

Chapter 1: Introduction

The invasion of *Coenurus cerebralis*, the larval stage of the canine tapeworm *Taenia multiceps* or *Multiceps multiceps*, causes coenurosis, commonly known as Gid or staggers, a localized, space-occupying deadly disease of the central nervous system. Dogs and other canids have adult worms that dwell in their tiny intestines (Soulsby, 1986). Although camels, deer, pigs, horses, and humans are the most common intermediate hosts for this tapeworm, it can also be found in camels, deer, pigs, horses, and cattle (Yoshino and Momotani, 1988). Infection develops as a result of grazing in dog-feces-infested pastures, followed by larval invasion of the central nervous system and the onset of clinical illness (Sharma and Chauhan, 2006). The migration of parasitic stages into the nervous system is linked to pathogenesis. In the vast majority of cases, the animal dies of malnutrition after a few weeks.

Hippocrates was the first to describe Gid in sheep (Himonas, 1979). The sickness in goats is diagnosed and treated in a different way (Razig and Magzoub, 1973; Ahmed *et al.*, 1974). (Komnenou *et al.*, 2000) detailed the surgical approaches for eliminating cysts in sheep, whereas (Oryan *et al.*, 2010) presented the pathological, molecular, and biochemical characterizations.

Coenurus cerebralis is a serious disease in sheep and goats all over the world, with an incidence of 1.3% to 36.8% in Turkey (Uslu and Güçlü, 2007). The disease is primarily seen in goats in Bangladesh, and it has become one of the most lethal goat diseases. According to one study, the incidence of surgical disorders in goats in Bangladesh is 5.2 percent (Hossain, 1991). According to another study, the condition affects 2.4 percent of people (Nooruddin *et al.*, 2000). Coenurosis is one of the most frequent central nervous system illnesses in sheep in the United Kingdom (Brewer, 1983), with a particularly high frequency in some places. This illness appears to have been eradicated in the United States (Skerritt, 1991).

The animals acquire neurotic indications as a result of the cyst developing in their brain, resulting in production losses and potentially death (Oryan *et al.*, 2012). Coenurosis has been described in both acute and chronic types (Scott, 2012). Various degrees of blindness, intermittent muscle tremors, ataxia, tripping, paralysis, anorexia, dullness, chewing of the teeth, and circling movement are examples of nervous symptoms (Yoshino and Momotani, 1988). Awkward demeanor and postural changes are common symptoms. However, depending on the cyst's location and size, symptoms may differ. Medically, there is no effective treatment for the illness. Unless the cyst in the brain is surgically removed, the infected animal will die. The surgical procedure for removal of cyst and post-operative treatment of a goat with *coenurus cerebralis* is described in this article.

Chapter 2: Materials and Methods

Case History

On 11 April 2021, a 2 year-old, female Black bengal goat weighing approximately 20 kg was brought to the Upazila Veterinary Hospital and Livestock Office, Gafargaon, Mymensingh with a history of anorexia, circling, bleating and head pressing against the wall.

Clinical Examination and disease diagnosis

A. By Physical Examination

a. Close Inspection

Firstly close inspection was done carefully to observe the presenting sign and recorded. On clinical examination, the animal showed circling and uncoordinated movements

b. Direct palpation

By fingertips at the base of the horn were palpated and felt soft bone.

Based on clinical sign's, we diagnosed the case as Gid disease.

Restraining and anesthesia

To keep the goat under control, both physical and chemical approaches were tried. To restrict movement during surgery, the animal was kept in lateral recumbency by keeping the affected side above and tying legs with rope. The surgical site was located between the horns. After thorough cleaning and shaving, the surgical site was soaked with povidone iodine. Anesthesia was obtained by local infiltration of 2% lidocaine hydrochloride solution (Injection Jasocaine®, Jayson Pharmaceuticals Ltd., Bangladesh) at the central point of occipital region.

Surgical Procedure:

A scalpel was used to make a X-shape incision at the base of the horn. Gauge pressure was used to check for bleeding. To remove the cyst, the subcutaneous tissue and thin bone were scraped and a hole was formed with a tissue forceps. A probe was gently inserted and circled to allow the cyst to be easily removed. When a cyst was discovered that needed to come out, the goat was permitted to jerk its head to allow the cyst to protrude. The cyst was then softly drawn out with forceps while being gently held. The cyst containing protoscolices was carefully monitored to ensure that it did not rupture and spill fluid into the brain (Figure 1). Before suturing the skin sulphanilamide powder (Pulv. Sumidvet, Square pharmaceuticals Ltd.) was applied over the wounds. Simple interrupted sutures with a non-absorbable suture were used to seal the flaps (nylon). The wound was then covered with a small bandage.

