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Serosurveillance of *Toxoplasma gondii* Antibodies in Camels at Tumbool Slaughterhouse, Central Sudan.

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ملخص البحث

فحصت مائة عينة سيرم من الإبل المذبوحة بسلخانة تمبول بمنطقة البطانة الكبرى- السودان وذلك بإستخدام طقم التخثرلاتكس لتعيين مدى إنتشار الأجسام المضادة لطفيل التوكسوبلازما. وجدت نسبة 44% من الإبل موجبة لهذا الإختبار وبالرغم من انه لا توجد علاقة إرتباطية معنوية بين جنس أو عمر الحيوان مع معدل الإصابة إلا أن أعلى نسبة إصابة وجدت فى الإبل الأكبر سناً (أكبر من 7 سنوات) وفى الإبل الواردة من مناطق الصعيد .

Summary

Serum samples from 100 camels slaughtered at Tumbool slaughterhouse in the Butana area- mid-Eastern Sudan, were tested for *Toxoplasma* antibodies by the latex agglutination test (LAT). Forty-four per cent of the camels were sero-reactive. Although there is no sex-or-age linked differences in sero-reactivity yet, the highest prevalence rate was found among camels over 7-years-old and in camels locally known as Saeed type.

Toxoplasmosis is one of the most prevalent parasitic infections of man and livestock (Ibrahim *et al*., 1997) caused by *Toxoplasma gondii*. Its transmission has usually been attributed to ingestion of undercooked or raw meat from infected livestock; therefore, the infection rate in those animals being an important risk predictor of human disease. Nevertheless, most infection in the immunocompetent persons is asymptomatic and symptoms (if present) are usually mild and self-limited. Infection in the foetus and immuno-deficient patients may lead up to clinically severe and often fatal toxoplasmosis. The objective of this study was to assess the prevalence of toxoplasmosis among the slaughtered camels at Tumbool area.

This study was conducted at Tumbool Camel Research Centre (TCRC) in Butana area where camels are usually purchased from different regions of Sudan for the slaughter at local market of Tumbool for human consumption.

Serum samples were collected from slaughtered camels at Tumbool slaughter house during the period from May - September 2009. Blood samples (about 5ml) were taken from the jugular vein of the animals into sterile plain vacutainers. The samples were allowed to clot at room temperature then the sera were separated by centrifugation at 4000 rpm for 5 minutes and kept frozen at -20^{o}C for serological test.

Latex agglutination test (LAT) was performed for determination of toxoplasmosis antibodies using commercial kits (Toxo-Latex, Spinreact, Sant Esteve de bas, Spain). HumanTex Toxo (Human Gesellschaft Biochemical Und Diagnostic MBH, Germany). Suspension of polystyrene latex particles coated with antigenic extract of *T. gondii* in a buffered saline solution that contains 0.95 g/L sodium azide.

Toxo-latex is a rapid slide agglutination procedure developed for the direct detection of antibodies against anti-Toxoplasma in the serum. The assay is performed by testing a suspension of latex particles (25µl) coated with antigenic extract of *T. gondii* with unknown samples (50µl). Agglutinated samples were considered sero-positive. Obtained data were subjected to Chi Square test using Basica statistical programme. The difference was significant at P<0.05

The sero- reactivity of examined sera showed that the prevalence rate of *T. gondii* antibodies in camel was 44%. The prevalence rate in camels was found to be independent of their sex (P>0.05; chi^2 –test; Table 1). Although, there is no statistical difference between the prevalence rate among camel at different age groups (P>0.05 chi^2 –test; Table 2) yet, old animals (above 10 years) appear to have high infection rate (Table 2). However, the prevalence of *T. gondii* in camels differed significantly (P<0.05) according to their local type where camels from Saeed area (Eastern Central Sudan) showed higher prevalence rate than Butana, West and Kassala types (P<0.05; chi^2 test; Table 3).

Table 1: Prevalence rate of *T. gondii* antibodies among male and female camels.

Toxoplasma	Male	Female	Chi	P
No. examined	16	84		
No + ve	6 (37.4%)	38 (45.2%)	0.08	0.76

Table 2: Prevalence rate of *T. gondii* antibodies of camels at different age groups.

Age group	No examined	No. positive (%)	Chi	P
1-3 years	14	5 (37.7%)		
4-6 years	24	10 (41.7%)	0.7	0.86
7-9 years	44	20 (45.4%)		
>10	18	9 (50.0%)		

Table 3: Prevalence rate of *T. gondii* antibodies of camels according to their local types.

Types	No examined	No. positive	Chi	P
Kassala	20	08 (40.0%)		
Butana	52	20 (38.5%)	6.1	0.01***
Saeed	15	11 (73.3%)		
West	13	05 (38.5%)		

The results of the present study revealed a high prevalence of *T. gondii* infection among animals slaughtered in Tumbool Slaughterhouse. The prevalence rate in camels (44%), in the present investigation, is high, similarly our neighbouring countries, including Saudi Arabia, Egypt, Somalia, and Abu Dhabi, high prevalence rate of *Toxoplasma* antibodies were investigated among workers (52.4%) and slaughtered animals (44.1%) in Tanta abattoir

(Ibrahim *et.al.*, 1997). In Abu Dhabi (30.9%) in racing camels were sero positive to *T. gondii* (Afzal and Sakkir, 1994). In Saudi Arabia the prevalence was much higher in female compared to male camels and in adults compared to young individuals (Hussein *et al*., 1988). More recent studies in Egypt reported 30.7% prevalence rate in camel (Shaapan and Fathia, 2008).

Previous study in the Sudan by Elamin *et al* (1992) showed high prevalence rate (67%) in camel at Butana plain (mid- Eastern Sudan) at Gedarif, Subagh and Al-Showak area. This may support our present finding that high prevalence rate is recorded among Saeed type of camel where the animals belong to this area of Butana. In addition, their movements are extended more into the eastern boarder of Sudan with Ethiopian territories and may be infected with a different strain of Toxoplasma spp.

In conclusion, this study suggests widespread infection with *T. gondii* among the camels a finding that warrants a closer look into the possible ways of infection, its economic impact, as well as its public health significance, especially among the nomads and camel consumers who consume raw milk and liver.

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