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Anti-*T. spiralis* Antibodies Detection in some Localities of Zacatecas (México)

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ORIGINAL

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Abstract

Transmitted diseases are called parasites infestations in humans. Its prevalence in tropical regions often simultaneous infestation with various types of helminths. Travel and human migration spead parasites to geographic locations where it was not known. Is estimated that the worldwide prevalence of helminth infection, exceeds other onfections, one third of the world population hosts a helminth infection. Which are biologically heterogeneous sampling variation in their life cycles, body structure, development, physiology, location in the host and sensitivity to chemotherapy. Immature forms can invade the human body through the skin or via gastrointestinal and evolve fully differentiated into adult parasites. According to the transmission mechanism, they can be categorized as transmissible by defecation, food, soil and animals arthropods. Trichinellosis is an endemic cosmopolitan zoonosis, being the cause of the nematode infestation of *T. spiralis*. It affects wild and domestic animals primarily accidentally transmitted to human by eating meat or undercooked, infected animals from raw products. The *T. spiralis* is indicated in the 32 species of nematodes that parasitize man also causing public health problems, it affects the economy and Animal pig production. The disease outbreaks have increased in the world in recent decades, indicating the need for new contributions on epidemiology, diagnosis and treatments that allow new strategies to control this disease. In Zacatecas *T. spiralis* is endemic zoonoses was reported since 1976. At present there is conducted its effective and timely diagnosis.

Objective: Detection of anti-*Trichinella spiralis* in human sera.

Keywords
Spiralis Trichinellosis; Antibodies; Zacatecas.

Introduction

Trichinellosis is an endemic zoonosis, which evolves with sporadic outbreaks (LAVERDE *et al.*, 2009). In Europe, Asia, North America, Argentina, Chile and Mexico. In 2013 it affects approximately 100 people outbreak in the southest of the province of Buenos Aires which was caused by eating pork products, mainly sausage without proper sanitary control (RANDAZZO 2013). In Santa Fe, they conducted a retrospective study in 2013 from 1998 to 2009, recording 27 outbreaks of Trichinellosis in 1519 humans of which only 1276 showed characteristic signs and symptoms of parasitosis, of these only 224 were positive by the immunofluorescence indirect technique (IFI) (SEQUEIRA, 2013).

It has not been reported in Colombia and in other tropical countries; but highly prevalent in warm climates like those in our country is observed. In Venezuela Trichinella is found in pigs and humans; in Chile the first report was in 1897; In Argentina, it represents a major public health issue, where the main problematic source of human infections is meat and offal of domestic swine. However, also IL Trichinella were detected in rats, dogs, cats, armadillos, pumas and foxes (KRIVOKAPICH *et al.*, 2012). There have been several studies that have isolated *T. spiralis*. The reasons for this as defined geographical distribution are not known. The trichinellosis is a global zoonosis that evolves with sporadic outbreaks, it has not been proven in some countries perhaps due to the lack of thorough investigations and surveillance (BUILES *et al.*, 2009).

T. spiralis affects humans, pigs, dogs, cats, rodents, horses, are the species where it is most often isolated. There are other species *T. native, T. nelsoni, T. britovi, T. murreli, papuae T., T.* and *T. zimbabwensis pseudospiralis, T. patagoniensis.* Those species infect wild animals such as bears, walruses and whales. These species become more important at the poles, where the meat of those animales is consumed and cause infection in humans. This parasitosis is widely adapted to different types of climate and regions (LAVERDE, 2009, KRIVOCAPICH, 2012, URIBARREN, 2013, CARACOSTANTOGOLO, 2013).

The frequency of Trichinellosis in humans can be determined by identifying the infective larvae (LI), cadavers or intradermal tests. Recent necropsy revealed a frequency of 2.2% or less, in the United States, compared to 25% 15 to 35 years. It is not known with certainty the number of new infections that occur each year in that country and are usually subclinical; but only a few hundred are identified, with several deaths. In pigs fed food scraps frequency is less than 0.5%, down 0.1% or less when the animals are fed with seeds (NEVA and BROWN 1992).

The Trichinellosis in Europe the first cases of Trcihinellosis appeared in Spain, it was the consumption of sausages as the main cause (FABREGAS *et al.*, 2001). The first human cases of *T. spiralis* were related to the consumption of horse meat were reported in 1975. Between 1975 and 1998, it has been attributed this rise to 12 buds. Each outbreak has allowed better understand the development of infection and practices related thereto. The main stages were: recognition of the horse as a possible natural host of the *T. spiralis*, its current dominance in generalized epidemics and the implementation of international control measures in slaughterhouses. Since 1975, consumption of horse meat has become the main cause of human *T. spiralis* in Western Europe, only two countries, Italy and France have been affected so far. Between 1975 and 1998 they have been reported more than 2,800 cases. A common horse usually weighs between 200 and 300 kg, the meat can be consumed by several hundred people (POZIO *et al.*, 1998).

