

## Pathological investigation of hydatidosis in goats of selected abattoirs at Barishal metropolitan area in Bangladesh

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### ABSTRACT

Echinococcosis is an important zoonotic parasitic disease that produces hydatid cyst in different body tissues, preferentially in liver and lungs. It has a major public health as well as economic impacts throughout the world. In this study the incidence of hydatidosis and pathological changes in the liver and lung of goat were investigated at the selected abattoirs of Barishal metropolitan area in Bangladesh. The study was carried out on 278 (n=278) randomly selected goats slaughtered for meat purposes; sex, breed, age and seasons were taken into account during the experimental period. The overall incidence in goats was found to be 11.87%. The prevalence of hydatidosis was more in male goats (13.25%) than female goats (9.27%). Black Bengal goats (13.52%) were found to be more susceptible than Jamunapari goats (7.04%). The prevalence rate was higher in adult ( $\geq 4.1$  years) goats (17.59%) as compared to the young ( $\leq 3$  years) goats (5.15%). Highest prevalence was found during rainy season (22.39%) and lowest prevalence was found during winter season (6.67%). In this study, liver (48.49%) was found to be the mostly affected organ followed by lungs (27.27%), whereas, in 24.25% cases both lungs and liver was found positive. Grossly, variable sized (1-5cm) cyst of 1-4 in number was observed in both liver and lung. In the histopathological examination, major findings were hepatic edema, vacuolated hepatocytes in liver; and presence of pockets within hydatid cyst wall with infiltration of inflammatory cells in both liver and lung parenchyma. Affected lungs revealed a thick coat of granulation with fibrosis, resulting in atelectasis and desquamation of bronchial epithelium. The indiscriminate slaughtering of goats is done in markets, streets and open fields; viscera, blood, bones and other organs are found here and there in the studied area. Thus hydatidosis that cause lesions in lungs and liver might be capable to transmit in human. So this situation possesses a serious threat to public health as it is a zoonotic disease. This paper reports the prevalence and pathological changes of hydatidosis in the slaughtered goats of Barishal metropolitan area in Bangladesh.

**Keywords:** Incidence, *Echinococcus*, Hydatid cyst, Goat, Liver, Lungs

### INTRODUCTION

Black Bengal goats are very popular because of their high quality meat and skin not only in Bangladesh but also in the world market. Goat rearing is one of the most important income generating sources in rural areas of Bangladesh. These animals are mainly reared on open grazing areas such as goat reared on uncultivated lands, roadsides, yards and bank of ponds. Parasitism is one of the major constraints that hinder its optimum production. Tropical climate together with the water logged and low-lying areas in

Bangladesh favor the survival, multiplication, spread and perpetuation of animal parasites (Saiful et al., 2003). Hydatidosis, Settariasis, Trichinellosis, Ascariasis and Amphistomiasis are the important parasitic zoonotic diseases (Schwabe, 1984). The importance of these diseases as a public health hazard, particularly in rural areas where a close association exists between man and domestic animal is well established (Kabir et al., 2010). Cystic echinococcosis is also known as hydatidosis caused by larval stage (metacestodes) of the tape worm *Echinococcus* sp., is a zoonotic disease that occurs throughout the world and causes considerable economic losses and public health hazards in many countries. World Health Organization has declared echinococcosis is a neglected zoonotic disease. Sheep, goats, cattle, camels, buffaloes, pigs, horses and donkeys have been repeatedly found infected with hydatid

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cysts (Dalimi et al., 2002; Lahmar et al., 2004).

Five species of *Echinococcus* are currently considered taxonomically valid: *Echinococcus granulosus*, *E. multilocularis*, *E. oligarthrus*, *E. vogeli* and *E. shiquicus* (OIE 2008). Hydatidosis is ubiquitous disease i.e., infecting wild, feral, domestic mammals of both herbivores and omnivores including man of the whole world. It commonly develops in dogs, although several other carnivores can also act as definitive hosts (Ahmed et al., 2006; Daryani et al., 2007), and various domestic ruminants, including goats act as an intermediate hosts for the parasite (Eckert and Deplazes, 2004); human get infection accidentally but not take a part for maintaining natural life cycle of the parasite. The larval stage of *Echinococcus* is more prone to occur in the liver and lung than any other visceral organs in intermediate host.

