses compared to that of cattle. This might be due to that fact that buffaloes are reared in scavenging system in marshy land and get more exposure to the various infectious agents and helminthes (Radostits et al., 1995). Higher prevalence of hepatic lesions observed in April-May month compared to the earlier months of observation. This difference might be influenced by the seasonality and climatic factors. In Bangladesh April-May is considered as summer season and high ambient temperature facilitate the infection with different pathogen which might affect the liver. There have been many reports on the seasonal influence of the liver affections. Usually high rainfall and hot summer season is highly preferable for infection with many helminth parasites such as fascioliasis, hydatidosis, amphistomiasis etc. for which liver is the predilection site (Soulsby 1982; Phiri et al., 2005).

Among the different pathological affections maximum (56.16%) liver was positive for presence of hydatid cysts which is highest compared to the previous reports in Bangladesh. Kabir et al. (2010) and Basak et al. (2011) reported 29.65% and 25.67% prevalence of hydatid cysts in cattle liver respectively whereas Sarder et al. (2006) recorded 17.17% hydatidosis. The higher prevalence of different parasitic infections might be due to most of the slaughtered cattle are imported from India. Kabir et al. (2010) demonstrated that Indian cattle particularly of Hariana breed suffer more than those of local and crossbred deshi cattle. The prevalence of hydatidosis was significantly found in higher rate in Cattle then that of buffalo, this might be due to species preference of the helminth parasite. Although Fascioliasis observed in higher rate in buffalo, there is no significant variation observed between the prevalence of Fascioliasis in Cattle. Ahmedullah et al. (2007) reported 22.5% Fascioliasis in buffalo liver which is much lower than our study result. The higher rate of liver cirrhosis in buffalo might be due to the fact that the rate of infection with fascioliasis is higher in buffalo which resulted such lesion. The pathological lesions observed in this study come in agreement with many previous reports. Ahmedullah et al. (2007) found large multiple hydatid cysts on the liver just beneath the capsule which is analogous to the lesions observed in this study. The size of the cyst varied largely but their average diameter (5-10 cm) which was similar to the findings of Basak et al. (2011). There was evidence of migratory tract and hyperplastic bile ducts found in relation to fascioliasis which is relevant to the Ross (1966) and Dow et al. (1967).
CONCLUSION
This study reports, a considerable number of slaughtered animal in Chittagong metropolitan area suffer from various types of liver diseases where hydatid cyst was the most common among them. The incidence of liver affection seems to be high in hot summer season and in buffaloes. More elaborative study is essential to identify the several risk factors associated with such condition. Bacteriological and molecular investigation is recommended to determine the incidence of potential zoonotic pathogen from the slaughtered animal carcass.

REFERENCES