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Coenurus cerebralis infection (Gid disease) in Black Bengal goats; Effects on certain blood values after surgical treatment

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ABSTRACT

The study was carried out in 35 Black Bengal goats (29 females and 6 males) affected with coenurus cerebralis (Gid disease). The occurrence of Gid disease was more frequent in the females (82.86%), also among females pregnant does were found to be more vulnerable (65.52%). The disease predominantly occurred (51.4%) in the animals between 1-2 years of age. All the affected goats were found to be emaciated and listless. The disease was more common in the rainy season compared to other seasons. In Gid diseased goats rectal temperature decreased significantly ($P<0.05$) while the pulse rate and respiration rates underwent no significant changes. After surgery (1 and/ or 2 weeks), hemoglobin (Hbgm %), packed cell volume (PCV %) and total erythrocyte count (TEC million/cumm) all increased significantly ($P<0.01$) compared to presurgical values. In contrast, total leukocytes counts (TLC thousands/cumm) decreased significantly ($P<0.01$) compared to presurgical values. All the goats were recovered completely after surgical operation. It is suggested that a better nutrition must be provided after surgical removal of the cyst in order to improve animal body condition.

Key words: **Black Bengal goats, Coenurosis, Gid disease, Treatment, Hb, PCV, TEC, TLC**

1. Introduction

Multiceps multiceps or Taenia multiceps is developed in the central nervous system particularly Gid is a parasitic disease caused by Coenurus cerebralis the larval stage of the tapeworm in the brain. Coenuriasis in the goats is an endemic disease of Bangladesh; one study reported the incidence to be 5.2 % among the surgical diseases in goats in Bangladesh (Hossain, et.al. 1999). Another study reported the disease having a prevalence of 2.4% (Nooruddin, et.al.2000). Amount of ecological variables (rainfall, relative humidity and air temperature) are considered to be the risk factors for coenuriasis (Rashid, et al., 2000). Due to development of the cyst in brain, the animals start showing nervous signs. These sign comprise ataxia, stumbling paralysis, frequent muscle fasciculation, anorexia, dullness, grinding of the teeth, and blindness in severe condition, incordination and irratic movement (Sharma, 1998; Doherty, et al, 1989). Histopathological examination revealed multiple

scolices growing on the internal layer of the cyst, neuronal degeneration, necrosis and demyelination in the affected cerebrum (Nourani and Kheirabadi, 2009). There is no effective medical treatment against the disease. The affected animal leads to death unless the cyst is surgically removed from the brain. Literature review reveal very little data regarding change of hematological values after surgical treatment in goats. This work was therefore, initiated to achieve the influence of sex, age and seasons in the occurrence of the disease and change of certain blood values.

2. Materials and Methods

This research work was conducted at Bangladesh Agricultural University (BAU) Veterinary Clinic and at the Department of Surgery & Obstetrics from March 2010 to October 2011. Demographic variables: Age, breed, sex, physical condition and hair coat were recorded. A total of 35 (29 Female and 6 Male) Black Bengal goats infected with coenurosis admitted at BAU Veterinary Clinic were enrolled in this study. Among the female goats, 22 were found to be pregnant. Also the clinical history, the clinical examination e.g. softening of the skull bone posterior to the horn, and the date of admission were considered for analysis.

Diagnosis of the disease: A thorough clinical and neurological examinations were conducted for all the Gid cases and the information regarding age, sex, breed and health status were recorded. The animal showing loss of appetite or cessation of feeding, circling movement, repeated bleating and skull softening just behind the horn base were diagnosed as gid disease.

Clinical Parameters: Rectal temperature-was taken after the bulb of the thermometer came in contact with the rectal mucosa. Pulse rate- was taken by palpating femoral artery or by direct auscultation with stethoscope. Respiratory rate was recorded by noting the excursion of the ribs and abdominal wall. Care was taken not to excite the animal before or during counting of the respiratory frequency (So respiratory rate was measured before pulse and temperature).

Total Erythrocyte Count (TEC) & Total Leukocytes Count (TLC): Counting and calculation of those cells were performed as per method described by Coffin (1955). Also hemoglobin (Hb) estimation and packed cell volume (PCV) were performed employing the techniques.

