Vol 14 No 1, p 69-71

PREVALENCE OF *Linguatula Serrata* NYMPHS IN SLAUGHTERED CAMELS OF IRAN

H. Tajik[1], M. Tavassoli[2], H. Khani[3] and S. Javadi[4]

Department of Food Hygiene[1], Department of Pathobiology[2], Department of Clinical Sciences[4], College of Veterinary Medicine, Urmia University, P O. Box 1177, Urmia, Iran. Private Practitioner[3]

ABSTRACT

One hundred and thirty eight slaughtered camels were investigated for *Linguatula serrata* infection in Iran. Samples from lungs, mesenteric lymph nodes and livers were examined macroscopically and liver samples were studied by digestion method. The results showed that mesenteric lymph nodes of 103 camels (75%), lungs of 41(29.7 %) and livers of 42 (30.4 %) camels were infected with *Linguatula serrata* nymphs. Fifty five out of 75 females (73.3%) and 48 out of 63 males (76.2%) were found to be positive to *Linguatula serrata*. High rate of infection in mesenteric lymph nodes of the camels indicate careful inspection of carcasses to find out *Linguatula serrata* infection. The maximum and minimum numbers of parasites in lymph nodes were 46 and 1, respectively. Infection of the offal of camels underlines the zoonotic importance of the disease, whereas consumption of raw or under-cooked camel livers is not unusual in some places of Iran.

Key words: Camel, halzoun, Iran, *Linguatula serrata*

Linguatula serrata (L. Serrata), one of the parasitic zoonoses, inhabits the canine respiratory system (final hosts). The eggs are expelled from the respiratory passages of the final host and, when swallowed by a suitable herbivorous animals (intermediate host), larva reaches the mesenteric lymph nodes (MLNs), liver, lung etc. in which it develops to infective nymph after 6 to 9 moulting. It usually lies in a small cyst surrounded by a viscid turbid fluid. Final host become infected by eating the infected viscera (Soulsby, 1982). Several attempts have been directed to study the prevalence rate of *L. serrata* in the dog (Khalil and Schacher, 1965; Dincer, 1982; Yagi *et al,* 1996 and Rezaee, 1998) and in camel as an intermediate host (Oryan *et al,* 1993). These studies revealed prevalence of 25-76.5 and 12.5% in dogs and camels, respectively. The frequency of linguatulosis in domestic farm species were reported in different regions of Iran, in goats 0.23% (Saiyari *et al,* 1996), 28.3% (Jamali *et al,* 1997), in sheep 0.45% (Shekarforoush and Arzani, 2001) and in small ruminants 33.9% (Esmail-Nia *et al,* 2000). Human beings may also be infected by both the nymph stage, a condition called nasopharyngeal linguatulosis or Halzoun syndrome and the egg, a condition called visceral linguatulosis. Human infection via consumption of raw or undercooked liver and lymph nodes has been reported from Africa, south-east Asia and the middle east (Beaver *et al,* 1984; Drabick, 1987 and El-Hassan *et al,* 1991). The clinical signs of Halzoun syndrome are pharyngitis, salivation, dysphagia and coughing but in visceral linguatulosis, the infection generally remains asymptomatic (Khalil and Schacher, 1965 and Yagi *et al,* 1996). Linguatulosis were reported from human with many authors in Iran (Montazeri *et al,* 1997; Arbabi *et al,* 1998; Sajadi and Ardehali, 1998 and Maleky, 2001). Consumption of raw or under-cooked ruminants is not unusual in Iran. Human linguatulosis may happen after eating under-cooked meat, liver or lungs of ruminants. Objective of this study was to determine the prevalence rate of *L. serrata* nymphs in liver, lung and MLNs of slaughtered camels brought to the Mashhad slaughter house of Iran.