The prevalence of cystic echinococcosis is higher in rural communities of developing countries due to close proximity between dogs, intermediate hosts species and man; slaughtering of animals in house premises, absence of meat inspection, improper disposal of dead animals, and grazing of domestic herbivores in communal fields where stray dogs have free access enhances the percentages of hydatidosis (Ibrahim, 2010). The fertility of hydatid cysts occurring in various intermediate host species is one of the most important factors in the epidemiology of the disease (Bortoletti et al., 1990) and the fertility of hydatid cysts varies depending on intermediate host species and geographical areas (Saeed et al., 2000). The size of the cyst ranges from 1 to 5 cm in diameter; reported largest one is 5 cm × 4 cm in size; the cystic wall is whitish in color with presence of numerous floating brood capsules as 'hydatid sand' in clear cystic fluid (Islam, 1980; 1981). The direct economic losses caused by hydatid cyst infection in livestock are due to the condemnation of the carcass and visceral organs including the

liver, lungs, spleen, heart and kidneys (Budke et al., 2006). Moreover, it causes retarded growth, reduced performance, reduced milk and meat yield as well as reduced to poor quality of wool, decreased hide and skin value and reduced birth rate (Moro, 2006; Torgerson and Budke, 2003; Torgerson and Macpherson, 2011). Echinococcosis can be diagnosed by CT scan, X-ray, immunological, serological and polymerase chain reaction assays; after opening of the body, cystic form of this tape worm can be seen with naked eye. PAS positive and the presence of germinal membrane with acellular layer are the characteristic feature of larval stage of *Echinococcus* in histologic sections (OIE 2008).

The existence of echinococcosis in ruminants of Bangladesh has been documented since 1976 (Islam et al. 1976). From then, researchers noticed its presence by both genetic and pathologic characterization in both human and animal elsewhere in Bangladesh (Faruk et al. 2017; Basak et al. 2011; Karim et al. 2015; Islam et al. 2003). But nobody investigated status of caprine hydatidosis and its pathological interferences in the target organ in Barishal metropolitan area of Bangladesh. Hence, from the economic and public health point of view, present study was undertaken to find out the prevalence of hydatid cyst and pathological changes in the liver and lung of goat naturally infected with larval stage of tape worm, *Echinococcus* sp.

## MATERIALS AND METHODS

### Study area and duration of the study

The study samples were collected at three selected slaughter house of Barishal metropolitan area namely Notun Bazar Abattoirs, Bogra road (abattoir-01), Chaumatha Bazar Abattoirs, Barishal (abattoir-02) and Madrasha Bazar Abattoirs, Nathullabath, Barishal (abattoir-03). The experiment was performed in the Department of Pathology and Parasitology,

Faculty of Animal Science and Veterinary Medicine, Patuakhali Science and Technology University (PSTU), Babugonj, Barishal, during the period from October 2016 to September 2017.

### **Study animals and sampling methods**

The study was a slaughter house survey, where goats were brought from various locations of Barishal division for slaughter. Samples were randomly collected from the abattoir. In order to determine the prevalence of hydatidosis, a total number of 278 slaughtered goats were examined, out of which apparently infected organs (especially liver and lungs) were collected for detail examination. Date of collection, age, sex and breed were recorded properly. All goats were divided into three (03) study groups depending on their age i.e., Group A  $\leq 3$ , Group B 3.1-4, and Group C  $\geq 4.1$  years of age. Macroscopic lesions of apparently infected organs with cyst and the location of the cyst in the respective organ were noted on the data sheet.

### **Examination of slaughtered goats and samples collection**

After slaughtering and opening of the carcass, thorough visual inspection, palpation and incision of visceral organ specially the liver, lungs, spleen, heart, kidneys and other organs were performed to detect hydatid cyst. The quantity and gross lesions of cyst were recorded by visual inspection and palpation. Then, the infected tissues along with normal parts were cut into small pieces (about 1 to 2 cubic cm) and fixed at 10% neutral buffered formalin solution and shifted to the laboratory for histopathological study.

### **Histopathology**

Formalin-fixed samples of the liver and lung were processed for paraffin embedding, sectioned and stained with haematoxylin and eosin according to standard method for histopathological study (Titford, 2009). Briefly, the well fixed tissues were washed in

running tap water for 24 hours and dehydrated through a series of ascending grades of ethanol (70%, 80%, 95% and 100%). Then, the tissues were cleared by two changes of chloroform and impregnated with two changes in paraffin at 58 °C. Finally, the tissues were embedded in liquid paraffin (58 °C). The tissues were sectioned at 4 to 6 microns from paraffin block with the help of rotary microtome and placed in water bath (37-40 °C) for spreading and the sections were taken on grease free clean glass slides and dried in air.

### **Staining technique**

The histological sections were stained with Mayer's Haematoxylin and Eosin (H&E) following the routine procedure of histopathological studies (Titford, 2009). The stained sections were then permanently mounted in Canada balsam with a cover slip.

### **Photography**

All images were taken with the help of a digital camera (Model: Samsung WB150F, South Korea). The photography of gross lesions was taken instantly and microscopic images taken during histopathological study performed by a binocular microscope (Model: TM450, Meiji Techno Co. Ltd., Japan).

