

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

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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, cholecystitis, 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  $\mu$ m 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:

Month of Visit	No. of Visits	No. Animal Slaughtered	Observed Liver lesions			Overall Percentage
			Cattle	Buffalo	Overall	
January	8	272	17	18	35	12.86%
February-March	15	463	31	9	40	8.63%
April-May	13	147	25	5	30	20.40%
Total	36	882	73	32	105	11.90%

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

Pathological Affections	Cattle (N= 73)			Buffalo (N=32 )			P value
	No.	(%)	95 % CI	No.	(%)	95 % CI	
Hydatid Cyst	41	56.16	44.56- 67.76	12	37.50	20.25-54.74	0.063*
Fascioliasis	22	30.13	19.41 -40.86	13	40.62	23.13-58.11	0.147

\* Significance was determined in 95% confidence interval when  $P < 0.05$ .

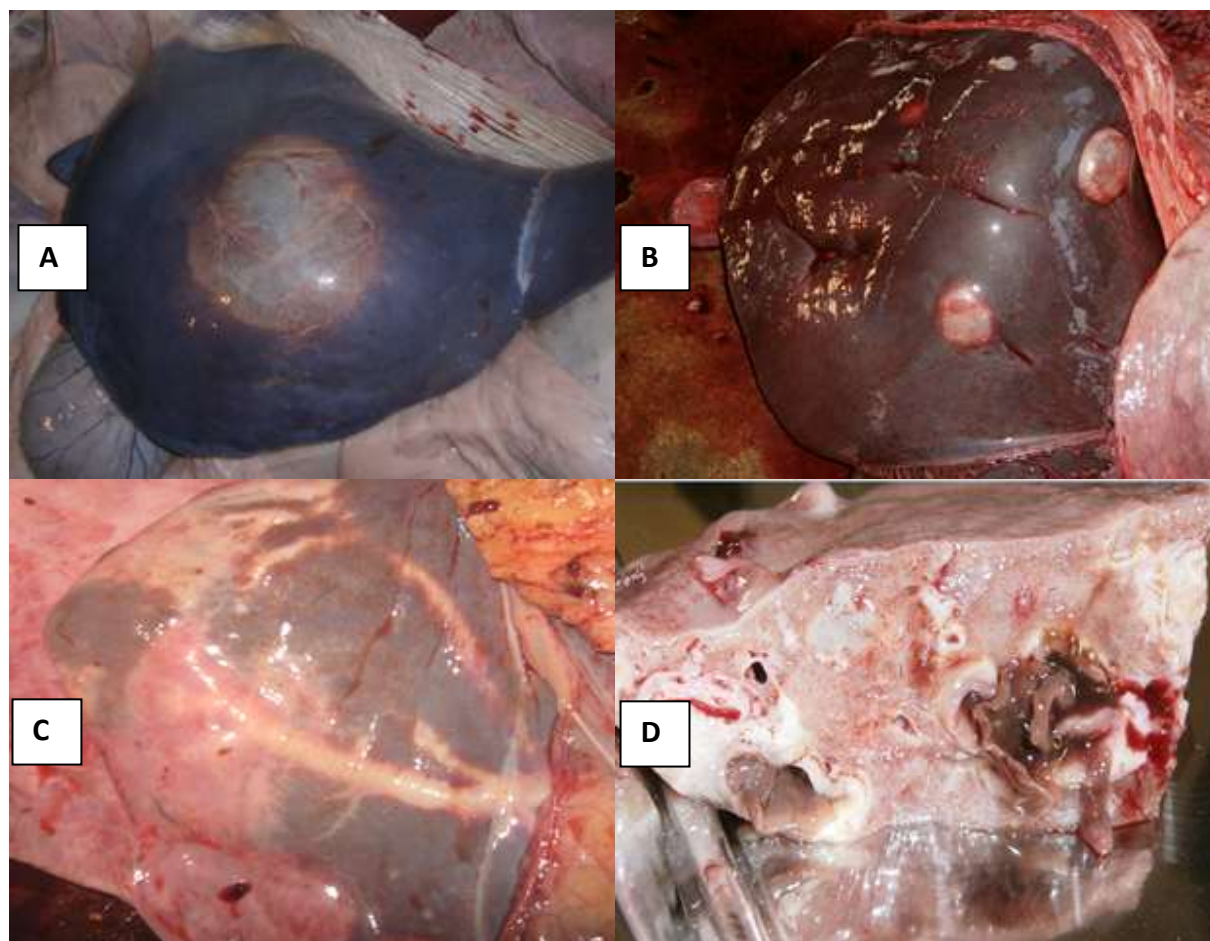


Fig.1: The gross pathological lesions observed in Fascioliasis and Hydatidosis of slaughtered animal: A. Large hepatic cyst occupying most of the quadrate lobe B. Multiple large hydatid cyst over the capsular surface of the liver C. Distinct migratory tract under the hepatic capsule caused by the movement of liver fluke; D. Cross section of the affected liver, adult fluke (*Fasciola spp*) protruding out from the bile ducts

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.



