

A CASE REPORT ON *Strongyloides papillosus* IN A GOAT



By

Ireen Sultana

ID: C 26

Roll: 10/67

Reg: O545

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The Author

Plagiarism certificate

This report is a significant new work/knowledge. No sentence, equation, diagram, table, paragraph or section has been copied verbatim from previous work unless it is placed under quotation marks and duly referenced. The work presented is original and own work of the author (i.e. there is no plagiarism). No ideas, processes, results or words of others have been presented as Author own work. There is no fabrication of data or results which have been compiled/analyzed. There is no falsification by manipulating research materials, equipment or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

The Author

Chapter I- Abstract

Strongyloides papillosus is a gastrointestinal parasite, which is very common in small ruminant and causes serious health problem in all over Bangladesh. This case study enumerates the clinical signs, postmortem findings as well as detail diagnosis and treatment protocol. A one year old female cross goat, weighing 30 kgs was brought to the Sahedul Alam Quaderi Teaching Veterinary Hospital (SAQTVH), Chittagong Veterinary Animal Sciences University (CVASU) with the history of loss of appetite and dullness for last 15 days. On the basis of clinical signs (diarrhea, anemia, dermatitis), followed by coproscopy of (Embryonated egg) and clinico-biochemical parameters (Hemoglobin-2gm %), the case was diagnosed as Strongyloidiasis. The condition of the goat was not improved after using hematinic mixture and steroid drug. The goat become weak gradually due to severe anemia and loss of appetite and finally died after 2nd day of treatment. Postmortem (PM) examination was conducted to further confirm the causes of dead and found that, the mucous present in intestine as well as pneumonia which may confirm the strongyloidosis of this.

Keyword- Strongyloidiasis, GI parasite, Diarrhea .

Chapter II - Introduction

Livestock is one of the most potential sub-sectors of agriculture which plays an indispensable role in promoting human health and national economy of Bangladesh. It is not only assists to upgrade the financial condition but also makes a substantial contribution to human nutrition.

Livestock is an integral part of farming system which has a better contribution to enhance the economy of Bangladesh. The present population of livestock is 23.12 million cattle, 1.39 million Buffalo, 24.15 million goat and 3.07 million sheep (DLS, 2010-11).

Despite of other livestock population goat possess the second important position which plays an important role in the rural economy and earns substantial amount of foreign currency through exporting skin and other by products (Alam, 1993). The estimated goat population was 34.4 million in 2001 and in 2002, it was 36.9 million (FAO, 2003). Among the total population, 97.90% are distributed in rural areas and rest in urban areas (BBS, 1986).

Most of goat population are reared in houses under the traditional husbandry practices and reared for several purposes like meat, wool and skin production (Hossain *et al*, 2004)

However goat rearing is hindered by various problems. Parasitism is one of the important limiting factors. The climatic condition of the country favors the development, growth and survival of various parasites. (U.k.Mohanto *et al*, 2007). According to FAO (1990), the estimated loss of productivity of animals in terms of mortality, loss of meat and milk, generation loss, loss of reproductive rate due to animal parasites extent upto 50% in Bangladesh .

Among the parasitism gastro-intestinal parasites are very common threat for the livestock population in Bangladesh. The infection rates are variable depending upon different intrinsic and extrinsic epidemiological and biological factors. The economic losses may be in the form of high mortality, decreased productivity, reduced weight gain and other means resulting globally from parasitic diseases (S. A Sardar *et al*, 2006).

Moreover goat with helminth infection usually shows the inappetite (Qadir, 1967; Haq and Shaikh, 1968). With concomitant reduction of food intake, an increased passage of food through the digestive tract, indirectly may be the cause of decreased food utilization and eventually decrease the synthesis of protein in the skeletal muscle and immune suppression (Soulsby, 1965).

.Common infection of gastrointestinal parasite (GI) like, Haemonchosis, Trichostrongylosis, Oesophagostomiasis and Monieziasis, Strongyloidiasis that impaired the growth and productivity of goats (Speedy, 1992).

