

PREVALENCE OF TOXOPLASMA GONDII INFECTION IN WILD ANIMALS IN NORTH-WESTERN PART OF LIBYA

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SUMMARY

The infection of wild animals with toxoplasmosis in Libya was conducted for the first time by this work. Antibodies to *Toxoplasma gondii* were detected in samples collected from 45 wild animals (free-ranging live) and captured at North-Western part of Libya. Serum was tested using Latex agglutination test (LAT). 4 out of 30 hedgehogs, 2 out of 10 red fox (*Vulpes vulpes*) and 1 out of 5 porcupines serum samples tested positive. The titers were 1/40, 1/80, 1/160 and 1/320 in hedgehogs, 1/80 and 1/160 in red fox but in porcupines was 1.80.

Key words: *Toxoplasma gondii*, Serum, wild animals, LAT.

INTRODUCTION

Toxoplasma gondii is an obligate, intracellular protozoan parasite that can multiply in any vertebrate cell (Frenkel et al., 1976). Toxoplasmosis is one of the most spread zoonosis, about one third of the world's population is believed to possess antibodies for the parasite (Pedro and Boris 1989). Also, toxoplasmosis is common in wild animals. Human have occasionally contracted the infection by handling or eating insufficiently cooked meat from game animals (Sacks et al., 1983). Wildlife animals in Libya as in other regions of the world play an important role as harbors of diseases which can be transmitted to domesticated animals and humans (FAO, 1992). However little data is recorded concerning the species, population and geographical distribution

of wild animals in Libya. So the diseases that occur in wild animal are not documented. The present work is a continuation of the work previously done by Hosni (2006) and it is conducted to know the prevalence of *T. gondii* in different wild animals in North-Western part of Libya by Latex agglutination test.

MATERIAL AND METHODS

2.1. Animal quarantine and restrain

The captured 45 life animals (10 red fox (*Vulpes vulpes*), 5 Crested porcupines (*Hystrix cristata*) and 30 hedgehogs (*Erinaceus algirus*) were transported in special cages from their natural habitat to veterinary clinic, where they kept in the quarantine enclosure to observe any abnormal symptoms. After quarantine the red fox and porcupines were restrained using a snare or a net to transfer to squeeze cage for anesthetize the animal using an intramuscular injection of ketamine hydrochloride (Imalgene1000, Merial). Hedgehogs were anesthetized in a special anesthetic box, where they anesthetized using a piece of cotton soaked in Diethyl ether and placed inside the box along side the hedgehogs.

2.2. Sampling

A blood sample was taken from the heart of hedgehogs and from the jugular vein of a porcupines and red fox by sterile syringe and transferred to vacutainer tube without anticoagulant. Sera separated from the blood sam-

ples and transferred to eppendorf tubes and kept at -20°C till use.

2.3. Latex agglutination test

Toxolates were used for the detection of anti-*Toxoplasma gondii* antibodies in serum samples. It is based on the agglutination principle of polystyrene particles coated with a *Toxoplasma* antigen, which allows the detection of both IgG and IgM antibodies. Serum antibodies against *T. gondii* are revealed by an agglutination of latex particles visible to the naked eye. In the absence of specific antibodies, there is no agglutination (Ohshima et al, 1981).

2.3.1. Qualitative procedure

By micropipette, deliver 25 µl of the serum to be tested in one square of slide.

Carefully shake the latex reagent and distribute one drop with the dropper provided in the box, then mix the drops with a disposable stirrer, spreader over the entire square. Rotate the slide gently if necessary and observe the presence of agglutination. In case of a positive result on pure serum, it is possible to evaluate the quantity of anti-*Toxoplasma* antibodies by testing increasing dilutions of the serum in glycine saline buffer, until a negative reaction is obtained.

RESULTS

The present work showed that the examination of 45 serum of different wild animals by Latex

agglutination test for detection of *T. gondii* antibodies revealed that 4 (13.3%) out of 30 hedgehogs serum samples, 2(20%) out of 10 red foxes

serum samples and 1(20%) out of porcupines serum samples have antibodies against *T. gondii* (Table 1).

Table (1): Prevalence of *Toxoplasma gondii* in 45 serum samples of different wild animals using Latex agglutination test.

Animal species	Results				Total
	(+)	(%)	(-)	(%)	
Hedgehogs	4	13.3%	26	86.7	30
Red fox	2	20	8	80	10
Porcupines	1	20	4	80	5
Total	7	15.6	38	84.4	45

As illustrated in the Table 2 the end point titres of antibodies against *T. gondii* in 7 positive serum samples of different wild animals by Toxolatest were 2 hedgehogs positive samples at dilu-

tion 1/4 - 1/8 and 2 samples at 1/160 - 1/180, in red fox at dilution 1/80 and 1/160 and in crested porcupines at 1/80.

Table (2): End point titres of antibodies against *Toxoplasma gondii* in 7 positive serum samples of different wild animals.

