

## SHEEP-AN IMPORTANT RESERVOIR OF HUMAN TOXOPLASMOSIS IN IRAN

AHMAD SHAHMORADI,\* MOSTAFA REZAEIAN,\*\* AND ABDOL-  
HOSEIN DALIMI ASLE\*

From the \*Dept. of Parasitology, School of Medical Sciences, Tarbiat Modarres University, and the \*\*Dept. of Protozoology, School of Public Health, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran.

### ABSTRACT

Toxoplasmosis is a zoonotic disease and ubiquitous in the world. Infection rate in the tropical and subtropical regions with high humidity is higher than other areas. The rate is lower in dry regions whether hot or cold. More than 200 species of warm-blooded animals are intermediate hosts and cats or members of the carnivore family Felidae have been found to be definitive hosts.<sup>8</sup>

In Iran in the northern provinces of Mazandaran and Gilan, infection rate is higher than other provinces (about 70%) while in the southern provinces of Hormozgan, Sistan and Baluchestan, and Khuzestan, this rate is lower (about 12%). Common routes of transmission of the infection are feeding of uncooked meat or working with contaminated meat.

In this study, 387 blood samples of sheep from slaughterhouses in Tehran were evaluated by the direct agglutination method. Prevalance rate was 61.24% and indicated a potential danger for food hygiene. The main aim of this article is to inform health officials as well as workers and housewives about this hazard.

*MJIRI, Vol. 7, No. 1, , 1993.*

### INTRODUCTION

*Toxoplasma gondii*, a ubiquitous coccidion parasite of the felines in nature, causes one of the most common infections of humans, as well as various wild or domestic animals like rodents, carnivores, primates, birds, reptiles, ruminants, etc.<sup>11</sup>

This parasite was first reported in animals by Nicolle and Manceux in 1908. However, its natural life cycle was not described until more than sixty years later.<sup>10</sup>

Sexual multiplication occurs within the intestinal epithelium of the feline host, and this entero-epithelial cycle results in the formation of oocysts.<sup>7</sup>

The oocyst is potentially infective for more than one year, and is resistant to common disinfectants. The mature oocyst, containing eight sporozoites is ingested by warm-

blooded animals, releasing tachyzoites which multiply asexually in the intestine; the tachyzoites invade cells directly or are phagocytized. They multiply intracellularly, then rupture the host cells and invade contiguous cells. Colonization of white blood cells results in systemic involvement. The tachyzoites can invade every organ and tissue of the human host, and cause congenital infection. This tissue destruction will continue until antibodies and cell-mediated immunity develop. They are found in virtually every organ, but the brain and striated muscles are the most common sites of latent infection.<sup>9</sup>

The natural route of transmission usually occurs when man ingests meat containing cysts or ingests oocysts from contaminated soil or food.<sup>10</sup> Experimental infection through milk has been documented in suckling mice and in swine, but transmission through breast-feeding in humans has not

## Sheep Reservoirs in Human Toxoplasmosis

been shown. Other unusual means of transmission include blood transfusion, laboratory infection, and organ transplantation.

According to reports, Fayer (1985) estimated that the global prevalence of toxoplasmosis in sheep is 31% (0-96%). This rate is reported from many countries.<sup>8</sup> The most important reason for abortion in sheep is reported to be toxoplasmosis in Scotland and Norway.<sup>9</sup> Prevalence of toxoplasmosis in sheep in Iran is reported to be 12.6%, 32.5 - 35.8%, and 29 - 31% in Kuzestan, Mazandaran, and Gilan, respectively.<sup>7</sup>

### MATERIAL AND METHODS

The blood samples were collected from 387 sheep (*Ovis aries*) obtained from four different slaughterhouses of Tehran. The serums were examined by direct agglutination (D.A.) test according to the Biomerieux Company instruction 1 (1991) based on Desmonts and Remington.<sup>2</sup>

The DA test was chosen due to its availability and sensitivity, especially with the modification of this method.<sup>2</sup>

### RESULTS AND DISCUSSION

Totally, 387 samples were collected and examined by the DA method. The results showed 61.24% of the samples were positive (237/387) and in 11.6% of the samples, prozone was observed.

These results showed that positive samples were two times more than that previously reported by Ghorbani et al (1983), and this may be due to reduction of health levels in animal husbandry.

An important remark in this study is the increased infection in sheep (61.24%) as compared with the previous studies. This is an important health hazard and all institutions

involved must be informed that sheep is one of the most important sources of human toxoplasmosis after cats in Iran.

### ACKNOWLEDGEMENTS

We would like to thank Dr. Semnani, Mr. Nasseri, Mirnia, Seidtabaei and their co-workers from Tarbiat Modarres University, and Dr. Saffarian and his co-workers in veterinary organization for their kind co-operations.

### REFERENCES

1. Biomerieux com.: Toxo-Screen DA. Detection of toxo. IgG Antibodies by D.A. (Sensitized Antigen). 1991.
2. Desmonts G, Remington JS, Direct agglutination test for diagnosis of toxoplasma infection. *J Clin Microbiol* 2(6): 562, 1980.
3. Desmonts G, Coverur G: Toxoplasmosis. In: Macclod GL, et al: *Parasitic Infection in Pregnancy and the Newborn*. Oxford Uni. Press, Oxford, 112-143, 1988.
4. Dubey JP: Status of toxoplasmosis in sheep and goat in the U.S.A. *Amer J Vet Med Ass* 196(2): 250, 1990.
5. Dubey JP, Thulliez R.: Serologic diagnosis of toxoplasmosis in cats fed *Toxo. gondii* tissue cysts. *J Amer Vet Med Ass* 194(9): 1297, 1989.
6. Fayer R, Thompson DE: Parasitology. In: Levine ND, *Veterinary Protozoa*. Iowa State Univ. Press, Iowa, 466-475, 1985.
7. Ghorbani M. et al: Animal toxoplasmosis in Iran. *J.T.M. Hyg.* 86: 73, 1983.
8. Hammond D.M. et al: *The Coccidia*. University Park Press, Maryland 343-410, 1973.
9. Laslo P: *Coccidia and coccidiosis*. Akademia Kiado, Budapest, 1974.
10. Levine N.D: *Veterinary Protozoology*. Iowa State Univ. Press, Iowa, 248-256, 1985.