### **Statistical analysis**

Statistical analysis was performed with a student's t -test (unpaired and unequal variances), executed with GraphPad Prism 5.0 statistical software (GraphPad Software, Inc., La Jolla, CA, USA). *p* values  $< 0.05$  were regarded as statistically significant

## **RESULTS**

### **Prevalence of hydatidosis in goat**

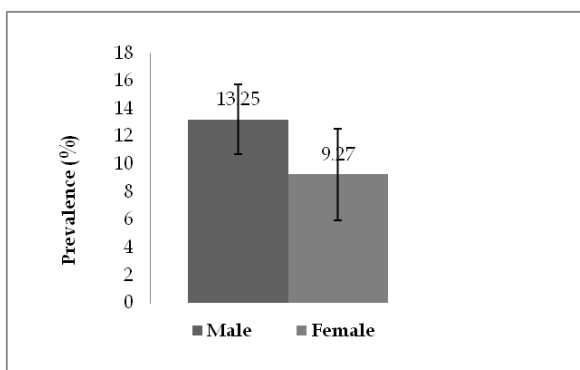
#### **Overall prevalence of hydatidosis in goat**

In order to determine the prevalence of hydatidosis in goats at three different abattoirs of Barishal metropolitan area during the period of October 2016 to

September 2017, a total of 278 goats were examined and out of which 33 cases were found positive for hydatid cyst. Therefore, the prevalence of hydatidosis in goats was recorded 11.87%. The present study was undertaken in three (3) different abattoirs in goats in Barishal metropolitan area. A total number of 278 goats were examined, of which 111, 78 and 89 goats from three (3) different abattoirs (abattoir-01, abattoir-02 and abattoir-03); 17, 7 and 9 goats were found positive for hydatidosis with the prevalence rate of 15.31%, 8.97% and 10.11%, respectively in ( $p < 0.05$ ).

#### Prevalence rate of hydatidosis in goats in relation to sex

Prevalence of hydatidosis in goats in relation to sex was also observed at three (3) different abattoirs. In case of male, prevalence rate was 15.85%, 9.52% and 12.28% in abattoir-01, abattoir-02 and abattoir-03, respectively with the overall prevalence of  $13.25 \pm 2.5$ . In case of female, prevalence rate was 13.79%, 5.56% and 9.37% in abattoir-01, abattoir-02 and abattoir-03, respectively with the overall prevalence of  $9.27 \pm 3.3$ . In this study, a total of 181 male goats were examined, out of which 24 goats were found infected, on the other hand, 97 female goats were examined, out of which 9 goats were found infected.



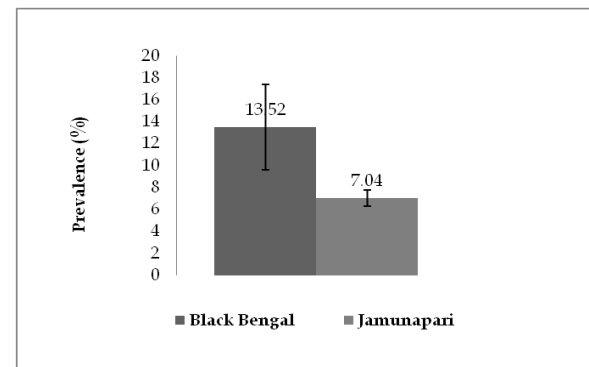
**Fig. 1:** Prevalence of hydatidosis in male and female goats in Barishal metropolitan area.

#### Prevalence rate of hydatidosis in goats in relation to breed

Prevalence of hydatidosis in goats in relation to breed was observed at three (3) different

abattoirs. In case of Black Bengal goat, prevalence was 18.51%, 9.67% and 10.93% in abattoir-01, abattoir-02 and abattoir-03, respectively with the overall prevalence of  $13.52 \pm 3.9$ ;

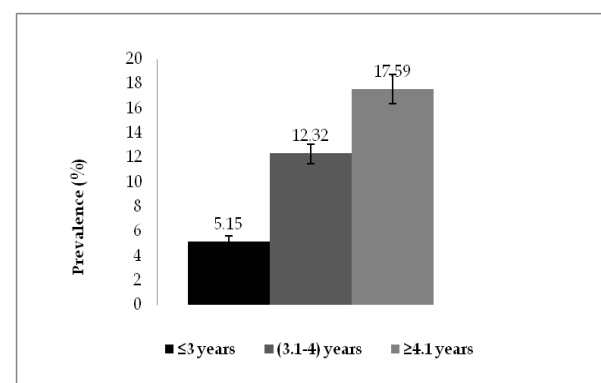
whereas, in case of Jamunapari goat, prevalence was 6.67%, 6.25% and 8% in abattoir-01, abattoir-02 and abattoir-03, respectively with the overall prevalence of  $7.04 \pm 0.74$ .



