

Abstract

The purpose of this case report was to describe a surgical approach to remove cyst from the brain of a goat with coenurosis. A four year female Jamnapari goat weighing approximately 25 kg was diagnosed as gid and decided to perform a surgery to remove cysts from the brain after clinical examinations. Following aseptic preparation for the surgery, the operative area was clipped, shaved and soaked with tincture iodine. The operative site was blocked by local infiltration of 2% lidocaine hydrochloride. Incision was made at the base of the horn and cysts were removed slowly by holding it with forceps. Finally, the flaps were closed by simple interrupted sutures using a non-absorbable suture. As a part of post- operative care fluid and antibiotics were administered for a period of 5 days. No complications were noted and the goat showed significant clinical improvement after surgical removal of the cyst.

Key words: Jamunapari goat, Gid disease, Coenurosis, Neurological signs.

Introduction

Coenurosis, commonly known as Gid or staggers is a localized and space occupying deadly disease of the central nervous system (CNS) caused by the invasion of *Coenurus cerebralis*, the larval stage of *Taenia multiceps* or *Multiceps multiceps*, the canine tapeworm. The adult worm lives in the small intestine of dogs, and other canids (Soulsby, 1986). Although sheep and goat represent the common intermediate host for this tapeworm, it can also be seen in camels, deer, pigs, horses, and rarely in cattle and humans (Yoshino and Momotani, 1988). Infection occurs as a result of grazing in pastures contaminated with dog feces and subsequently larval invasion of the central nervous system occurs with the development of clinical disease (Sharma and Chauhan, 2006). Pathogenesis is related with the migration of the parasitic stages into the nervous system. The majority of cases result in the death of the animal from starvation after some weeks.

The very first case of Gid was described in sheep by Hippocrates (Himonas, 1979). The diagnosis and treatment of the disease in goat were described elsewhere (Razig and Magzoub, 1973; Ahmed et al., 1974). Surgical procedures for removing cysts in sheep were illustrated in detail by Komnenou et al. (2000) while the clinical, pathological, molecular and biochemical characterizations were described by Oryan et al. (2010).

Coenurus cerebralis is an important problem in sheep and goats across the world and its incidence in Turkey is reported to be 1.3 - 36.8% (Uslu and Güçlü, 2007). In Bangladesh, Goats are the main susceptible host of the disease and this disease has become one of the fatal diseases of goats. One study reported the incidence to be 5.2% among the surgical diseases in goats in Bangladesh (Hossain, 1991). Another study reported the disease with a prevalence of 2.4% (Nooruddin et al., 2000). In the United Kingdom, Gid disease is one of the most common affections of the central nervous system in sheep (Brewer, 1983) and has a particularly high incidence in certain areas. In the USA, this disease has apparently been eliminated (Skerritt, 1991).

Due to development of the cyst in brain, the animals develop nervous signs leading to production losses and even death (Oryan et al., 2012). Both of the acute and chronic forms of coenurosis have been described (Scott, 2012). Nervous signs comprise varying degrees of blindness, occasional muscle tremors, ataxia, stumbling, paralysis, anorexia, dullness, grinding of the teeth, and circling movement (Yoshino and Momotani, 1988). General symptoms include abnormal demeanour and postural change. However symptoms can vary on the basis of the location and size of cyst. There is no effective medical treatment against the disease. Consequently the affected animal leads to death unless the cyst is surgically removed from its brain. This report describes the surgical procedure for removal of cyst and the post-operative care of a goat affected with *coenurus cerebralis*.

Case Description

On March 2021, a 4 year-old, female Jamunapari goat weighing approximately 25 kg was brought to the Upazila Livestock Office and Veterinary Hospital, Anwara, Chattogram with a history of anorexia, bleating and head pressing against the wall. The animal was fair in body condition. On clinical examination, the animal showed circling and uncoordinated movements (Figure 1). Palpation of the occipital bone between two horns revealed softening. Other clinical parameters (temperature, respiration and pulse rates, size of lymphnodes and status of dehydration) were within normal limits. Based on all these clinical signs, it was diagnosed as a case of coenurosis or gid, and decided to perform a surgery.

Restraining and anesthesia

Both physical and chemical methods were used to control the goat. The animal was placed in lateral recumbency by keeping the affected side upper and tied with rope in order to limit movement during surgery. The surgical site was located between the horns. After thorough cleaning and shaving, the surgical site was soaked with tincture iodine. Anesthesia was obtained by local infiltration of 2% lidocaine hydrochloride solution (Figure 02) at the central point of occipital region. Surgical preparation was performed as described by Rahman et al., 2017.

Surgical technique

The surgical approach that was applied on this goat as mentioned by Komnenou et al., 2000. An incision was given at the base of the horn with scalpel (Figure 3). Bleeding was checked by applying gauge pressure. The subcutaneous tissue and the thin bone were scrapped and a hole was made with the help of a tissue 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 to enable the protrusion of the cyst. Then the cyst was slowly pulled out by gently holding it with forceps (Figure 4). Utmost care was taken not to

allow the cyst with protoscolices (Figure 5) to rupture and pour the fluid into the brain. The flaps were then closed by simple interrupted sutures using a non-absorbable suture (nylon) (Figure 6). After suturing, sulfonilamide powder and herb oil was applied over the wounds to prevent flies. A small bandage was then applied over the wound.