Materials and Methods

From September 2005 to March 2006, 138 slaughtered camels were studied for *L. serrata* infection. Age of the slaughter animal was determined on the basis of eruption of permanent incisor teeth (Curasson, 1947). Samples from lungs, mesenteric lymph nodes (MLNs) and livers were collected. The collected lymph nodes of each animal varied from 7 to 10. Total number of 1095 MLNs were collected. The lymph nodes of animals were placed in separate bottles containing normal saline and were transferred to the laboratory. In the laboratory, a gross appearance (colour and consistency) was recorded. Each lymph node was cut longitudinally, put in petri dishes with the saline and examined under a dissecting microscope for *L. serrata* nymphs. The samples were then examined for the presence of nymphs using a stereomicroscope. The total nymphs per lymph nodes were recorded. Liver

SEND REPRINT REQUEST TO H. TAJIK

samples were examined in two steps. First, they were sliced into sections of 4-5 mm thick, and observed carefully to find encapsulated or free nymphs. Second, 100 g of mixed sliced samples were digested in 200 ml of a tepid digesting medium containing 0.3 M hydrochloric acid (317, Merck) with 0.5% (w/v) pepsin (700 FIP U/g, 7197 Merck), and were incubated at 37°C for 24 h. The suspension was placed on a sieve and washed by tap water. The final suspensions were examined using a stereomicroscope to observe the nymphs. Lungs samples sliced into small pieces and examined for *L. serrata* nymphs. The nymphs were stained by azocarmine and studied by microscope. Parametric tests were used to analyse data after using the Kolmogorove Smirnove test to verify the normality of the data. Pearson correlation test was used to find correlations between age of the camels and total number of parasites found in each camel. Camels were studied in three age groups i.e.; <5, 5-7 and >7 years. One way analysis of variance was used to find significant differences between different age groups of camels. Student t-test was used to find significant differences between male and female camels. The SPSS statistical software Version 10 was used for all statistical analyses.

Results

The results showed the MLNs of 103(75%), lungs of 41(29.7%) and livers of 42 (30.4%) camels were infected with *L. serrata* nymphs. Fifty five out of 75 females (73.3%) and 48 out of 63 males (76.2%) were found to be positive to parasite. There was no significant difference in number of isolated *L. serrata* from different organs of male and female animals. From 1095 inspected MLNs 26.7% were infected to *L. serrata*. The minimum and maximum numbers of parasite in MLNs were 1 and 46, respectively. The results showed a higher infection rate of MLNs compared with that of livers and lungs. There was significant positive correlations between age and number of counted parasites in studied animals (Table 1). Isolated number of *L. serrata* (Total and isolated from lymph nodes) in camels with age of >7 years was sufficiently higher than 5-7 years (P= 0, P= 0, respectively) and <5 years old (P=0.001, P=0.004, respectively). There were no significant differences in total number and isolated number from lymph nodes of *L. serrata* in camels with age of <5 years and 5-7 years (P= 0.8, P= 0.9, respectively) (Table 2, Fig 1).

Table1. Pearson correlations between number of isolated *L. serrata* nymphs and age of the male and female camels.

		Age	
Lymph nodes	Male	r = 0.56	p= 0
	Female	r = 0.4	p= 0.003
Liver	Male	r = -0.14	p = ns
	Female	r= 0.05	p= ns
Lung	Male	r = 0.23	p= ns
	Female	r = -0.01	p= ns
Total	Male	r = 0.58	p = 0
	Female	r = 0.43	p = 0.001

Discussion

The prevalence of *L. serrata* in the dog has been reported from different countries such as Lebonan (Khalil and Schacher, 1965), Turkey (Dincer, 1982), Sudan (Yagi *et al*, 1996) and Iran (Rezaee, 1998). Rezaee reported a high prevalence (76.5%) of *L. serrata* in stray dogs in Shiraz, Iran. Close contact between dogs and intermediate hosts plays an important role in the transmission of *L. serrata* in this area.