**Fig. 2:** Graphical presentation of prevalence of hydatidosis in two breeds namely Black Bengal goat and Jamunapari goats.

#### Prevalence rate of hydatidosis in goats in relation to age

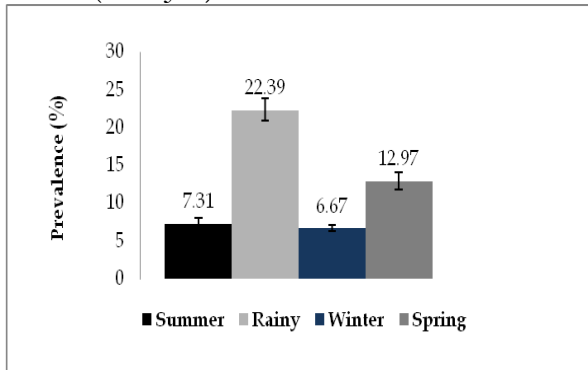
In this present study, goat samples were divided into three (3) different age groups to observe the prevalence of hydatidosis. It revealed the highest prevalence was found in the  $\geq 4.1$  years age group ( $17.59\% \pm 1.2$ ) followed by  $12.32\% \pm 0.8$  and  $5.15\% \pm 0.5$  in 3.1-4 and  $\leq 3$  years age groups respectively.



**Fig. 3:** Prevalence of hydatidosis in goats at different age groups.

### Seasonal prevalence of hydatidosis among examined goats

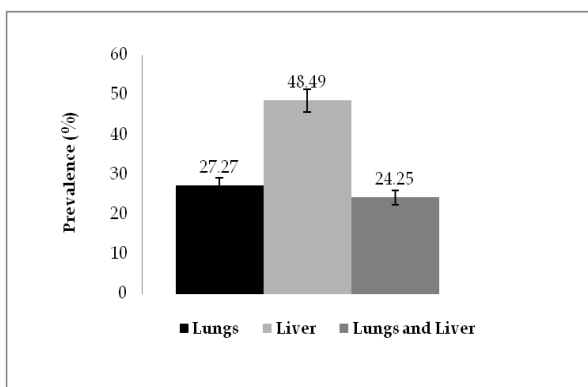
In this experiment, study period was divided into four (4) different seasons to observe the seasonal prevalence. Highest prevalence was found in the rainy season (Aug-Oct)  $22.39\% \pm 1.5$  followed by  $12.97\% \pm 1.1$ ,  $7.31\% \pm 0.7$  and  $6.67\% \pm 0.4$ , respectively in spring (Feb-April), summer (May-July) and winter (Nov-Jan) season.



**Fig.4:** Prevalence rate of hydatidosis in relation to season.

### Prevalence rate of hydatidosis in different organs of goats

Hydatid cyst is mostly found in liver  $48.49\% \pm 2.8$  followed by lungs  $27.27\% \pm 1.9$  and both lungs and liver  $24.25\% \pm 1.8$ .



**Fig. 5:** Prevalence of hydatidosis in different organs

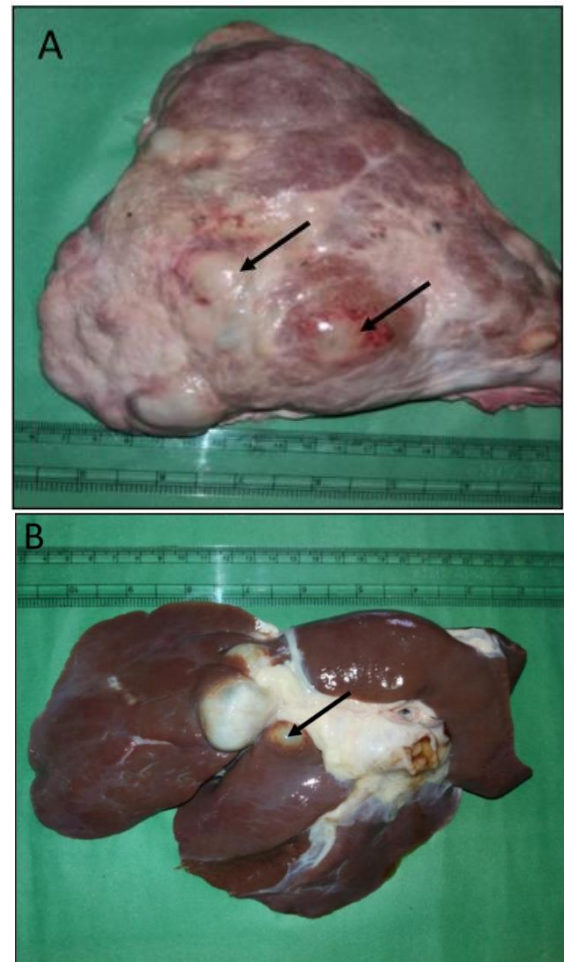
### Lesions of hydatidosis

#### Lesions of hydatidosis in liver of goats

##### Gross lesions

The hydatid cyst in the liver was recognized by the presence of variable sized (2-5 cm)