Animal species	Results of titration					Total
	1 / 20	1 / 40	1 / 80	1 / 160	1 / 320	
Hedgehogs	–	1	1	1	1	4
Red fox	–	–	1	1	–	2
Porcupines	–	–	1	–	–	1
Total	–	1	3	2	1	7

DISCUSSION

The results of serological examination revealed the presence of antibodies against *T. gondii* in serum of hedgehogs, red fox (*Vulpes vulpes*) and porcupines with prevalence 13.3%, 20% and 20% respectively. The prevalence of *T. gondii* detected in red fox in this study was lower than that mentioned by Jakubek et al.(2001) in Sweden 38%, Wolfe (2001) in Ireland 48% and Dubey et al. (1999) in USA 243 (85.9%) of 283 red foxes, and 73 (75.3%) of 97 gray foxes. Other authors in different countries recorded higher prevalence in different wild animals. Anwar et al., (2006) detected antibodies against *T. gondii* in 63 of 90 (70%) badgers by LAT in southern England. In the mid western United States, de Camps et al., 2008 determined the seroprevalence of *T. gondii* antibodies in wild zoo felids, by using the modified agglutination test (MAT) among wild felids, antibodies to *T. gondii* were found in 6 (27.3%) of 22 cheetahs, 2 of 4 African lynx, 1 of 7 clouded leopards, 1 of 5 Pallas cats, 12 (54.5%) of 22 African lions, 1 of 1 jaguar, 1 of 1 Amur leopard, 1 of 1 Persian leopard, 5 (27.8%) of 18 Amur tigers, 1 of 4 fishing cats, 3 of 6 pumas, 2 of 2 Texas pumas, and 5 (35.7%) of 14 snow leopards. From different regions of Spain, serum samples from 282 wild carnivores were tested for antibodies to *T. gondii*, antibodies to *T. gondii* were found in 22 of 27 (81.5%) Iberian lynx, 3 of 6 European wildcats, 66 of 102 (64.7%) red foxes (*Vulpes vulpes*), 15 of 32 (46.9%) wolves, 26 of

37 (70.3%) Eurasian badgers, 17 of 20 (85.0%) stone martens, 4 of 4 pine martens, 6 of 6 Eurasian otters, 4 of 4 polecats, 1 of 1 ferret, 13 of 21 (61.9%) European genets, and 13 of 22 (59.1%) Egyptian mongooses, serological results indicated a widespread exposure to *T. gondii* among wild animals (Sobrino et al., 2007). The seroprevalence to the protozoan parasites *T. gondii* in 337 red foxes (*Vulpes vulpes*) from 16 out of 19 counties in Hungary, antibodies to *T. gondii* were detected in as many as 228 (68%) of the foxes using a commercial direct agglutination test (DAT). The high prevalence of foxes positive for *T. gondii* might be explained by the widespread occurrence of the parasite in the diet of foxes. (Jakubek et al 2007). Also, Buddhirongawatr et al. (2006) detected *T. gondii* antibody in serum samples of 21 captive wild felids including one fishing cat (*Prionailurus viverrina*), one leopard (*Panthera pardus*), two flat-headed cats (*Prionailurus planiceps*), 6 tigers (*Panthera tigris*), two leopard cats (*Felis bengalensis*), two clouded leopards (*Felis nebulosa*), 3 pumas (*Puma concolor*), and 4 jungle cats (*Felis chaus*). Antibodies to *T. gondii* were founded in 9 of 21 felids (42.8%). Almeria et al. (2004) were found 65 (14.2%) wild rabbits are infected in Spain. The free-ranging wildlife animals studied play an important role in the area of study in harboring and transmitting the parasites. which may play an important role as a source of *Toxoplasma* infection to humans, domesticated animals and wild animals in study area.

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مدى انتشار الإصابة بالمقوسة القندية في الحيوانات البرية

في شمال غرب ليبيا

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إصابة الحيوانات البرية التي شملتها هذه الدراسة بالمقوسة القندية سجلت لأول مرة في ليبيا. حيث تم الكشف على عدد ٤٥ من الحيوانات البرية الطليقة منهم (١١) ثعلب أحمر و (٥) الشيهم و (٣٠) القنفذ. تم صيدها من منطقة شمال غرب ليبيا لمعرفة اصابتها بالمقوسة القندية باستخدام اختبار التلازن. أظهرت النتائج أن عدد (٤) القنفذ و (٢) الثعلب الأحمر و (١) الشيهم منهم تحتوى على أجسام مناعية ضد المقوسة القندية وبمعدلات مختلفة من الأجسام المناعية في العينات الموجبة (١/٤، ١/٨٠، ١/١٦٠، ١/٣٢٠ في القنفذ و ١/٨٠، ١/١٦٠ في الثعلب الأحمر أما الشيهم فكان المعدل النهائي ١/٨٠.