In this study, the prevalence rate of liver and lung infection was lower than that of MLNs which is in accordance with the findings of the other investigators (Rahman *et al*, 1980, Shekarforoush and Arzani, 2001, Shekarforoush *et al*, 2004). These finding are compatible with life cycle of *L. serrata*. According to the life cycle of *L. serrata*, MLNs, located in the way of portal circulation before the liver, are the first sites infected. Other organs such as liver and lung are infected thereafter.

Table 2. Statistical data of isolated *L. serrata* nymphs in different age groups of 103 infected camels.

	min	max	mean	SEM	SD	
<5 y (n=15)	Total body	1	3	1.9	0.2	0.8
5-7 y (n= 47)	Total body	1	32	5	0.9	6.5
>7 y (n= 41)	Total body	1	165	21	4.1	26

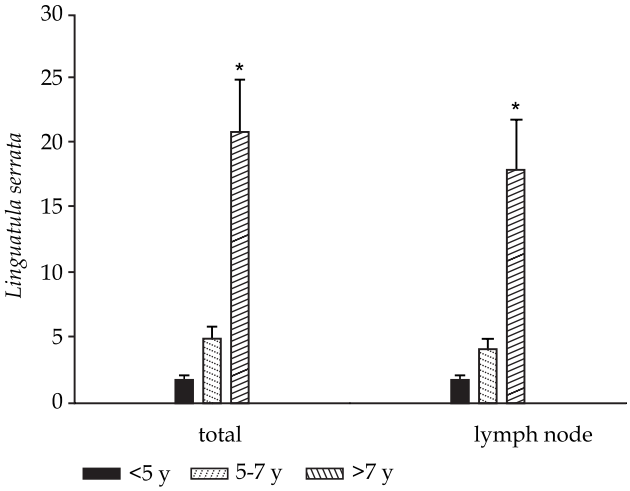

Fig 1. Isolated number of *Linguatula serrata* (Total and isolated from lymph nodes) from camels in different age groups. Astrics (*) indicates significant changes.

Furthermore in our study the mean number of isolated *L. serrata* nymph from MLNs was higher than those isolated from liver and lung. These findings confirm that inspection of MLNs are the most important organs of the carcasses which have to be inspected carefully to find out *L. Serrata* infection. In this study significant positive correlations between age and number of counted parasites in the camel were found.

Consumption of raw or under-cooked camel livers is not unusual in some places of Iran, offal's infection of the camels underlines the zoonotic importance of linguatulosis. Some clinical cases of human nasopharyngeal linguatulosis in Iran have been reported (Sadjjadi *et al,* 1998). The clinical signs were pharyngitis, salivation, dysphagia and coughing which appear shortly after consuming the infected edible offal (Sadjjadi *et al,* 1998). It is believed among some women in Iran, particularly of tribal origin, that consuming raw or under-cooked liver of ruminants is useful for growth of the foetus because of its high content of iron and vitamins. Since livers in the present study were found to harbour nymphs, the consumption of raw or under-cooked camel liver may result in nasopharyngeal linguatulosis (Halzoun syndrome).

Although the prevalence of *L. serrata* in camel is high, but because of its relatively lower population and narrow distribution in Iran it seems that have little role in epidemiology of this parasite in compare with small ruminant in different part of Iran. Further investigations about the epidemiology of linguatulosis in this area are warranted.

References

Arbabi A, Mobedi I, Hoshiar H and Bostani M (1998). A case report of Pantastome larvae in human. The 3rd National Congress of Zoonoses in Iran. Mashhad, Iran.

Beaver PC, Jung ROC and Cup EW (1984). Crustacea, linguatulid, millipeds, centipeds, scorpions, spiders, ticks and mites. In: Beaver PC, Jung ROC, Cup EW (Eds.), Clinical Parasitology, Ninth Ed. Lea and Febiger, Philadelphia. pp 572-573.

Curasson G (1947). *Le Chameau Estses Maladies*. Paris: Vigotfreres: 188-211:237.

Dincer S (1982). Prevalence of *L. serrata* in stray dogs and animals slaughtered at Elazing abattoir (Turkey). Veteriner Fakultesi Dergisi Ankara Universitesi 29:324-330.