cysts. The both unilocular and multilocular harbored cysts protruded on the surface (Figure 6A and 6B). The cysts were found both at the parietal and visceral surfaces of right and left lobes (Figure 6A and 6B). The highest offal condemnation was seen in the liver of goats. In general, the cysts were doughy and soft to touch in nature. On aspiration, it revealed clear to slightly turbid fluid.

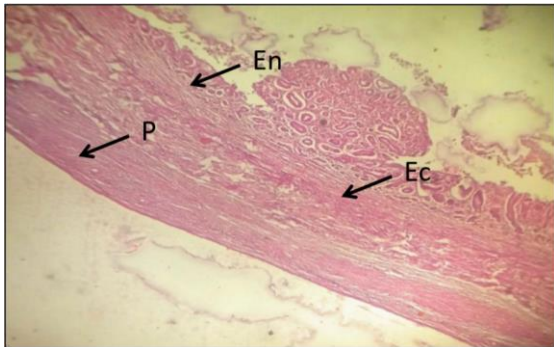


**Fig.6.** Various sized hydatid cyst protruding on the surface of the liver (Indicated here as black arrow). (A) Hydatid cyst on the parietal surface of the right lobe (B) Hydatid cyst on the parietal surface of caudate lobe of liver

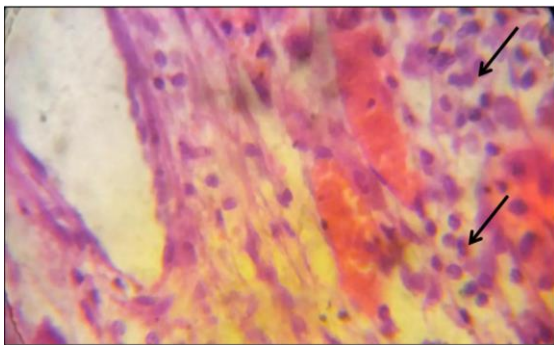
##### Microscopic lesions

The cysts consisted of a thin inner germinal layer (endocyst or proliferous membrane), laminar layer (ectocyst) and outer adventitial layer (pericyst). In most sections, parasitic

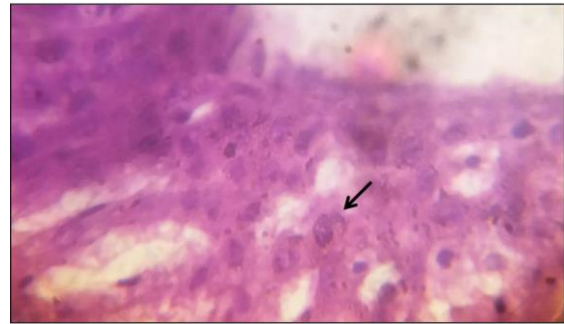
membrane (both ectocyst and endocyst) were observed (Figure 7). Some liver sections showed severely infiltration of inflammatory cells (Figure 8), proliferation of fibrous connective tissue (Figure 11), vacuolated hepatocytes (Figure 9) and hepatic edema (Figure 10). Some sections showed pockets inside the hydatid cyst wall (Figure 12). The normal tissue appears with normal hepatocytes and sinusoids without infiltrations of inflammatory cells.



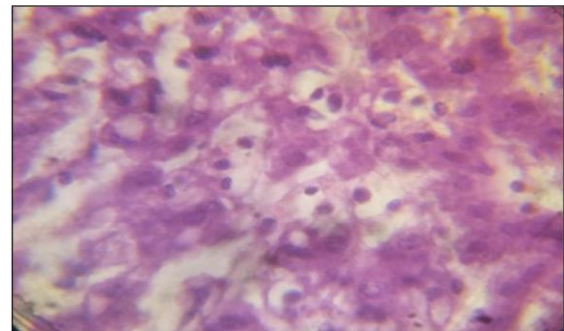
**Fig.7.** The hydatid cyst wall (Liver) structure showing endocyst (En), ectocyst (Ec) and pericyst (P) (Indicated here as black arrow) (H&E X 72)



