The prevalence of *Linguatula serrata* nymphs in one-humped camel (*Camelus dromedarius*) in Northwest of Iran

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**Abstract.** The *Linguatula serrata* is a tongue-shaped parasite that infections carnivores or insectivorous reptile as final host and herbivores as intermediate ones. The aim of this study was to evaluate the prevalence of nymphal stages of *L. serrata* in mesenteric and mediastinal lymph nodes of camels which slaughtered in Tabriz slaughterhouse, Northwest of Iran. In this study, a total of 185 camels (121 males 64 females) of different ages were examined from April 2010 to June 2011 for *L. serrata* of which 25(13.5%) were found to be infective. The mesenteric lymph nodes of 18 (9.7%) and the mediastinal lymph nodes of 4 (2.1%) out of 185 camels were infected. No significant difference (P>0.05) was found between the infected male and female animals but the infection rate increased with age (P<0.05).

**Keywords:** *Linguatula serrata*; One-humped camel; Tabriz; Iran.

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**Introduction**

The phylum pentastomida consists of about 100 species of endoparasites which are the respiratory tract parasites of vertebrates. These parasites are important in veterinary and human medicine. They are classified in the two families, linguatulidae and procephalidae which the species of the genus *Linguatula* and *Armillifer* are zoonotic parasites (Schmidt and Roberts, 1981). *Linguatula serrata* Frohlich, 1789 is a zoonotic parasite causing visceral and nasopharyngeal linguatulosis or ‘Halazoun Syndrome’ in humans. *L. serrata* is tongue shaped, lightly convex dorsally and flattened ventrally. Males measure 1.8-2 cm, while females measure 8-13 cm in length. Adults inhabit the canine respiratory system as final hosts. The eggs are expelled from the respiratory passages of the canine and, when swallowed by an intermediate host, the larva reaches the mesenteric and mediastinal lymph nodes, liver, and other organs, in which it develops to the infective nymphal stage. The final host becomes infected by eating the infected viscera of intermediate hosts (Soulby, 1986). This parasite has also been reported in humans in Iran (Mohammadi et al., 2008; Sadjjadi et al., 1998; Siavoshi et al., 2002) with clinical signs of nasopharyngeal symptoms.
including sneezing, coughing and nasal discharge following consumption of barbecued liver (Kabab). Maleky (2001) described linguatulosis caused by *L. serrata* in the throat of a 28-year-old woman from Tehran, Iran. Consuming raw or under-cooked liver is not unusual in some part of Iran particularly in women of child bearing age. It is thought among some women, that consumption of raw or undercooked liver is helpful for growth of the fetus because of its high content of iron and vitamins. Several studies have been conducted on the prevalence rate of *L. serrata* in dogs (Meshgi and Asgarian, 2003), camels (Haddadzadeh et al., 2009; Oryan et al., 1993; Shakerian et al., 2008), buffaloes (Tajik et al., 2008), sheep (Shekarforoush et al., 2004; Tavassoli et al., 2007) and goats (Razavi et al., 2004; Saiyari et al., 1996). Human infection with *L. serrata* has been reported from different parts of the world including tropical regions of North and South America, Europe, Asia, Africa and Australia (Riley et al., 1985). There are also some reports of the infection from different regions of Iran (Maleky, 2001; Siavoshi et al., 2002).

The objective of this study was to determine the prevalence rate of *L. serrata* nymphs in mesenteric and mediastinal lymph nodes of camels that were processed in the Tabriz slaughterhouse.

Materials and methods

During April 2010-June 2011, 121 males and 64 females camels in three age groups (<5, 5-10, >10 years old) were selected randomly at the Tabriz slaughterhouse. For this study, mediastinal and mesenteric lymph nodes were examined for nymphal stage of *L. serrata*. Samples were cut into small pieces and immersed in normal saline (0.9% NaCl) solution and left for 5–6 h to allow nymphs to come out from the tissue. Recovered nymphs were flattened, dehydrated in ascending grades of ethyl alcohol and cleared in creosote before examining under a stereomicroscope. Then, the negative samples were digested in 200 ml of digestion solution containing 5 g of pepsin and 25 ml hydrochloric acid in 1000 ml distilled water, and incubated at 37°C for 24 h (Razavi et al., 2004). The statistical analysis was performed using SPSS software version 16 (SPSS, Inc, Chicago, IL). The Chi-square test was used to check the differences between the percentages. The data were analyzed using Chi-squared test.