Postoperative care:

After surgery, sufficient fluid replacements, anti-inflammatory, antihistaminic and antibiotics were administered daily for 5 days. Antibiotic Ceftriaxone (Inj. Trizon vet® , the ACME laboratories Ltd., Bangladesh) was administered intramuscularly once daily for 5 days, Ketoprofen (Inj. Kop vet®, Square pharmaceuticals Ltd., Bangladesh) was administered intramuscularly at a dose rate of 2 ml daily for 5 days, antihistaminic pheniramine maleate (Inj. Asta vet®, Acme Laboratories Ltd., Bangladesh) was injected intramuscularly at a dose rate of 2.5 ml daily. It was suggested that the animal be kept in a clean environment and that it not be permitted to brush its head. There were no complications, and the animal recovered without incident. The suture was removed on the ninth day, and the surgical site was found to be totally healed.

Chapter 3: Results and discussion

Coenurosis is a central nervous system parasitic disease caused by the larval stage of *Taenia multiceps*, which affects a variety of ruminant species, most notably sheep and goats, as well as humans on rare occasions. A goat with probable coenurosis underwent surgery to remove a cyst from the brain in this case. Clinical symptoms of cerebral coenurosis were identified, which were comparable to those described by (Ramoler *et al.*, 1973). The clinical signs of *C. cerebralis* vary depending on where the cyst is located (Sharma and Chauhan, 2006). In this case, the goat's clinical signs included incoordination, ataxia, uncontrollable movements, and circling. The animal was observed tilting its head to the side of the cyst and/or circling in the cyst's direction. Cysts in *C. cerebralis* have been reported to frequently form in the central nervous system. According to studies, 96 percent of CNS cysts are found in the left or right hemispheres, with only 4% in the cerebellum (Nourani and Kheirabadi, 2009).

The infected goat in this investigation was a 2-year-old female goat. Females are more susceptible to infection than males (Amin *et al.*, 2013). In the instance of sheep, Scott (2012) described age variation. The sickness is most usually seen in animals between the ages of 6 and 18 months, but it is rarely seen in animals older than 3 years. Rainfall, relative humidity, and air temperature are some of the ecological variables that are thought to be contributing factors for coenurosis (Rashid *et al.*, 2000).

The presence of clinical signs and weakening of the skull were used to diagnose coenurosis in goats. Previously, ultrasonography was used to make diagnosis in goats (Biswas, 2003). The most crucial information needed to remove a cyst is the location of the cyst in the brain, and ultrasonography can help locate the cyst within the brain. Ultrasonography, on the other hand, provides extremely limited information about cyst positioning. As a result, a thorough neurological examination combined with

ultrasonography is more effective in locating and removing cysts in goats (Biswas, 2003).

Anesthesia was provided by local infiltration of 2% lidocaine hydrochloride in the current surgery, however general anesthesia was also employed in some of the experiments described by Misra and Behl (1993). Before surgery, thorough preoperative preparation is essential, which should include haematologic and blood chemistry values; however, laboratory research of blood parameters was not performed before the current surgery, which is a study constraint.

In this case the success rate was 100% and the goat showed significant clinical improvement after surgical removal of the cyst. And no complications were seen after surgery.

Limitation

We were not able to perform the surgery under complete aseptic condition. As there was lacking of facility in Upazilla Veterinary Hospital. But we tried to maximise the safety by using antiseptics and clean instruments.

Conclusion

The surgical removal of a coenurus cyst from the brain under local anesthetic was documented in detail, with no post-operative problems and a smooth recovery. The cyst in the brain surgically removed, may result in 100 percent recovery. In the field, history and clinical data have been found to be helpful in diagnosing clinical cases.

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Figure 1: Removal of cyst from the brain of the goat

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Biography

I am Niaj Ahmed Shimul, son of Atiqul Islam Babul and Shamima Yasmin. I Passed my Secondary School Certificate examination from Gafargaon Islamia Govt. High School, Gafargaon in 2013 and Higher Secodery Certificate examination from Shahid Syed Najrul Islam College, Mymensingh in 2015. I enrolled for Doctor of Veterinary Medicine (DVM) degree in Chattogram Veterinary and Animal Sciences University (CVASU), Bangladesh. In future, I want to be a veterinary practitioner and want to contribute to the development of the nation.