In Asia include the People's Republic of China. Most outbreaks occur in ten provinces, including Yunnan, Henan, Tibet, Hubei, Sichuan, Guangxi, Jilin, Liaoning, Heilongjiang and Jiangxi Neimonggol where the domestic cycle occurs with a prevalence of swine *T. spiralis* up 50%. The most important source of infection is meat of domestic pigs, but infections are also related to the consumption of bear

meat, goat and dog. Native Trichinella has been detected in dogs from the northern regions of the People's Republic of China. Downtown areas of the People's Republic of China, where the potentially infected meat may be exported to other provinces have prevalence rates of *T. spiralis* infection in pigs in Hubei 6.8% and 4.3% in Henan. This has led to a dramatic increase in the size of the human population at risk of *T. spiralis* in the west of the People's Republic of China (Moreno *et al.*, 2012; Moreno *et al.*, 2007).

The absence of the *T. spiralis* can be explained in some countries who do not eat pork, their only source of protein is fish, because religious taboos on pork, the absence of the disease in Hindu, Jewish explained, Muslims and other Presbyterian (Brown and Neva 1992).

In Mexico the *T. spiralis* was first detected in humans in 1871 (Rivera, 1882). However, is was not until 1891 that Zuniga detected *T. spiralis* On cadavers in medical school Mexico City. (Ramirez-Valenzuela, 1981).

In an epidemiological study conducted by Martinez in 1974 he reported that there was a frequency of up to 8.1% of the general population, so it was considered a public health problem. Currently in Mexico, most infections occur in humans by eating contaminated pork with *T. spiralis*. There have been identified geographical regions where the disease occurs more frequently with increasing number of cases; Toluca Valley has been identified as endemic area, mainly cases of swine outbreak.

In Mexico, in the period 1976-1985 decade, both sporadic and epidemic outbreaks were reported; is distributed predominantly in Chihuahua, Zacatecas, Mexico State, Durango, Guanajuato and Mexico City (Moreno *et al.*, 2012;. Dorado B., *et al.* 2011).

In our environment the source of infection in 100% of cases are mainly related to the consumption of sausage or "carnitas" undercooked or raw pork. The diagnosis was confirmed by histopathological observation of the IL in skeletal muscle.

Various studies at the national level, on the incidence of *T. spiralis* swine, conducted by analysis of meat Compression Device (C/P) on Artificial Digestion (D/A). The global analysis of the results indicates that in a population of 108 pigs there is an incidence of 0.032% (Chavez *et al.* 2006).

The study of *T. spiralis* in the State of Zacatecas began in 1970. Zacatecas is considered an endemic area of *T. spiralis*. The first outbreak was diagnosed in the state in 1975; later there were several outbreaks, one in Laguna of Carretero, Villanueva, Zacatecas in 1976 where 8 deaths out for its size and lethality (31%) which where recorded. In a study in 1978-1988 166 cases were reported in 17 outbreaks diagnosed clinically and histologically, of these, called the attention of Valparaiso where death ocurred in a woman of 20 years where it caused an abortion in Pozo de Gamboa. The most affected age group comprises between 15 and 44 years being more recurrent in women. Seven of the 58 municipalities, corresponding to 12% have been reported, these include Zacatecas Villanueva, Valparaiso, Panuco, Jerez, Jalpa and Guadalupe; the degree of involvement corresponds to the order in which they occur; the transmission mechanism, in most cases, was by eating raw or undercooked pork. The diagnosis was confirmed by clinical tests, pathological, double Microinmunodifusión (DMID). They have been studied in pigs in municipal traces of Zacatecas, Jerez and Ojocaliente, which obtained 85 samples of each taking 15 grams of masseter which was analyzed by (C/P) and (DA) also 950 sera of live pigs, 250 and 700 backyard farm to which underwent DMID (Chavez *et al.* 2006).

Methodology

For this study 4699 sera general population from health centers belonging to the health services were obtained Zacatecas. which was subsequently transferred to the laboratory of Cell Biology and

Microbiology, Academic Unit of Biological Cs, for processing indirect laboratory techniques MicroInmuno double diffusion (DMID), dot-ELISA, positive latter technique was performed Immunoblotting EIT. DMID technique was performed by sieve and considered reliable and economical diagnostic method, the Dot ELISA was used to be an economical, sensitive and specific technique. The WB was used as confirmatory.

Results

The analysis of the 4699 human sera made with DMID technique 32 positives were detected the 0.68% **figure 1**, these samples were subjected to the technique of Dot ELISA for screening randomly selected 10% of serum (469) plus positive by MIDD, human sera positive throwing the equivalent of 91 (19.41%) were positive (1.93%) of the total of 4699 serum samples, **figure 2**, which were subsequently confirmed the presence of Ac - anti *T. spiralis* with the WB observed a predominance of the characteristic triplet of 42,45 and 48 kDa parasitosis, demonstrating the presence of Acs. anti-*T. spiralis* in these sera, **figure 3**.