Drabick JJ (1987). Pentastomiasis. Review of Infectious Diseases 9:1087-1094.

El- Hassan AM, Eltoun IA and El-Asha BMA (1991). The Marrara syndrome: isolation of *L. serrata* nymphs from a patient and the viscera of goats. Transactions of Royal Society of Tropical Medicine and Hygiene 85: 309.

Esmail-Nia K, Hadizadeh-Moalem S, Derakhshanfar A, Moatamedi G (2000). A study on the prevalence of *L. serrata* infestation in small ruminants of Mazandaran province in Babol abattoir. Pajouhesh & Sazandegi 45:94-95.

Kalil GM and Schacher JF (1965). *L. serrata* In relation to halazoun and Marrara syndrome. American Journal of Tropical Medicine 14:736-746.

Khalil GM (1970). Incidence of *L. serrata* infection in Cairo mongrel dogs. Journal of Parasitology 56:458.

Khalil GM and Schacher JF (1965). *L. serrata* in relation to halzoun and the Marrara syndrome. American Journal of Tropical Medicine and Hygiene 15:736-746.

Jamali R, Montazeri A and Behtash F (1997). An investigation on *L. serrata* infection of lung and liver of slaughtered animals in Tabriz slaughterhouse. 2nd National Congress of Parasitic Diseases. Tehran, Iran, pp 177.

Maleky F (2001). A case report of *L. serrata* in human throat from Tehran, central Iran. Indian Journal of Medical Sciences 55(80):439-441.

Montazeri A, Jamali R and Kazemi A (1997). Two case reports of *L. serrata* (Halazoun syndrome) in human, in Tabriz, Iran. 2nd National Congress of Parasitic Diseases. Tehran, Iran, pp 175.

Oryan A, Moghaddar N and Hanifepour MR (1993). Arthropods recovered from the viscera organs of camel with special reterance to their incidence and pathogenesis in Fars province of Iran. Indian Journal of Animal Sciences 63(3): 290-293.

Rahman MH, Mondal MMH and Haq S (1980). On the occurrence of *L. serrata* nymphs in goats and cattle of Mymensingh District, Bangladesh. Bangladesh Veterinary Journal 14:41-44.

Rezaee M (1998). The study on the occurrence of *L. serrata* in goats and dogs in Shiraz, Iran. DVM Thesis. Shiraz University, Iran.

Sadjjadi SM, Ardehali SM and Shojaei A (1998). A case report of *L. serrata* in human pharynx from Shiraz, Southern Iran. Medical Journal of Islamic Repubic of Iran 12:193-194.

Sajadi SM, and Ardehali S (1998). A case report of *L. serrata* in human. The 3rd National Congress of Zoonoses Mashhad, Iran. pp 192.

Saiyari M, Mohammadian B and Sharma RN (1996). *L. serrata* in lungs of goats in Iran. Tropical Animal Health and Production 28(40):312-314.

Shekarforoush SS and Arzani P (2001). The study of prevalence rate of *L. serrata* nymphs in liver of sheep, goat and cattle in Shahre-kord, Iran. Iranian Journal of Veterinary Research 2:57-62.

Shekarforoush, SS, Razavi SM and Izadi M, (2004). Prevalence of *Linguatula serrata* nymphs in sheep in Shiraz, Iran. Small Ruminant Research 52:1-2.

Soulsby EJL (1982). Helminths Arthropods and Protozoa of Domesticated Animals, 7th Ed. Bailliere Tindall, London. pp 497-498.

Yagi H, El-Bahari S, Mohammed HA, Ahmed ERS, Mustafa B, MahmoudM, Saad MBA, Sulaiman SM and El-Hassan AM (1996). The Marrara Syndrome: a hypersensitivity reaction of the upper respiratory tract and buccopharyngeal mucosa to nymphs of *Linguatula serrata.* Acta Tropica 62(3):127-134.