Previous study showed that 25% kids and 43% adult are died due to infection of GI parasite both in rural and farm condition (Rahman *et al.*, 1975). Prevalence of various GI parasites in goats were reported as *Strongyloides spp.*, (0.9%), *Capillaria spp.*(0.45%), *strongyles* (77.92%) and *Trichuris spp.*(6.31%) (Arkong Sangvaranond *et al*, 2010)

Among them *S. papillosus* infections, especially in small ruminants causes serious health problem all over in Bangladesh. *Strongyloides* is a genus that containing some 50 species of obligate GI parasites of vertebrates (Speare, 1989). Except ruminants, birds, reptile's mammals and amphibians are also infected by *Strongyloides*. . Indeed, in many cases the specific designation may have been attributed largely by the host species in which the parasites were found. Investigation shows that, most species appear to be able to infect one, or at most a very few, host species (Mark E.Viney, 2007).

The life cycle of *S. papillosus* is complex and special. Complete development occurred in both asexually and bisexually. Inside a final host, reproduction is parthenogenic that is called homogonic cycle. The adult females lay eggs (up to 2000 a day) asexually, i.e. not fertilized by males but nevertheless capable of developing to adult worms. These eggs contain an already developed embryonated or L1 larva when deposited. The asexually producing eggs are shed outside the host with its feces. In the environment some of these eggs hatch and develop directly to infective L3 larvae within 2 to 3 days. Under suitable conditions, they can remain infective in the environment for up to 4 month, but they don't resist cold and dryness. These larvae re-infect a host through the skin or are ingested with contaminated Pasture, food or water. After ingestion they goes to lungs, trachea, mouth and small intestine through blood vessel.

Other larvae develop indirectly, i.e. they follow a bisexual path and maintain heterogonic cycle. After mating, adult female produce fertilized eggs that develop to infective L3 larvae within 7 to 10 days. These free-living bisexually produced larvae can either complete development to adult males and females in the environment or infect a host through the skin or orally. In the host's gut they complete development to adults but only females are produced, which begin producing eggs parthenogenetically.

Some migrating larvae may not follow the usual path to the lungs but reach other organs, including the placenta, the udders and the milk. This way they can be directly transmitted to the sucklings (galactogenic transmission). Transplacental or perinatal is also possible (Mark. E. Viney *et al* 2011.)

Goats are infected percutaneously with either single or multiple, low or high levels of *S. papillosus*. Young goat's upto 12 months of age are mostly susceptible. Some animals developed immunity so they show substantial resistance to infective doses. Diarrhea, misshapen, elongated fecal pellets terminally, dehydration, anorexia, cachexia, gnashing of teeth, foaming at the mouth, anemia and nervous signs such as ataxia, a wide-based stance, stupor and nystagmus are found as clinical sings in goat infected with *S. papillosus*. A 'pushing syndrome' was seen in 22% of the animals.

In addition enteritis, status spongiosus in the brain, hepatitis leading to rupture of the liver, nephrosis, pulmonary edema, interstitial pneumonia are the major pathological change. About 6% of the goats died acutely from fatal hepatic rupture.

The development of an acquired immunity was determined. The immunity by allergic skin reaction at the application site of larvae or injection sites of larval metabolites. The most profound clinicopathological changes induced by the parasites were an anemia (most pronounced in the young goats) and hypophosphataemia. Copper (Cu), Manganese(Mn), Selenium(Se) deficiency provide evidence of Strongyloidiasis in some goats.(Pienaar JG,1999).

Despite of the severity and economic importance of Strongyloides infection limited study was conducted to find out the real features of a Strongyloides infected goat in Bangladesh.

Therefore in this study, we have investigated the clinical features of a Strongyloides infected goat. Here we enumerate the clinical signs, postmortem findings as well as detail diagnosis and treatment protocols of Strongyloides.

Additionally the retrospective data for last 6 month was collected from SAQTVH and analysis to reveal the prevalence of Strongyloides infection in Ctg Metropolitan areas.

Objectives

- I. To investigate clinical findings of strongyloides affected goat.
- II. To study the postmortem examinations and to record major gross changes in strongyloides affected goat.
- III. To study the information on hematological changes in *S. papillosus* affected goat.
- IV. To know the efficacy and prognosis of treatment protocols used to give for the treatment of Strongyloides affected goat.

Chapter III - MATERIALS AND METHODS

3.1 Location and duration of the study

The study was conducted in SAQTVH, CVASU, Chittagong. During my internship placement in SAQTVH, I have observed remarkable number of *Strongyloides* infected goat in hospital which make me interested in working on Strongyloidiasis in goat. Consequently I have started to collect data for last 6 month which is started from January until July 2015. Finally I have decided to work on a particular case that represents the common condition of *Strongyloides spp* affected goat in Chittagong.

