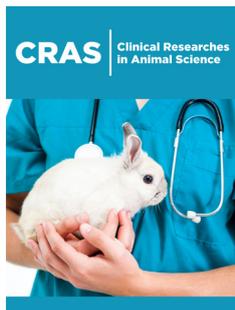


Therapeutic Management of Fasciola Induced Apparent Pneumonia in a 3-years-old Menz Ewe Using Anthelmintic Drugs: A Clinical Case Report

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Abstract

Fasciola induced apparent pneumonia was managed in a 3-years-old multiparous local breed ewe using flukicide anthelmintic drugs following unsuccessful antibiotic treatment. The patient had progressive pneumonia. There was dyspnea accompanied by loud grunting sound. After unsuccessful antibiotic treatment, fecal sample was taken from the patient and examined for the presence of Fasciola eggs using sedimentation technique. The patient was found positive for Fasciola parasite eggs and as a result, flukicide treatment was indicated. Triclabendazole 250mg (East African Pharmaceuticals P.L.C., Ethiopia) was administered at 20mg/kg body weight using a balling gun with the animal in standing position. The patient recovered starting from day 3 after treatment and returned to its flock after a week post-treatment. Fecal samples were taken on days 7, 14 and 21 post-treatments to check the fecal egg count and the reduction of the Fasciola parasite eggs was 86%, 92% and 98% at days 7, 14 and 21 post-treatments, respectively. The examination and treatment protocols used in this case demonstrated that fasciolosis might be the cause for secondary pneumonia in Fasciola endemic areas and this type of pneumonia could be treated using effective flukicide anthelmintic drugs like triclabendazole.

Keywords: Fasciola; Pneumonia; Menz; Ewe; Triclabendazole

Introduction

Ethiopia is the home for more than 30.7 million sheep [1]. Despite this huge sheep population, the country is still unable to meet the growing domestic and export need for mutton because of several reasons. Poor management and husbandry practices and diseases of varied etiologies are among the leading bottlenecks of sheep production [2]. Among the wide range of diseases, respiratory ailments are the single greatest causes of death in the sheep [3]. Respiratory diseases significantly impact upon the profitability of farms and farmers, both directly through the death of lambs and indirectly by decreasing the productivity of older animals in most developing countries [4] and also compromise the welfare of the animals [5].

Respiratory disease (pneumonia) is regarded as a disease complex which is usually associated with the lower respiratory tract of sheep, and it can be acute, chronic or progressive [6]. The diseases involve the interactions between the host (immunological and physiological), multiple etiological agents and environmental factors (temperature, humidity and dust levels). The etiological agents can be bacteria, viruses or parasites (verminous pneumonia) [6,7]. Usually, verminous pneumonia in small ruminants is considered as a chronic and prolonged infection of sheep and goats caused by any of parasitic nematodes namely, *Dictyocaulus fiaria*, *Protostrongylus rufescens*, and *Muellerius capillaries* [8]. It is characterized clinically by the most common signs including pyrexia, coughing, rapid shallow breathing, nasal discharge, and emaciation with retarded growth [9,10].

Although the above description is a generally accepted medical principle, respiratory symptoms may not always be caused by either bacterial or lung worm infection of the lung, and they may rather be secondary manifestations for severe organ damage in other parts of the body. In countries with temperate climates and in the highlands of tropical and subtropical countries like Ethiopia, the widely distributed parasite, *Fasciola hepatica*, can cause pneumonia in small ruminants. Respiratory distress due to excessive damage of the liver by *Fasciola* parasites has similar symptoms with the one caused by bacteria and lung worm species. As a result, veterinary practitioners often considered pneumonia in sheep as bacterial or lung worm origin and tried to treat the condition as the usual way using antibiotic and nematocidal anthelmintic drugs. But in areas where liver flukes are common problems, *Fasciola* induced pneumonia has to be considered. This is because of the fact that abdominal pain due to excessive liver damage can disturb the animals' breathing system and fasten the rate of respiration, leading to dyspnea [11]. In such conditions, flukicidal drugs can be used to effectively kill the flukes so that the affected animal will be freed from the parasites and the symptoms of pneumonia will disappear. Therefore, this clinical case report describes the anthelmintic management of *Fasciola* induced apparent pneumonia in a 3-year-old ewe at Debre Birhan Agricultural Research Center (DBARC), one of the fluke endemic areas in the highlands of Ethiopia.