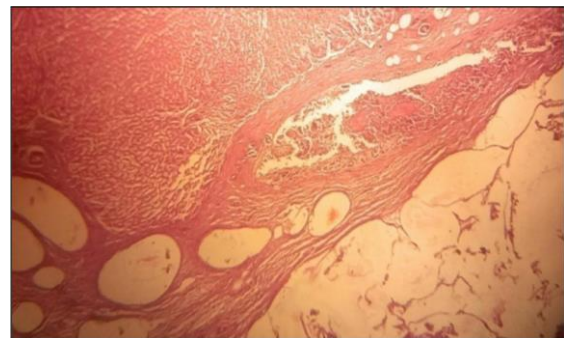
**Fig.8.** Section of liver of hydatid cyst infected goat showing infiltration of inflammatory cells (Indicated here as black arrow) (H&E X 1000).



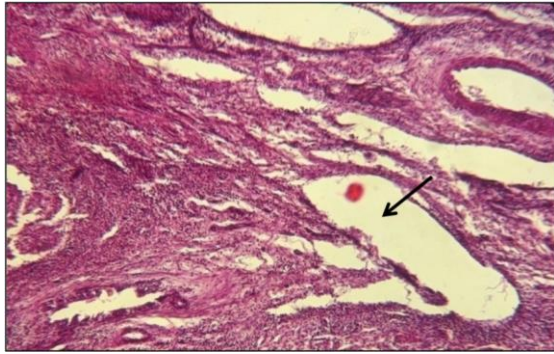
**Fig.9.**Section of liver of hydatid cyst infected goat showing vacuolated hepatocytes and infiltration of inflammatory cells (Indicated here as black arrow) (H&E X 1000).



**Fig.10.**Section of liver of hydatid cyst infected goat showing the hepatic edema (H&E X 1000).



**Fig.11.** Section of liver (porto-biliary space) of hydatid cyst infected goat showing fibrosis (H&E X 72).



**Fig.12.** Section of liver of hydatid cyst infected goat showing pockets in hydatid cyst wall (Indicated here as black arrow) (H&E X 720).

### Lesions of hydatidosis in lungs of goats

#### Gross lesions

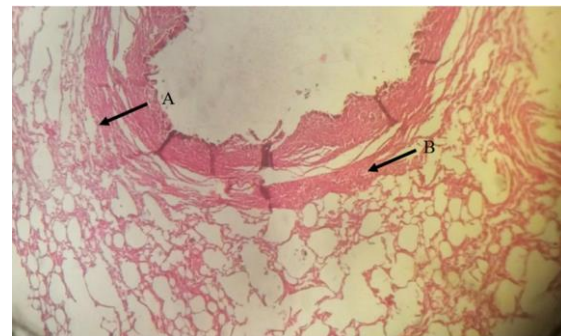
The cysts were found both at the parietal and visceral surfaces of left and right diaphragmatic and apical lobes (Figure 13) but not in the cardiac lobe. The size of the cysts ranged from 1 to 3 cm in diameter. Most of the cysts were situated superficially just beneath the pleura and some were partially embedded. The hydatid cyst of lung showed similar characteristics as of lung. The wall was whitish in color and the cystic fluid was clear and its volume ranged 1 ml to 7 ml.

#### Microscopic lesions

The histologic features of the hydatid cyst in lung were similar to that in liver. In some sections, cyst wall was found proliferated fibrous connective tissue with infiltration of inflammatory cells (Figure 14). The alveoli were compressed around the cyst wall in some sections (Figure 14). In addition, the inter-alveolar septa were also thickened due to proliferation of fibrous connective tissue, granulation tissue, and infiltration of reactive cells that causes atelectasis and desquamation of bronchial epithelium.



**Fig.13.** A small sized hydatid cyst (Indicated here as black arrow) on the costal surface of right lung (inferior / lower lobe).



**Fig.14.** Section of lung showing lesions of hydatid cyst. (A) Layers of cyst compressed to alveolar wall (Indicated here as black arrow) (B) Infiltration of inflammatory cells in the lung parenchyma (Indicated here as black arrow) (H&E X 72).

### DISCUSSION

Hydatidosis is a zoonotic disease caused by the larval stage of *Echinococcus tapeworm*, which is one of the major constraints in the development of goat rearing in Bangladesh. So, to increase the goat population, emphasis should be given to check on hydatidosis. The prevalence of hydatidosis in a particular area depends on various factors like geographical location, climatic condition, biological barriers, immunization status and social awareness etc. So, the present investigation was conducted on slaughtered goats in Barishal metropolitan area to determine the incidence of hydatidosis.

