The Prevalence of Sarcocystis Infection in Sheep and Cattle in Bojnurd, North Khorasan Province, Iran

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Abstract

Background: Sarcocystosis is caused by genus of Sarcocystis, an intracellular protozoan parasite in the phylum Apicomplexa. This parasite causes gastrointestinal symptoms in human. The objective of this study was to determine the prevalence of Sarcocystis in sheep and cattle in Bojnurd, North Khorasan Province.

Method: This was a descriptive cross-sectional study. 256 samples from liver, diaphragm, heart, and muscles were prepared from 64 sheep and cattle (32 males and 32 females). For observing bradyzoites in tissue samples, 70 grams of each tissue were ground and digested in %1.5 HCL acid and %0.5 Pepsin at 29°C overnight.

Results: This study showed that samples of liver, diaphragm, heart and muscles of sheep and cattle (100%) were infected with bradyzoite of Sarcocystis.

Conclusion: With regard to the high prevalence of Sarcocystis infection in sheep’s tissues, it is strongly recommended to avoid eating raw or under-cooked meat or place them at freezing temperature for at least 4-7 days.

Keywords: Sarcocystis, digestion method, Iran

Introduction

Sarcocystis is an obligatory intracellular protozoan parasite which can infect humans and animals. It has a worldwide distribution and has been reported by many investigators from different parts of the world [1-5]. There are two definitive (final) and intermediate hosts with two sexual and asexual stages in the life cycle of this parasite. The sexual stage is performed in the epithelial cells of definitive host and asexual stage in the tissues of intermediate host [2].

Humans acquire infection by eating raw and undercooked beef, pork or meat products (hamburger, sausage and hot dogs) containing schizonts of Sarcocystis. The prevalence of intestinal infection to Sarcocystis is about 6% to 10% in the world [6]. The clinical signs of intestinal sarcocystosis in human are digestive system disturbances such as nausea, vomiting, and diarrhea, especially in immunocompromised patients [6]. Since the chemical treatment and prophylaxis of this parasite is not possible, controlling should be based on the epidemiological studies of each region [7].

Previous studies throughout the world have indicated that 70% to 100% of sheep and cattle are infected with Sarcocystis [1-5]. According to a research in northwestern Ethiopia, 93% of sheep had Bradyzoite in their tissues [8]. Studies in other countries were carried out based on Heamagglutination method and indicated that all sheep were

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infected with this parasite [9]. The researchers in Iran in different provinces showed that the prevalence of *Sarcocystis* in sheep and cattle was 100% [10, 11,12,13,14, 15]. In another study in Iran, 52% of camels were infected with this parasite [16]. The prevalence of *Sarcocystis* infection in sheep and cattle was 100% in Kerman [10].

*Sarcocystis* spp. are pathogenic for sheep and cattle and cause acute diseases in calves: eosinophilia, myositis, abortion, still births, flaccid paralysis and death in pregnant ewes [17]. The host’s immunity and intensity of infection are the most important factors for development of clinical symptoms such as anemia, hepatitis, and myocarditis [17].

Researchers in Iran have showed the prevalence of *Sarcocystis* in different provinces. Since there was no information regarding prevalence of this parasite in Bojnurd, the present research was conducted in order to determine the prevalence of *Sarcocystis* in sheep and cattle in this region.

**Material and Methods**

**Sampling Method**

This descriptive cross-sectional study took 8 months (from April until December 2013) to be completed. 256 samples were collected from heart (64), liver (64), diaphragm (64) and muscles (64) from 64 slaughtered sheep and cattle (32 males and 32 females) in Bojnurd, North Khorasan province.

**Digestion Method**

Tissue Digestion Method was used for observing bradyzoites in tissue samples. Seventy grams of each tissue were ground and digested in %1.5 HCL acid and %0.5 Pepsin at 29°C overnight. The digested samples were filtered through mesh and centrifuged at 1500 rpm for 10 minutes. Then the supernatant fluid was discarded and sediment were stained by Gimsa and examined microscopically for detecting bradyzoite of *Sarcocystis*.

**Results**

The results of this investigation showed that all samples of liver, diaphragm, heart, and muscles of sheep and cattle (100%) were infected with bradyzoite of *Sarcocystis* (Table 1, Figure 1).

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Fig. 1 Bradyzoite of Sarcocystis in tissue
Discussion

Sarcocystis Sarcocystis is an obligatory intercellular parasite of animals in many parts of the world. Humans are also infected with the parasite as intermediate and final host in which the parasite inhabits in muscular and intestinal tracts, respectively. Humans show some clinical intestinal symptoms as the final host via eating under-cooked or raw infected meat.

In this study, all tissue samples of sheep and cattle (heart, liver, diaphragm, and muscles) were infected with Sarcocystis. Studies in Iran and the world have indicated that animals can be infected with this parasite [6, 7, 8, 12, 13, 14, 15]. Several investigations showed that there are considerable infection rates in sheep and cattle in Iran and the world [2, 4, 6, 18].

Sarcocystis in sheep and cattle is pathogenic [19]. From a clinical view, the severity of clinical symptoms caused by Sarcocystis depends on the dose of ingested sporocyst and the immune system of host [19].

Sarcocystis can lead to acute sarcocytosis in uninfected sheep [19]. Nonspecific infection symptoms include fever, anorexia, tachycardia, and anemia. In acute sarcocystosis, the central nervous system is involved which causes encephalitis, encephalomyelitis, and hemorrhagic and ends up with the death of sheep [20, 21]. In pregnant sheep, acute sarcocystosis can cause fetal death or premature birth of offspring and chronic sarcocystosis can create economic problems due to reduced meat, milk or wool [19, 22].

Since the rate of Sarcocystis infection is high in sheep and cattle tissues, it is strongly recommended that these meats and meat productions should be heated before consumption.

This investigation was done for the first time in Bojnurd and in parallel to other studies. It proved that all tissues of sheep and cattle were infected with Sarcocystis.

The Sarcocystis parasite can infect all tissues of sheep and cattle and can consequently cause enormous economic losses.

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