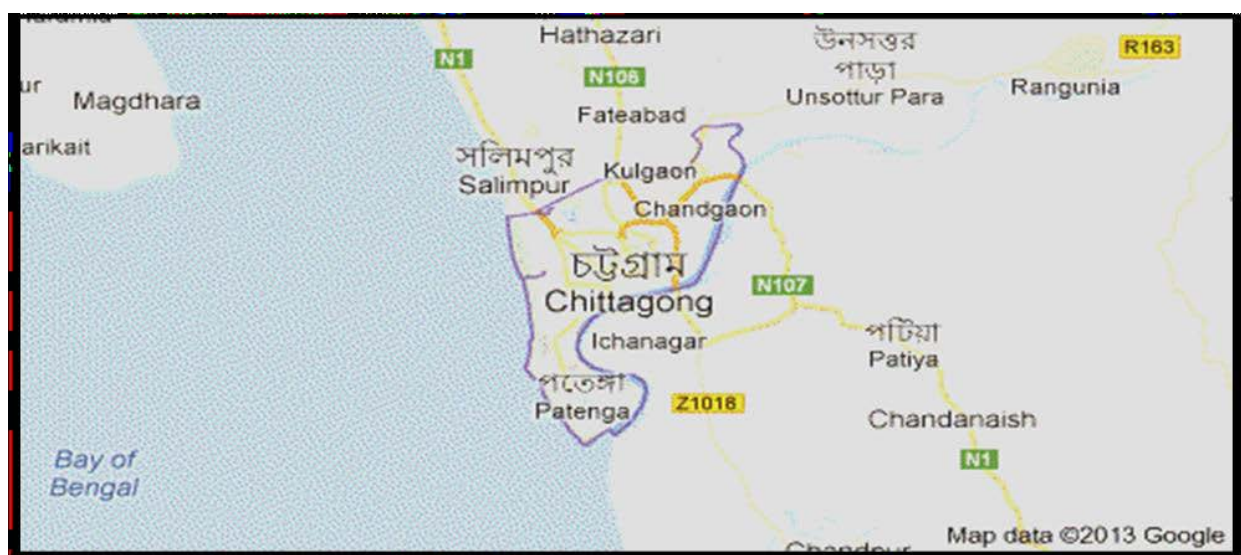


FIG 2.- Site of study conducted

3.2 Tools of diagnosis

Diagnosis of Strongyloidiasis was made by means of history and clinical signs like dullness, depression, and tremendous weight loss, diarrhea followed by severe anemia, dehydration and difficult breathing. The degree of dehydration was estimated by conventional skin fold test. The confirmatory diagnosis was supported by coproscopy, hematological findings and post mortem examination results.

3.3 Anamnesis

A one year old female local goat weighing 30 kg was brought to the teaching veterinary hospital, CVASU with the history of loss of appetite, dehydration, and weight loss for last 15 days.

3.4 Clinical examination

By close inspection respiratory difficulty was found. For the confirmation, respiratory rate and condition was investigated by indirect auscultation. Other clinical examination, like indirect palpation and skin fold test were conducted to find out the temperature and dehydration respectively. Finally characteristics clinical sings were recorded to diagnose the infection of this goat.



Fig 2 : Dull and Depressed goat



Fig 3: Pale mucous membrane

3.5 Paraclinical examinations:

3.5.1 Microscopic examination

Direct method:

Several drops of water with an equal amount of feces were placed on a glass slide. The water and feces were mixed together with a wooden applicator until the solution was homogenous. Then solution was smeared over the slide into a thin film, if there were any large particle then it should

be removed. A cover slip was placed over the smear and examine under microscope at 10x and 40x.



Fig-4: Coproscopy of feces



Fig- 5: Embryonated egg of *S. papillosus*

Mc master technique:

3gm feces with 45ml water were taken in a marked plastic jar. After shaking the mixture properly it was filtrate with a fitter paper. 15 ml of this mixture was taken in a centrifuge tube and centrifuge at 1500 rpm. After centrifugation pour off the supernatant and then flotation fluid (Zinc Sulphate ($ZnSO_4$) 384gm and Distilled water 1lit) was added upto 15ml marks. Chamber of Mc master slide filled with the above suspension fluid by using Pasteur pipette and leaving the slide for 2-3 min. The Mc master slide was then set on the microscope and counting was done at 10xand40x.