In this investigation, the overall prevalence of hydatidosis was recorded 11.87% in goats

which was less than previous study, reported by Swai et al., 2017; Yadav et al., 2014 and Kabir et al., 2010, where, they reported the prevalence rate 22.2%, 19.8% and 26.01% respectively. On the other hand, the studied prevalence rate was more than those reported by Adugna and Ayalew, 2015; Hayajneh et al., 2014; Iqbal et al., 2012; Jarjees and Al-Bakri, 2012; Getachew et al., 2012; Sangaran and Lalitha John, 2009 where they reported the prevalence were 11.1%, 6.1%, 6.21%, 0.52%, 6.13% and 7.1%, respectively. This variation might be due to unhygienic and poor management, grazing over infected pasture and the presence on number of stray dogs in the goat rearing area. In our country, the higher infection rate of hydatidosis might be due to the presence of backyard slaughtering system, contact between a large numbers of stray dogs with goats, improper disposal of affected offals and eating of such type of uncooked offals by the dogs.

In this study, role of sex in the occurrence of hydatidosis was examined. Male goats (13.25%) were found more susceptible than the female goat (9.27%) (Figure 1) though the result was not statistically significant. This observation compared with the findings of Hassan et al., 2016; Roberts et al., 2014; Iqbal et al., 2012 where they found the prevalence in male and female 5.18% and 5.99%; 6% and 25%; 7.58% and 8.25% respectively. On the other hand, the study supports the findings of Kabir et al., 2010 who reported 65.21% and 34.78% prevalence in male and females, respectively. It might happen that examined slaughtered female goats were reared within house premises for kids feeding and thus got little chance of contact with stray dog, whereas, male goats were kept free, so more contact with stray dogs rendered it more chances of getting hydatidosis. Besides, male goats were more slaughtered than the female goats due to customer preferences in the studied abattoirs.

Occurrence of hydatidosis in goats was compared between two breeds. Black

Bengal goats revealed higher prevalence (13.52%) than Jamunapari goats (7.04%) (Figure 2). Roberts et al., 2014 showed that cystic hydatidosis is common and widely distributed in local goats and they might play an important role in the life cycle and transmission of this zoonosis in Oman. As, Black Bengal goat is a local breed and more prolific than Jamunapari goat, so, goat rearing nomadic people give less attention than their counterpart thus getting more chance of getting contamination from stray dogs. This result may also explain the immunity of Black Bengal goats towards echinococcosis, is more susceptible than those Jamunapari goats; however, it needs more investigations to prove this hypothesis.

Incidence of hydatidosis is greatly varied with age (Kebede, 2009; Yadav et al., 2014). In this study, the highest incidence was recorded in goats age group-C ( $\geq 4.1$ ) years (17.59%) followed by group-B (3.1- 4 years; 12.32%) and group-A ( $\leq 3$  years; 5.15%) (Figure 3), which were more or less similar to those reported by Yadav et al. (2014). This could be attributed to the fact that aged animals have more chances of exposure to the eggs of *Echinococcus granulosus* (Azlaf and Dakkak, 2006). Minimum 10 months is required for formation of full grown hydatid cyst, though initial development is achieved within 10-14 days (Thompson and Lymbery, 1988), so, large sized cyst can easily be detected by the meat inspector or researchers through naked eye that might be another reason of higher incidence in higher age groups.

Seasonal incidence of hydatidosis in intermediate host is poorly studied. In this study, highest prevalence was recorded in rainy season 22.39%, followed by spring 12.97%, summer 7.31%, and winter season 6.67% respectively (Figure 4). These results are in resemblance with the results of Iqbal et al., (2012), who reported 24.16% (Spring, Mar-Apr), 25.50% (Summer, May-Sep), 27.52% (Autumn, Oct-Nov) and 22.82% (Winter, Dec-Feb). At the same time, this



finding was compared with the study of Jarjees and Al-Bakri, 2012 who recorded the seasonal prevalence was 1.25% (Winter, Jan-Mar), 0.41% (Spring, Apr-Jun), 0.0% (Summer, Jul-Sep) and 0.41% (Autumn, Oct-Dec). Seasonal variations of hydatidosis might be due to the differences in the environmental conditions, geographical location, time variation, rainfall and climatic condition etc. However, intensive analysis is necessary to find out the effective factors.