Figure 1: Shows the positive sera technique DMID, Control (+) and No. 4 positive serum.

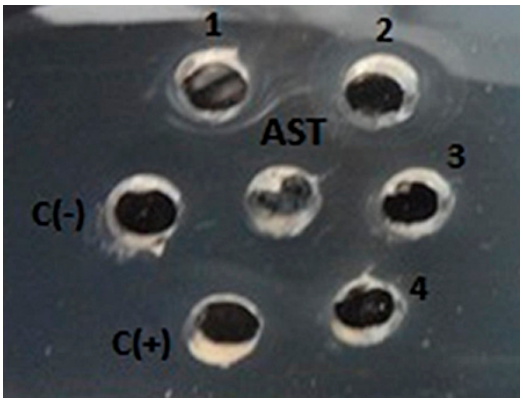


Figure 2: Serum (+) Dot ELISA Control (+) is number 3.

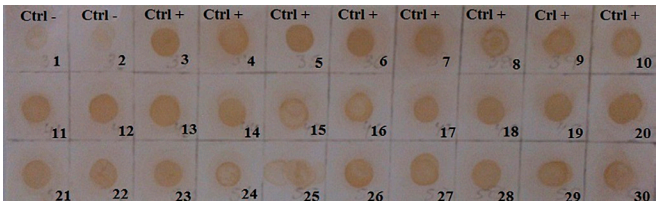
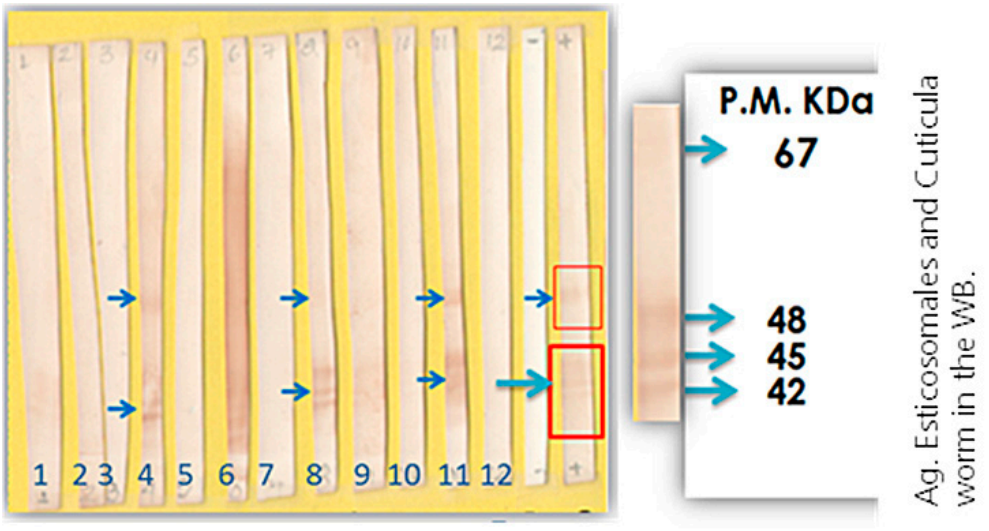


Figure 3: Shows confirmation of the presence of anti *T. spiralis* in samples of human sera DMID technique and ELISA and Dot Control (+) rat serum infected with *T. spiralis* and control (-), positive samples are the number 1 to 11 respectively observing the characteristic triplet *T. spiralis* (42, 45 and 48 kDa). The presence of protein positivity triplet evidence before the nemátodolas. In addition it is also seen, the band of 67 kDa parasite belonging to the cuticle in the positive control



Discussion

The Trichinellosis is common in the human population, unfortunately the diagnosis is not routinely done. In this paper were detected anti.Trichinella antibodies in an open population of Zacatecas state in México. Using techniques DMID, Dot-ELISA and Inmunoelectrotrasferencia. Several authors have implemented these techniques, taking adequate results in both experimental models and in humans. However is should be considered that DMID technique is specific, but has a low sensitivity (mg protein), and Dot-ELISA is a highly sensitive and specific technique (pico-grams of protein) that does not require significant infrastructure and The WB would be a confirmatory technique. Based on our results we suggest the use of the Dot-ELISA as a useful and accessible technique in the diagnosis of Trichinella spiralis.

Conclusion

Positive sera was confirmed by WB, indicating that the percentage of *T. spiralis* is a zoonotic disease remains endemic in the State, and only in experimental trials is reported. It is important to distinguish that serum was examined from patients without signs and symptoms, but patients where attending to the health unit for perform other type of laboratory studies, so unfortunately it was not detected.. Was confirmed using indirect detection techniques, the presence of anti-*T. spiralis* antibodies was confirmed in human serum samples of general population of the municipalitie of Calera, Zacatecas and Guadalupe, using indirect detection techniques.

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