Results

Twenty-five out of 185 camels (13.5%) were infected with nymphs of *L. serrata*. Seventeen out of 121 males (14.06%) and eight out of 64 females (12.5%) were found to be positive (table 1). Eighteen camels (9.7%) had nymphs in their mesenteric lymph nodes. Also four camels (2.1%) had nymphs in their mediastinal lymph nodes. The mean numbers of parasites in mesenteric and mediastinal lymph nodes were 13 and 2, respectively. The infection rate increased has significantly higher in camels between 5 and 10 years old (P<0.05), but no significant difference was observed between males and females (P>0.05).

**Table 1.** The prevalence of *Linguatula serrata* nymphs in camels slaughtered at Tabriz slaughterhouse, Iran

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Gender</th>
<th>No. of camels</th>
<th>No. of infected camels (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt;5</td>
<td>5-10</td>
</tr>
<tr>
<td>No. of camels</td>
<td></td>
<td>78</td>
<td>68</td>
</tr>
<tr>
<td>No. of infected camels (%)</td>
<td></td>
<td>(10.2)</td>
<td>(22.05)</td>
</tr>
</tbody>
</table>

Discussion

Linguatulosis poses veterinary and public health importance in the world including Iran. As intermediate host, one-humped or two humped camel, like the other ruminants, may play a vital role in the life cycle of *L. serrata*. As the camels are mostly kept freely in the pastures, they are very susceptible in persistence of infection and its dissemination (Tajik et al., 2007).

Without any specific clinical symptoms, *L. serrata* infection in ruminants leads to the reduction of animal products and hidden economic loss, as well as public health risks. The prevalence rate of *L. serrata* in dogs is 76.5% and 62.2% in Shiraz and Shahrekord, Iran,
respectively (Meshgi and Asgarian, 2003; Oryan et al., 2008). Close contact between dogs and the intermediate host plays an important role in transmission of *L. serrata* in this area. Several studies have been conducted to determine the prevalence of linguatulosis in ruminants in Iran and other countries. The prevalence rate was 29.9% in goats in Shiraz, Iran (Razavi et al., 2004), 44% in cattle in Urmia slaughterhouse, Iran (Tajik et al., 2007), 49.1% in goats slaughtered in Kerman, Iran (Nourollahi Fard et al., 2008). In this study, 9.7% and 2.1% of the camels had *L. serrata* nymphs in mesenteric and mediastinal lymph nodes, respectively. Wahba et al. (1997) reported that *L. serrata* nymphs were found in the lymph nodes of 3 camels (Wahba et al., 1997). In another study, 12.5% of camels in Shiraz were infected with nymphal stage of *L. serrata* (Oryan et al., 1993). The occurrence of *L. serrata* nymphs in the left lobe of lung of a two humped male camel was previously reported in Tabriz, Iran (Haddadzadeh et al., 2009).

In another study with slaughtered camels, Tajik et al. (2007) showed that mesenteric lymph nodes, the lungs and the liver were infected with *L. serrata* nymphs of 75%, 29.7% and 30.4% of animals, respectively (Tajik et al., 2007). Shakerian et al. (2008) reported that mesenteric lymph nodes (21%) and liver (4.5%) were infected with the infective stage of these parasites in Najaf Abad, Iran (Shakerian et al., 2008). The prevalence of the infection in camels may be influenced by many factors such as the geographic and climatic changes which affect the survival of the parasite eggs. The prevalence rate (13.5%) of infection in lymph nodes should be considered as a risk factor for human being infection. In this study no significant difference (P>0.05) was observed between the infected female and male camels. The infection rate increased with the age of animals (P<0.05) that may be due to the re-infection of animals and lack of the protective immunity. The prevalence rate of mediastinal lymph nodes was significantly (P<0.05) lower than that of mesenteric lymph nodes. It is explained with the development of *L. serrata* in the intermediate hosts. The high prevalence of infection observed in ruminants is of concern owing to the zoonotic nature of the parasite and the risk of infection to humans and other animals. Considering this facts that consumption of undercooked camel lung is common in the studied area, the zoonotic importance of this infection should be concluded.

References