Case Report

A 3-year-old multiparous ewe, a member of one of the highland breeds of sheep, locally called "Menz sheep", weighing 27kg was reported to the animal health research team of Debre Birhan Agricultural Research Center (DBARC), Ethiopia, on 21 May, 2021, with chief complaints of respiratory symptom which was typically characterized by difficult breathing with grunting sounds. The flock attendant reported that she first observed in-appetence, dullness and lagging behind the flock when animals were allowed to graze on a nearby field.

History of flock nutrition and health management

The flock containing the individual affected animal (ewe) was kept under semi-intensive management system. The flock was provided harvested hay and commercial concentrate feed (maize, oil seed cake, wheat bran and salt) in addition to the morning and afternoon grazing on natural pasture. Moreover, these animals were treated using anthelmintic drugs that include albendazole (albendazole 300mg, Chengdu Qiankun Veterinary Pharmaceuticals Co. Ltd., China), tetraclozash 900mg (oxyclozanide 450mg+ tetramisole HCL 450mg, Ashish Life Science PVT limited, India), tetramisole (tetramisole HCL 600mg, Inner Mongolia Huatian Pharmaceuticals Co., Ltd, China), ivermectin (ivermectin 5 mg, Ashish Life Science PVT limited, India) and triclabendazole (triclabendazole, 250mg, East African Pharmaceuticals P.L.C., Ethiopia) in four rounds per year in September, December, March and June following manufacturers' recommended doses. They were also vaccinated against major infectious diseases in the area which include pasteurellosis and sheep and goat pox. Regular deworming

for parasite control and vaccination against pasteurellosis and sheep and goat pox were given because of the fact that parasitic infections and respiratory diseases are the two commonest problems in the area.

Antibiotic Treatment

As soon as observation of these signs, the individual affected animal was isolated from the flock and the condition was treated with an intramuscular injection of a bacteriostatic antibiotic drug containing 10% oxytetracycline preparations (OXYVET-10%, Eagle Vet. Tech. Co. LTD., Korea) for the first five successive days. However, the affected ewe showed no signs of recovery after the treatment. Due to this lack of recovery, the patient was given an intramuscular injection of a bactericidal antibiotic drug containing a combination of penicillin and streptomycin (H-PENSTREPO 20/20, Hebei Hope Harmony Pharmaceuticals Co., LTD., China) for the other five successive days. To avoid the problems of under-dosage and over-dosage, the treatments were given based on the accurate body weight of the affected animal. Despite such trials, the antibiotic treatment did not provide successful results and the condition progressed to a more severe form of respiratory problem with grunting sounds audible outside the barn which prompted further clinical examination and critical management.

Clinical Examination

Clinical examination of the patient was conducted to identify the clinical abnormalities that are present and to determine the most likely cause for the current problem. Up on this examination, the individual affected animal was presented with respiratory signs which include coughing, exaggerated breathing, and exercise intolerance but with no signs of nasal discharges. In addition, the patient was anemic with paler ocular and oral mucosae with capillary refill time assessed from gums and lips of more than 2 seconds. The temperature, pulse and respiratory rates were 38.6 °C, 74 beats/minute and 42 cycles/min respectively. Based on the clinical observations, verminous pneumonia and liver damage due to chronic fasciolosis were tentatively diagnosed. As a result, fecal samples were collected directly from the rectum of the patient into a universal sampling bottle and sent to the parasitology laboratory of the research center for microscopic examination of lung worm larvae and liver fluke eggs.

Laboratory Investigation

Fecal examination was conducted using two laboratory methods. The first examination was conducted using Bear man technique to check the presence of lung worm larvae. Based on the result of this examination, the ewe was negative for lung worm larvae. The second examination was conducted using sedimentation technique to check the presence of liver fluke eggs. After sedimentation, the examination result yielded more than 48 *Fasciola* parasite eggs which indirectly indicated the presence of patent *Fasciola* parasites in the patient. Accordingly, administration of effective flukicide anthelmintic was indicated.

Anthelmintic Treatment

The most widely used anthelmintic for the treatment of fasciolosis in small ruminants of the case report area is triclabendazole which was highly effective against both mature and immature stages of liver flukes [12,13]. In line with this trend, the Fasciola-positive patient was treated by a single oral dose of triclabendazole 250mg (East African Pharmaceuticals P.L.C., Ethiopia) at 20mg/kg body weight using a balling gun with the animal in standing position.

Post-Deworming Follow Up

The patient was followed up in an isolated condition starting from the day of triclabendazole treatment onwards to observe its progress. On day 3 post-treatment, the ewe showed signs of recovery from the symptoms of anemia and its appetite for feed returned to the previous condition. Coughing also disappeared 7 days after the anthelmintic treatment. For assessment of drug efficacy, fecal samples were taken from the patient on days 7, 14 and 21 post-treatment and the percentage reduction of the fecal Fasciola egg count was found 86%, 92% and 98%, respectively.