Surgical techniques: The animal was controlled manually with an assistant on lateral recumbency by keeping the affected side upper. The operative area was clipped, shaved and soaked with Tr. of iodine. Soon after sterilization the operative site was blocked by 2% lidocaine hydrochloride, a local analgesic (Jasocaine, Jayson Pharma,). A crosswise incision was given to make four flaps each of which was detached from the subcutaneous tissue by blunt dissection. Bleeding was checked by applying thumb pressure or gauge pressure. The subcutaneous tissue and the thin bone were scrapped then a hole was made sufficiently large enough with the help of a tissue forceps (Toothed forceps) to remove the cyst. A probe was gently introduced a bit and circling was done so that cyst can come out easily. Whenever cyst was found to come out the goat was allowed to jerk its head and move. Then the cyst was slowly removed by holding it with dry cotton and finger. Utmost care was taken not to

allow the cyst to rupture and pour the fluid into the brain. Sometimes it is needed to wrap with thin cotton around the tip of the forceps. Before suturing the skin sulphanilamide powder was applied over the wounds. The flaps were sutured by interrupted pattern with nylon. A benzoin seal was then applied over the wound. In the weak and emaciated animals 5% dextrose saline (500 ml) was administered continuously into the jugular vein during operation.

Postoperative care: A combined antibiotic Like (Streptopen, Renata Bangladesh Ltd) containing procaine penicillin 0.1 million units, benzathine penicillin 0.3 million units, streptomycin sulphate 0.5 gm (plus 5 ml distilled water) was used intra-muscularly @ 2 ml/10 kg body weight daily for 7 days. Intravenous saline was indicated until animals start eating again after surgery. It was advised to keep the animal in a clean house and not allowed to rub its head.

Suture was removed after 7-9 days.

Analysis of data: The Mean of data with its SEM was calculated. Students paired‘t’ test was performed to compare the obtained data before and after Gid operation.

Analysis of Variance (ANOVA) test in completely randomized design was carried out according to Steel and Torrie (1980) to test significance of variance among the effect in different time interval.

3. Results

Effects of age, sex and seasons on the occurrence of gid disease: The influence of age, sex and seasons on the occurrence of gid disease in goats is presented in Table 1. The disease predominantly occurred between 1-2 years of age. The females (especially pregnant) were more vulnerable to the disease (82.8%) than male. The disease predominantly occurred (57.1%) in rainy season than in the other season of the year.

Clinical findings: At the early stage the goat showed signs of anorexia, dullness, easily frightened and frequent muscle fasciculation. Progressive bone softening overlying the cyst and severity of the sign were increased rapidly after few weeks. When bone become soft, thin and rarefied yielded pain under palpation or pressure on it. Subsequently, the goat showed in-coordination, erratic movement, rolling of eye balls, stiffness of neck and signs confusing with other nervous diseases. In case of pregnant doe the signs were more pronounced become cachectic and listless.

Effects of Gid disease on rectal temperature, pulse and respiratory rate: The results of these clinical parameters are presented in Table-2. The mean hemoglobin (Hb) values, Packed cell volume (PCV), Total erythrocyte count (TEC), and Total leukocytes count (TLC) are shown in Table 3 in different time period i.e. before operation, 7 days after operation and 14 days after operation, respectively. The changes of hemoglobin percentages were significant ($P<0.001$) when compared to preoperative value i.e.it was increased. PCV also increased significantly after operation. After surgery the TEC in the Gid affected goats increased

significantly (P<0.001). In contrast, TLC decreased significantly (P<0.001) when compared to preoperative values.

Effects of surgical treatment: All the animals were recovered smoothly after removal of the cyst.