Hydatid cyst can develop in any soft tissues of animal body but major predilection site is in the lung and liver (Kebede et al., 2009). In this study, highest prevalence was found in the liver (48.49%), followed by 27.27% in the lungs and 24.25% in both the lungs and liver (Figure 5). Researchers reported different percentages of liver hydatid cyst around the globe, such as, Adugna and Ayalew, 2015, Iqbal et al., 2012, Yadav et al., 2014 and Jarjees and Al-Bakri, 2012 reported incidence of liver hydatid cysts were 56.7%, 40.56%, 2.3% and 40%, respectively. Incidence of hydatidosis in lung (27.27%) was compared with the findings of Adugna and Ayalew, 2015, Iqbal et al., 2012, Yadav et al., 2014 and Alam et al., 2001 who reported the incidence rate in lungs were 40%, 34.38%, 3.4% 0.40% and 32.03%, respectively. Moreover, the incidence in both lungs and liver (24.25%) were compared with the findings of Iqbal et al., 2012 and Yadav et al., 2014 who recorded the prevalence 16.95% and 14.1%, respectively. This variation in prevalence might be due to geographical location, breed variation etc. Location of liver near to the intestinal mucosa might be a reason of higher incidence of hydatidosis there assuming that oncosphere easily reach the portal circulation by penetrating intestinal mucosa; though oncosphere spread throughout the body via blood circulation, due to their size most of them are settled in liver parenchyma and develop cyst there.

Grossly, the liver revealed single to multiple hydatid cyst in both surfaces of liver (Figure 6A and 6B); the cysts were 2-5 cm in size

filled with watery fluid that is consistent with the findings of other researchers such as Beigh et al., 2014 and Ibrahim and Gameel, 2014. The both left and right diaphragmatic lobe and apical lobe of lung showed hydatid cyst as of liver (Figure 8). Similar findings have been reported by other scientists (Beigh et al., 2014; Ibrahim and Gameel, 2014).

Histopathological changes in affected organ varied with age, stage of development of the cyst and organ involvement. Microscopically, the sections from the infected lungs showed laminated membranes surrounded by a zone of cellular infiltration of inflammatory cells predominantly lymphocyte, plasma cells, macrophages and giant cells with encapsulation of fibrous connective tissue layer and calcification (Beigh et al., 2014). Proliferated fibrous connective tissue in the cystic wall and infiltration of inflammatory cells in the lung parenchyma with compressed alveoli were observed in this study (Figure 14). Liver cyst also showed similar histopathological findings with vacuolated hepatocytes (Figure 9), hepatic edema (Figure 10), hepatic fibrosis (Figure 11) with infiltration of inflammatory cells (Figure 8); laminated layer of cystic wall and presence of pocket within wall was discernible (Figure 7 and 12). Similar lesions were also reported in liver in other places (Beigh et al., 2014; Ibrahim and Gameel, 2014; Verma and Swamy, 2009).

### Summary and conclusion

Larval stage of *Echinococcus* tape worm is less harmful to goat as it does not produce severe and acute form of disease. But it has great public health significance when cystic stage attacks central nervous system or other vital organs of human body. Cooking system of Indian subcontinent makes little chance of transmission to man by ingestion of infected meat and offal but it degrade the meat quality of infected organ and even make unsalable from the aesthetic point of view, leading to high economic losses. This study focused on the incidence of

slaughtered goats by inspecting different organs, especially liver and lungs. A total of 278 slaughtered goats were examined to determine the incidence of hydatidosis in goats from the abattoirs of Barishal metropolitan area of Bangladesh during the period from October 2016 to September 2017. This investigation revealed a total number of thirty three (33) cases of hydatidosis found positive out of 278 goats. The overall incidence of hydatidosis in goats was 11.87 %. The prevalence of hydatidosis was more in male goats than female goats. Among breed susceptibility, Black Bengal (BB) goats were found to be more susceptible than Jamunapari goats. The prevalence rate was higher in adult (Group C  $\geq 4.1$  years) goats as compared to the young (Group A  $\leq 3$  years) goats. In this study, liver was the mostly infected organ followed by lungs and both lungs and liver. Highest prevalence was found during rainy season and lowest prevalence was found during winter season. In the histopathological examination, major findings were hepatic edema, vacuolated hepatocytes and presence of pockets in hydatid cyst wall with infiltration of inflammatory cells in livers. On the other hand, affected lungs revealed a thick coat of granulation with fibrosis, resulting in atelectasis and compressed lung alveoli. From the present and previous studies on hydatidosis of domestic animals, it is clear that goats play an important role as intermediate host in the life cycle of *Echinococcus granulosus*. With regard to the high incidence of this metacestodes in the goat, investigation of current status of the hydatidosis in human is warranted. Hence, a strict inspection of meat at slaughter houses by registered veterinarians and control the access of livestock to contaminated pasture with the feces of dogs are imperative as the major preventive and control measures. It is therefore highly recommended that public awareness about hydatidosis, quality veterinary extension services and improvement of slaughter policy are

essential to avoid infections in humans in Bangladesh. The findings of this investigation will contribute to the farmers as well as common people to build up awareness about the sources of infection and its control.

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