## 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

- Ahmedullah, F., Akbor, M., Haider, M.G., & Hossain, M.M. (2007) Pathological investigation of liver of the slaughtered buffaloes in Barisal district. *Ban J Vet Med* 5, 81-85.
- Basak, P., Rashid, S.M.H., Isalm, M.N. & Hossain, M. (2011) Pathological investigation of liver of slaughtered cattle in dinajpur district of Bangladesh. *Ban Res Pub J* 5(2), 86-91.
- Belkhiri, M., Tlidjane, M., Benhathat, Y. & Meziane, T. (2009) Histopathological study and pulmonary classification of bovine lesions. *Afr J Agri Res* 4(7), 584-591.
- Dow, C., Ross, J.G. & Todd, J.R. (1967) The pathology of experimental Fascioliasis in calves. *J Comp Path* 77(4), 377-386.
- Gupta, P.P. (1983) Studies on pathology of buffaloes livers. *Ind J Vet Path* 7, 91.
- Herenda, D., Chambers, P.G., Ettriqui, A., Seneviratna, P. & Silva, T.J.P. (2000) Manual on meat inspection for developing countries. Food and Agriculture Organization of the United Nations Rome.
- Jones, T.C., Hunt, R.D. & King, N.W. (1997) The digestive system, In: *Veterinary pathology* (6th Ed), Williams & Wilkins, U.S.A. 1089-1100.
- Kabir, M.H.B., Eliyas, M., Hashem, M.A., Mohiuddin, M. & Miazi, O.F. (2010) Prevalence of zoonotic parasitic diseases of domestic animals in different abattoir of Comilla and Brahman Baria region in Bangladesh. *Raj Univ J Zool* 28, 21-25.
- Khalilov, E.M. & Namosov, F.I. (1983) Study of cell reactions in liver helminthiasis of buffaloes. *Ref Zhu Vet* 8, 82-15.
- Luna, L.G. (1968) Manual of histologic staining methods of the Armed Forces institute of Pathology (3rd Ed.). Mc Graw Hill Book Co. New York.
- McGavin, M.D., Carlton, W.W. & Zachary, J.F. (2001) Liver, biliary system, exocrine pancreas, Thomson's special veterinary pathology (3rd Ed), 81-118.
- Phiri, A.M., Phiri, I.K., Siziya, S., Sikasunge, C.S., Chembensofu, M. & Monrad, J. (2005) Seasonal pattern of bovine fasciolosis in the Kafue and Zambezi catchment areas of Zambia. *Vet Parasitol* 134, 87-92.
- Radostits, O.M., Blood, D.C. & Gay, C.C. (1995) Disease of alimentary system. In: *Veterinary medicine* (8th Ed.). Bailliere Tindall, London, England, 1102-1233.
- Ross, J.G. (1966) An abattoir survey of cattle liver infections with *Fasciola hepatica*. *Br Vet J* 122(11), 489-494.
- Runnels, R.A., Monlux, W.S. & Monlux AW (1965). *Principles of Veterinary Pathology* (7th Ed.) Scientific Book Agency, Calcutta.
- Sarder, S.A., Ehsan, M.A., Anower, A.K.M.M., Rahman, M.M. & Islam, M.A. (2006) Incidence of liver flukes and gastro-intestinal parasites in cattle. *Bang J Vet Med* 4(1), 39-42.
- Scott, J.C., Stefaniak, J., Pawlowski, Z.S. & McManus, D.P. (1997) Molecular genetic analysis of human cystic hydatid cases from Poland: identification of a new genotype group (G9) of *Echinococcus granulosus*. *Parasitol* 114, 37-43.

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18. Soulsby, E.J.L. (1982) Parasitic Zoonoses (2nd Ed.), London, Academic Press, NC. 402.
  19. Tulayakul, P., Sithisarn, P., Sanguankiat, A., Khuntamoon, T., Poolkhet, C., Kasorndorkbua, C., & Kasemsuwan, S. (2008) Development of Disease Monitoring and Follow-up System in Cattle Slaughter House. The 15th Congress of FAVA. 31-34.
  20. Uzoukwn, M. & Ikeme, M.M. (1978) Hepatic changes in natural Fasciola gigantica infectious of Fulani Zebu Bull. Ani Pro Afr 26, 162-167.