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SEROSURVEY OF *Toxoplasma gondii* AND *Brucella* spp. IN CAMELS (*CAMELUS DROMEDARIUS*) FROM SOMALIA

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ABSTRACT

Toxoplasma gondii and *Brucella* spp. are important pathogens that may cause abortion in animals and human beings. Toxoplasmosis and brucellosis have worldwide occurrence and causes socio-economic losses in livestock dependent communities. In Somalia, camels (*Camelus dromedarius*) are an important livestock species and plays a pivotal role as food and income for the reliant communities. Therefore, this cross-sectional study has aimed to serosurvey 180 dairy camels from the Banadir region of Somalia for *T. gondii* and *Brucella* spp. Camel serum samples were tested for anti-*T. gondii* antibodies by latex agglutination test (LAT), and anti-*Brucella* spp. antibodies by rose bengal plate test (RBPT) and competitive enzyme linked immunosorbent assay (cELISA). Sixty-seven out of 180 (37.3%; 95% CI: 30.2-44.7%) camels were seroreactive for at least one pathogen. A total of 62/180 (34.4%; 95% CI: 27.5-41.9%) camels were seroreactive for *T. gondii*. Three out of 180 (1.7%; 95% CI: 0.4-4.8%) and seven/180 (3.9%; 95% CI: 1.6-7.9%) animals were seroreactive for *Brucella* spp. by RBPT and cELISA, respectively. Three (1.7%) camels were seroreactive for *Brucella* spp. by both diagnostic methods. Two camels were seroreactive for both pathogens. Using cELISA as gold standard, RBPT has shown a sensitivity of 43% (95% CI = 15.8-74.9%) and specificity of 100% (95% CI = 94.2-100%), with a moderate degree of agreement (*k* = 0.59). Considering that raw camel milk consumption by Somali communities is a common practice, our data highlights the importance of epidemiological studies to address development and implementation of effective control strategies for livestock in this country.

INTRODUCTION

Toxoplasma gondii and *Brucella* spp. are important abortifacient food-borne pathogens in both human and animals with worldwide occurrence (Tenter 2009; Corbel *et al.* 2006). These pathogens may cause serious financial drains for livestock owners and, more broadly, for country's economy, which can have wide consequences for a society's health (Habtamu *et al.* 2015; Ibrahim *et al.* 2016). Somali camels (*Camelus dromedarius*) play an important role as a source of food and income generator for livestock dependent households (Abdurahman and Bornstein, 1991). The country has more than seven million camels, the highest number in the world (FAOSTAT, 2016). *Camelus dromedarius* have been reported to harbour pathogens with zoonotic importance (e.g. *Brucella* spp., *Toxoplasma gondii*, Rift Vallley Fever Virus, *Bacillus anthracis*, *Coxiella burnetii*) (Ibrahim *et al.,* 2016; Browne *et al.* 2017). Because of zoonotic importance and economic impact of *T. gondii* and *Brucella* spp., the present study was aimed to determine the seroprevalence of toxoplasmosis and brucellosis and their serological co-existence in camels from Mogadishu, Somalia.

MATERIAL AND METHODS

During December 2015 and December 2017, a total of 180 whole blood samples (up to 5 mL) of apparently healthy camels (6 males and 174 females) from Mogadishu city (2°2′N 45°20′E), the capital of Somalia, were randomly collected by venipuncture of the jugular vein. Samples were stored at room temperature (25 °C) until visible clot retraction. The samples were centrifuged at 1500 g for 5 min, serum separated and stored at –20°C until serological analysis.

All serum samples were tested for anti-*T. gondii* and anti-*Brucella* spp. antibodies. For the detection of anti-*T. gondii* antibodies, camel samples were tested by a commercial latex agglutination test (LAT) (SPINREACT, S.A/S.A.U Ctra Santa Coloma, Spain), according to the manufacturers' instructions. For the detection of anti-*Brucella* spp. antibodies, serum samples were tested by the Rose Bengal Plate Test (RBPT) (CVRL, Khartoum, Sudan) and commercial competitive-ELISA (cELISA) (Svanova Biotech AB, Uppsala, Sweden), according to the manufacturers' instructions. The optical density (OD) was measured using a wavelength of 450 nm, and samples with a percentage of inhibition (% I) ≥30% were considered positive by cELISA.

RESULTS

A total of 67/180 (37.3%; 95% CI: 30.2-44.7%) camels were seroreactive for at least one pathogen. Sixty-two out of 180 (34.4%; 95% CI: 27.5-41.9%) camels were seroreactive for *T. gondii*. A total of three/180 (1.7%; 95% CI: 0.4-4.8%) camels were seroreactive for *Brucella* spp. by both diagnostic methods, RBPT and cELISA. Using cELISA as gold standard, RBPT has shown a sensitivity of 43% (95% CI = 15.8-74.9%) and specificity of 100% (95% CI = 94.2-100%), with a moderate degree of agreement (*k* = 0.59). Two animals were seroreactive for both *T. gondii* and *Brucella* spp.

DISCUSSION

The overall seroprevalence of toxoplasmosis (34.4%) in this study was higher than that reported in Iraq (25.2%) by Mahmoud *et al.* (2014) but lower than that recorded in Sudan (55%) by Ibrahim *et al.* (2016). However, our finding is comparable to that reported in Egypt (30.7%) (Shaapan and Khalil 2008). The high seroprevalence of *T. gondii* antibodies in the present study may be due to the presence of cats in the studied herds.

Our present result (1.7%) on camel brucellosis in Somalia was slightly higher than the previous finding (0.4%) of Amina (1987). However, our result is lower than that (10.4%) reported by Andreani *et al.* (1982) and comparable to the finding (1.9%) of Baumann and Zessin (1992). The low seroprevalence of brucellosis in this study may be due to the timely culling of camels with proven reproductive problems from the herds.

Toxoplasmosis had the highest seroprevalence (34.4%) than brucellosis (1.7%). Serological co-existence of both *T. gondii* and *Brucella* spp. (3%; 95% CI = 0.4-10.4%) was found in this study. Higher results of mix-infection (16.7%) was reported in the Sudan (Ibrahim *et al.* 2016).

CONCLUSIONS

The present study is an evidence of the existence of anti-*T. gondii* and/or anti-*Brucella* spp. antibodies among camels (*Camelus dromedarius*) from Mogadishu city of Somalia. Since the awareness on these zoonotic pathogens in Somalis is very low with their practice of unpasteurized camel milk consumption, the people in this country are at great public health risk. Therefore, there is a need to promote the one-health concept among multi-sectoral professionals for better and sustainable integrated health development. Further area-wide epidemiological study on both people and their livestock is recommended for designing and implementing effective control strategies against these zoonotic diseases.

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