Results and Discussion

In the present case, the animal was presented with clinical manifestations characterized by severe respiratory distress, coughing, paler ocular mucosa and loud snoring with no nasal discharges from both nasal openings. Based on such signs, frequent attempts were made to symptomatically treat the animal using a bacteriostatic antibiotic drug containing 10% oxytetracycline preparations and then bactericidal antibiotic containing a combination of penicillin and streptomycin, assuming that the symptoms occurred after bacterial infection. But due to administration of these treatments without careful diagnosis considering the environment, the animal and the agent, both of the treatments were not effective. This treatment failure was faced because of the reason that the case showed the above signs as secondary manifestations for the severe abdominal pain following excessive liver damage by fasciola parasites.

The presence of Fasciola parasites in the present case was confirmed by microscopic examination, after sedimentation, of fresh fecal samples which revealed oval shaped eggs with golden brown color. As a result, the case was treated by a single oral dose of flukicide anthelmintic, triclabendazole. To check the efficacy of the treatment, the case was followed for three successive weeks through repeated fecal sampling and examination at days 7, 14 and 21 post treatments. Based on examination result, the reduction of the Fasciola parasite eggs was 86%, 92% and 98% at days 7, 14 and 21 post-treatments, respectively. Apart from this, physical examination of the animal indicated recovery from the symptoms of anemia and the appetite for feed returned to the previous condition starting from day 3 after treatment. In addition to the above progress, coughing also disappeared 7 days after the anthelmintic treatment which evidenced successful handling of the case using triclabendazole. Triclabendazole is a benzimidazole anthelmintic

that can kill all the early immature, immature and adult stages of fasciola parasites [12] and its efficacy has to be evaluated after day 21 post treatment in animal [14].

This case report gives an account of anthelmintic treatment involving Fasciola induced apparent pneumonia using triclabendazole in sheep as an adjunct procedure to antibiotic and nematocidal drug therapy. The affected animal, in this case, was depressed, weak, anemic and positive for fasciola eggs in addition to labored breathing. Liver damage due to fasciola parasites is a serious problem in sheep herds and often leads to fatality, therefore effective anthelmintic therapy like triclabendazole is by far essential [15]. Although the externally manifested clinical signs for the present case were similar with the usual symptoms of primary respiratory problems, deworming by triclabendazole was performed as a fluke removal procedure and also due to fasciola positive laboratory examination result of the corpological sample.

Depending on the diagnostic result and the type of cases encountered, drug treatments of clinical cases of any condition can be curative, symptomatic or supportive. Among these, symptomatic initial treatment was administered based on the major symptoms manifested by the clinical cases considered. Because lots of different animal diseases can be manifested by similar clinical signs, this type of treatment is usually misleading and hence not recommended due to lack of success or little success, if present, to cure the case. In contrast to the symptomatic treatment, effective curative treatment can remove all the root causes of the disease, irrespective of the external clinical manifestations. For the present case, the first two treatments for bacterial infection and lung worm fail because of the dependence of symptomatic treatment that cannot remove the causative agents.

When respiration is considered, it is a natural fact that apparently healthy ruminant animals have abdominal type of respiration (breathing). But when there are problems in the abdominal organs, the affected animal started to take pain relieving measures and its respiration shifted from abdominal type of breathing to the thoracic type of breathing. At this point, the individual affected animal will show secondary symptoms as the respiratory distress indicated here for liver damage and lead to diagnostic error, especially when treatment decisions are given based on physical examination alone. Therefore, what has to be emphasized here is that accurate diagnosis of the root cause of the external manifestations for different diseases, with careful consideration of the host, the causative agent and the environment, is critically important to administer effective treatment and to successfully handle the clinical cases encountered.

Conclusion

Fasciolosis is an endemic disease-causing high morbidity and mortality in sheep of the temperate areas, mainly, due to weight loss and excessive liver damage, among other problems. However, the excessive liver damage caused by the migratory juvenile and hematophagous adult flukes can also lead to the secondary

respiratory distress (Dyspnea), which is mainly sourced from the severe abdominal pain induced by the damaged liver. Such cases can only be successfully treated by removal of the root cause of the problem (Fasciola parasites) from the liver through oral administration of flukicidal anthelmintic drugs like triclabendazole rather than the frequent attempts of antibiotic therapy against the secondary manifestations (respiratory distress). Here, accurate diagnosis of the root cause of the problem, considering all the environmental, host and agent factors, has paramount importance for successful treatment of clinical cases in veterinary medicine.

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