3.5.2 Hematological examination

Blood samples were taken from affected goat and blood parameters were analyzed to see the blood parameters as previously described through using “Human Analyzer”. In this automated machine we provide a tube containing blood sample into a circular carouseis that rotate to make the sample available and different reagent was used according to the manual to see different blood parameters.

3.6 Postmortem examination

Routine inspection procedures for adult sheep and goat consist of a visual examination of the dressed carcass, head, and viscera. In addition, the lungs, heart, and liver shall be palpated.

The retropharyngeal lymph nodes shall be incised except for partially dressed carcasses, where it may be easier to incise the parotid lymph nodes. The mesenteric lymph nodes shall be observed. In addition, the bronchial, mediastinal, hepatic, and superficial body lymph nodes (subiliac, superficial inguinal or mammary, superficial cervical) are to be routinely visualized and palpated.

Lymph nodes shall be incised whenever palpation is inadequate to determine the absence of abscesses indicating caseous lymphadenitis, (Merck Veterinary Manual; September 2013).

For post-mortem worm recovery, identification and enumeration, after slaughtering the entire GI tract, liver and lungs of each goat were collected and processed separately, and then collected materials were transported within 24 h to the parasitology laboratory, (Urquhart et al., 1996).



Fig-6: Pneumonic lung

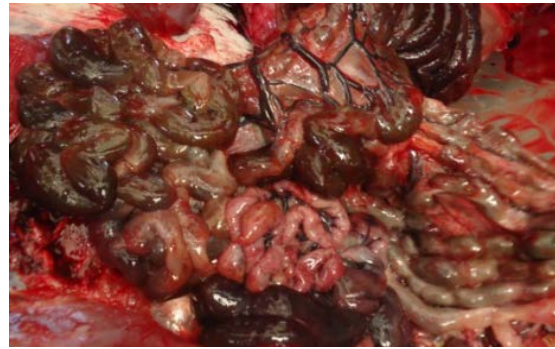


Fig-7: Hemorrhage in intestine

3.7. Treatment:

After the confirmatory diagnosis, supportive treatment was given to the patients. The therapy regime as Hematenic mixture of Reneta that is Inj.Hemovit (10ml) that contain vitamin B₁₂(120mg), B₁(75mg), B₂(2mg), B₆(5mg), pantothenic acid(20mg), nicotinamide(100mg), Ferrus(Fe)(15mg), Cobalt(Co)(0.7mg), Copper(Cu)(0.2mg) and also given steroid drug of Techno Inj. Dexavet(10ml) which contain Dexamethasone Sodium phosphate(NaPO₄) (2mg/ml).

Chapter IV- Result and Discussion

4.1 Prevalence of Strongyloides in goat in Ctg. Metropolitan area

In 6 month total number of goat was 65 with parasitic infection. In the entire period of observation 65 goats were clinically examined of which 10 were identified with strongyloidiasis, which indicating the overall prevalence was 15.38% (Table .1). The prevalence rate of *S. papillosus* irrespective of month was in January 33.3%, February 20%, March 28.75%, April 0, May 5.55%, June 23, 1% July 20%.

The overall prevalence of *S. papillosus* infections in goats of this study showed consistency with the observation of Howlader *et al* (2012), Hasan *et al* (2012), Khajuria *et al*(2012),Terefe D *et al*(2012) Koinari *et al.* (2012) who recorded 16.67% in Shyllet, 51.74% in Chittagong, 4.2% in Jammu province, 4.7% in Ethiopia and 8.2% in Papua New Guinea respectively.

Variation in occurrence of GI parasite infection might be due to geo-climatic condition, sample size, breed, age, sex, plane of nutrition, stress, availability of intermediate host, vegetation, grazing pattern, rearing and husbandry measures, deworming, generic resistance etc. (Hansen and perry, 1999).

Table 1: Prevalence of Strongyloidiasis in Ctg. Metropolitan area

Duration	Total no. of animal with parasitic infection.	Total no. of <i>S.papillosus</i> affected goat	Prevalence
January – July	65	10	15.38 %

Table 2: Prevalence of strongyloidiasis irrespective of month

Month	Parasitic infestation	Strongyloidiasis	Prevalence
January	3	1	33.33%
February	5	1	20%

March	7	2	28.57%
April	9	None	0
May	18	1	5.55%
June	13	3	23.1%
July	10	2	20%

4.2 Clinical findings of infected goat

Loss of appetite, severe anemia, dullness and depression, diarrhea, pale mucous membrane, difficult breathing and dermatitis are the clinical signs of strongyloidiasis. Diarrhea is the major clinical sign due to catarrhal inflammation in the intestine and dermatitis occurs due to skin penetration.