Post-operative care

After surgery, sufficient fluid replacements, anti-inflammatory, antihistaminic and antibiotics were administered daily for 5 days as described by Biswas, 2013. Antibiotic Ceftriaxone (@ 10 mg/kg BW) was administered intramuscularly once daily for 5 days and 500 ml of 5% dextrose saline was given intravenously to maintain the fluid level. Meloxicam (@ 0.5 mg/kg BW) was administered intravenously at a dose rate of 2.5 ml daily and continued for 5 days to minimize inflammation and antihistaminic pheniramine maleate (@ 0.8 mg/kg BW) was injected intramuscularly at a dose rate of 2 ml daily for 5 days. It was advised to keep the animal in a clean house and not allowed to rub its head. No complication was noted and the animal had an uneventful recovery. On the 9th day the suture was removed and it was noticed that the surgical site was healed completely (Figure 7).

Discussion

Coenurosis is a parasitic infestation of central nervous system caused by the larval stage of *Taenia multiceps* which affects ruminant species particularly sheep and goats and occasionally humans. In the present case, a goat with suspected coenurosis was underwent surgery to remove cyst from the brain. The typical clinical signs of cerebral coenurosis were observed, similar to those which were reported by Ramoler (Ramolar, 1973). Clinical symptoms in *Coenurus cerebralis* vary depending on the location of the cyst (Sharma and Chauhan, 2006). The clinical symptoms reported in the goat of present case were incoordination, ataxia, uncontrolled movements, and circling. The animal was noted to tilt its head towards the side of the cyst and/or circle to the direction of the cyst. In *Coenurus cerebralis*, it had been reported that cysts often localize in the central nervous system. Studies showed that 96% of the CNS cysts are located in the left or right hemisphere and 4% are located in the cerebellum (Nourani and Kheirabadi, 2009).

In this study, the infected goat was a female with age of 4-years. Females are more vulnerable to the infection compare to males (Amin et al., 2013). Scott (2012) described age variation in case of sheep. The disease is commonly reported in animals aged between 6 to 18 months, but rarely reported in animals older than 3 years. Some of the ecological conditions those are considered to be the influencing factors for Gid include rainfall, relative humidity and air temperature (Rashid et al., 2000).

The coenurosis in goat was diagnosed based on presenting clinical manifestations and softening of the skull. Previously diagnoses have been made in goat using ultrasonography (Biswas, 2003). The position of the cyst in the brain is the most important information required to remove a cyst, and ultrasonography is useful for locating the cyst within the brain. However, ultrasonography provides very limited information about the positioning of cysts. Therefore detailed neurologic examination along with ultrasound provides better efficiency to locate and remove the cysts in goats (Biswas, 2003).

In the present surgery, the anesthesia was performed by local infiltration of 2% lidocaine hydrochloride whereas general anesthesia was also used in some of the studies described by Misra and Behl (1993). After following all of the standard protocol, the goat was recovered without any complication. According to Komnenou et al., 2000 past six years 623 cases of coenurosis (gid) in sheep have been treated surgically. Cysts were removed successfully from 573 of them (92 per cent) and 517 (83 per cent) were able to return to their flocks, although 36 showed no clinical improvement. In 37 cases, the cyst could not be localised, and postmortem examinations showed that in nine cases the cyst was in the brainstem, and in 28 cases it was in the cerebellum. Fifty-six cases deteriorated gradually after surgery and in these cases more than one cyst was found postmortem. Thirteen cases died during surgery.

A good preoperative preparation is required before surgery and should include haematologic and blood chemistry values, but laboratory investigation of the blood parameters was not followed during the present surgery which is a limitation of this study.

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.

Conclusion

The technique of surgical extraction of coenurus cyst from the brain under local anesthesia was described with no post-operative complications and unexpected recovery. Surgical removal of the cyst from the brain may yield 100% recovery. History and clinical findings were found to be useful in diagnosing clinical cases in field level.

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Figures



Figure 01. Characteristic circling movement observed in the goat



Figure 02. Preparation of local anesthetic 2% lidocaine hydrochloride



Figure 03. Incision at the base of the horn with scalpel



Figure 04. Removal of the cyst from the brain



Figure 05. Cyst with scolex that were removed from brain



Figure 06. Skin was sutured with nylon after removal of cyst from brain



Figure 07. Post operative condition

Biography

I am Shourav Datta Roni, son of Raghu Nath Datta and Rupna Datta. I passed my Secondary School Certificate (SSC) examination from Anowara Govt. Model High School, Anowara, Chattogram in 2013 (G.P.A-5.00) and Higher Secondary Certificate (HSC) examination from Govt. City College in 2015 (G.P.A-5.00). Now I am an intern veterinarian under the Faculty of Veterinary Medicine in Chittagong Veterinary and Animal Sciences University. I have immense interest to work in the field of Microbiology.