4. Discussion

The disease occurred more frequently in animals between 1-2 years of age. The disease predominantly occurred in female animal particularly in the pregnant does. Although not clear, it may be explained in the following ways: The pregnancy is a stress which might adversely affect the animal's inherent level of immunity. This suppressed immunity may be conducive for receiving infection once the animals get exposed to it; moreover, the pregnant animals require extra feeding for the foetus so the doe become voracious eater. Thus, females are more vulnerable to the infection compare to males. Poor condition (69.5%) associated with malnutrition, parasitic disease and gastroenteritis in Bengal goats is a common problem (Nooruddin, et al., 2000), however, it was not possible to ascertain whether poor animals were susceptible to the disease. The disease predominantly occurred in rainy season. The higher percentages of ecological variables (rainfall, relative humidity and air temperature) are considered to be the influencing factors for coenuriasis (Rashid, et al., 2000). In rainy season, rain causes spread of feces of dog, fox (Final host) over the grasses and these contaminates are responsible for the increased occurrence of gid during rainy season. Clinical findings and severity depends on the condition of the cyst. The cyst in the brain gave pressure the goat rubbed its head against some objects in order to relieve or decrease pressure. Rubbing and inside pressure by the cyst causes softening of the skull bone. Due to loss of appetite the animal become emaciated and cachectic, lusterless. The rectal temperature in goats has been reported to be 103.180F (Ghosh, 1996). With the progress of the Gid disease the temperature become relatively lower. This temperature may be modified due to increased pressure caused by the cyst on the thermoregulatory centres located in the hypothalamus. This observation is supported by Verma, et al (1973). They reported that rectal temperature at the later stage of the disease may vary from 102-1040F. The pulse and respiratory rates of the affected animals before operation were also relatively higher. These increase, however, were not significant when compared with the value recorded at 14 days of operation. The blood sample collected from the gid affected animals at 14 days after operation demonstrated significantly high Total erythrocytes counts (TEC) compared with the preoperative values. This findings support the earlier investigation (Ghosh, 1996). The increase of TEC occurred due to better nutrition, pregnancy lactation and excitement (Swensen, 1977). The animal infected with gid might be emaciated due to prolonged starvation or loss of appetite. The TLC of the infected animals before operation was relatively high and decreased significantly at 14 days after operation. This might be due to increased eosinophils before operation, but number decreased after operation (Swensen, 1977). The increase of PCV and Hb values after operation were within the normal range. These findings also correspondence with the earlier investigation (Ghosh, 1996).

5.0 Conclusions:

It may be mentioned that the disease is more common in pregnant does especially during rainy seasons. Surgical removal of the cyst from the brain may results 100% recovery. No cases of death due to coenuriasis or postoperative death were observed during the period of study

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Table. 1. Effects of age, sex and seasons on the occurrence of Gid disease in goats (n=35)

Parameters	No. of animals infected	Percentage of occurrence
1. Age		
a) Less than 1 year	7	20
b) Between 1-2 years	18	51.4
c) Over 2 years	10	28.6
2. Sex		
a) Male	6	17.2
b) Female	29	82.8
Pregnant	19	65.5
Non-pregnant	10	34.5
3. Seasons		
a) Rainy seasons	20	57.2
b) Late summer	8	22.8
c) Early summer	4	11.4
d) Autumn	3	8.6

Table 2. Effects of Gid disease on rectal temperature, pulse and respiratory rates in different time.

Parameters	Before operation	7 days after operation	14 days after operation
Rectal Temperature (^{0}F)	103.03±0.14	102.00±0.13*	101.30±0.13**
Pulse rate/ min	80.66±0.40	81.43±0.31^{NS}	82.17±0.31**
Respiration rate/min	31.23±0.36	31.94±0.34^{NS}	32.09±0.30^{NS}

(=P<0.01, *=P<0.05 =Significant, NS=P>0.05= Non-significant)**

Table 3. Effects of gid disease on Hemoglobin (Hb), packed cell volume (PCV), Total erythrocytes count (TEC) and Total leukocytes count (TLC).

Parameters	Before operation	7 days after operation	14 days after operation
Hb (gm%)	7.84±0.12	8.69±0.13**	9.49±0.13**
PCV (%)	25.49±0.33	28.60±0.24**	32.14±0.29**
TEC (million/cumm)	9.30±0.21	15.4±0.23**	15.99±0.18**
TLC (thousand/cumm)	18.71±0.30	15.59±0.29**	12.44±0.25**

(= P<0.001=highly significant)**

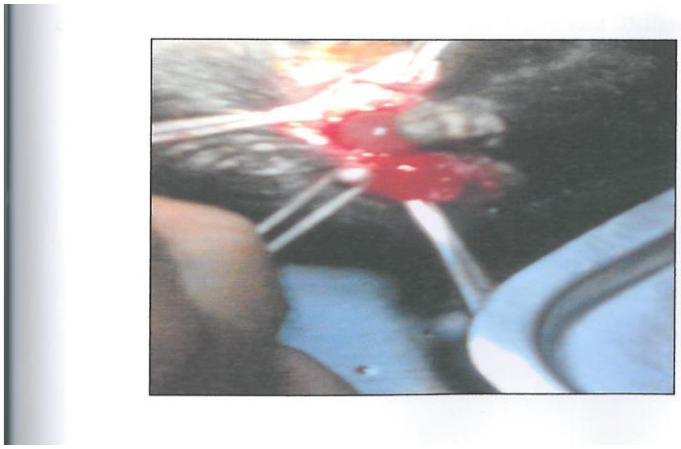

Fig 1. Operative technique for removal of an intact coenurus cyst from the brain of a goat.