4.3 Blood picture of infected goat

The blood parameter pictures of Strongyloides affected goats were shown compared with normal goats in Table 4.3. Here the blood protein level of SGPT is 74.7U/L where normal level is 19 U/L which is much higher than normal level, which clearly indicates abnormality in liver function. The SGOT level was recorded as 51.0 U/L, where normal level is 167-513 U/L, which is lower than normal level indicating vitamin B₁₂ deficiency in goat.

Table 3: Blood examination report (Liver function test)

Name of the test	Result	Normal range
S.GPT	74.7	Upto 19 U/L
S.GOT	51.0	167-513 U/L
S. Total protein	61.2	67.4-74 gm/l
S. Albumin	32.25	27-39 g/dl

The parameter the hemoglobin level of strongyloides affected animal is much lower than the normal level. It can be disrupted the transport of oxygen from lungs to the tissue, change the pH of blood. In this case the animal may suffer from macrocytic anemia. The level of packed cell volume (PCV) is decreased (10%). PCV is the percentage of red blood cells in circulating blood. A decreased PCV generally means red blood cell loss from any variety of reasons like cell destruction. In case of blood, blood loss, and failure of bone marrow production, lymphocytes

level is also increase 49% which is more than normal level that indicate suppressed immune system. There was also increase level of eosinophil that is 13% was found which is pretty higher than the normal level 1-8%. Indicating the animal is affected by parasitic infection. From all above findings, we can conclude that, the goat was suffering with the parasitic infection, particularly *Strongyloides*.

Table 4: Blood examination (RE)

Name of the test	Result	Normal range
Hemoglobin	2	8-12 gm%
ESR	1	
Total count		
Total count of Rbc	9.54	8-18 million/cumm
Total count of WBC	10.2	8-12(million thousand/cumm)
PCV	10	50-70%
Differential count of WBC		
Lymphocytes	49	22-35%
Neutrophill	32	30-48%
Eosinopholl	13	1-8%
Monocyte	6	0-4%

4.4 Microscopic examination of feces

4.4.1 Qualitative test

Feces were collected according to the standard protocol and qualitative test were performed. The ellipsoidal shape with thin wall containing a larva that is embryonated eggs were found (Figure 5). This morphology identifies the eggs as *Strongyloides*. Moreover, the presence of larvae in fresh feces confirm *Strongyloides* infection

4.4.2 Quantitative test

Under Mc master technique we have detected the degree of infection. The Modified McMasters technique was applied to a fecal sample obtained from affected goat. Here we have 5 egg in one chamber, so in one chamber egg per gram is 500. That is very severe form of infection. Severe anemia and dehydration of this goat also supporting the above findings.

4.5 Response of treatment

The goat was severely cachectic and anemic (Hb-2gm %). In that case anthelmintics was not given the goat due organophosphorus poisoning, decrease metabolic rate. Hematinic mixture was given to prevent anemia, and Steroid drug was given to increase metabolism. But the animal was not response to the treatment and day by day its health condition was decrease due to severe anemia and dehydration. The animal was died at 2nd days of treatment and after dead postmortem examination was performed.

4.6 Postmortem examination of *S. papillosus* infected goat

Postmortem was performed after the failure of treatment e.g. previously described. After opening of dead carcass the different organs were grossly checked for presence of any lesion and found that intestinal villi was atrophied and catarrhal inflammation which prove that the Strongyloide larva were penetrating the mucosa for a long time.

Conclusion

Strongyloidiasis becoming a major problem for goat in Bangladesh. Present study was conducted to reveal the clinical sign and postmortem lesions of Strongyloidiasis in goat. Through this study we identified the egg of *S. papillosus* by coproscopy, but genomic identification was not possible. If genomic identification is possible in near future it may help to understand their life cycle and treatment procedure more clearly.

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Biography

Name	Ireen sultana
Present position and affiliation	Intern student, 15 th Batch, FVM, Chittagong Veterinary and Animal Science University.
Educational background and year	Doctor of Veterinary Medicine in 2015 (appeared), Chittagong Veterinary and Animal Science University.
Research interest	Genomic identification of <i>Strongyloides</i> sp in Bangladesh.
On going research	A case report on <i>Strongyloides papillosus</i> in a goat