

## Clinico-Pathological and Etiological Characterization of an Outbreak of Abortion caused by *Toxoplasma gondii* in a herd of Dairy Goats in Palestine

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*An outbreak of abortions occurred in a farm of dairy goats (Anglo-Nubian cross) in Palestine. All 30 goats in the farm either aborted (n=18), had still births (n=10) or mummified fetus (n=2). All abortions occurred in the last trimester of gestation in both primiparous and pleuriparous goats. Grossly, the fetal membranes showed many cotyledonary necrotic foci (2-3 mm in diameter) and inter-cotyledonary edema. Histologically, there were multiple foci of necrosis in the cotyledons and focal microgliosis in the brain of aborted fetuses. A diagnosis of T. gondii was confirmed by a fourfold increase in convalescent antibody titers using ELISA. This is the first well-studied outbreak of abortion in dairy goats in Palestine.*

### KEYWORDS

*Toxoplasma gondii*, abortion, dairy goats, Palestine, ELISA.

### INTRODUCTION

Abortion is common in small ruminants and can occur any time during gestation (Pugh and Baird, 2001; Radostits, 2007; Buxton and Rodger, 2008; Sirios and Hendrix, 2007; Matthews, 2009). Infectious abortion can lead to significant economic losses because of rapid transmission among individuals of the herd. *Toxoplasma gondii* (*T. gondii*) is considered one of the most common causes of infectious abortion in goats world-wide (Pugh and Baird, 2001). In some circumstances, *T.*

*gondii* abortions can account for more than 25% of all abortions in the herd (Pugh and Baird, 2001). Some affected animals may also give birth to weak newborns while others may have mummified fetuses. In most outbreaks, the affected animal remains clinically normal (Matthews, 2009).

*T. gondii* is a protozoan parasite with an obligate intracellular life cycle (Buxton, and Rodger, 2008). Domestic and wild cats serve as a primary host while farm animals and man serve as an intermediary host (Bowman et al., 2008; Buxton and Rodger, 2008; CDC, 2012). Oocysts are spread throughout the environment in the fecal matter of the primary host where they become infective in few days. The intermediary host become infected by ingesting infective oocysts in contaminating pastures, soil, feed concentrate and occasionally water supply (Radostits, 2007; Buxton and Rodger, 2008; Matthews, 2009).

Toxoplasmosis is an important zoonotic disease (Bowman et al., 2008; CDC, 2012). Humans can contract the disease by ingesting improperly cooked meat or unpasteurized milk from animals infected with *T. gondii* (CDC, 2012). Pregnant women are especially vulnerable and the infection can lead to abortion, or the birth of infected newborn with neurological consequences (CDC, 2012).

The present study constitutes the first report on, an abortion outbreak caused by *T. gondii* in dairy goats in Palestine.

### MATERIALS AND METHODS

This study was conducted on herd of 30 adult goats (Anglo-Nubian cross). Goats were 2-3 years of age. The goats were housed in closed pen with a small outside free- area provided for

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exercise. Goats were fed a ration consisted of concentrate and straw and tap water for drinking was available ad libitum. Animals were routinely treated for internal and external parasites using ivermectin and were vaccinated against Brucella, Sheep pox, Peste Des petit ruminant and Foot and Mouth disease.

The aborted fetus, fetal membranes and affected does were subjected to physical examination immediately after each incident. Whole blood was withdrawn from the jugular vein and placed in a plain blood tubes from all affected does within 12 hours after abortion and again 4 weeks later. Tissue samples were collected from fetal membranes and from the brain of aborted fetuses and fixed in a 10% neutral buffered formalin for routine histopathology examination using H&E staining (Sirios and Hendrix, 2007; Buxton and Rodger, 2008). Serum was obtained by centrifugation of blood samples at 5000 g for 10 minutes. Sero-conversion and antibody titers were determined using commercially available ELISA kit as directed by the manufacturer (Diagnostic Automation/Cortez Diagnostics Inc., California, USA).

## RESULTS

All 30 goats in the farm either aborted (n=18), had still birth (n=10) or mummified fetus (n=2). All abortions occurred in the last trimester of gestation in both primiparous and pleuriparous goats. All animals appeared clinically normal before abortion, but were lethargic and pyrexia during the incident. Some does suffered repeated abortions in successive pregnancies. All affected goats appeared to seroconvert within 3-4 weeks after abortion.

Examination of the fetal membranes showed inter-cotyledonary edema and numerous white foci of necrosis approximately 2 – 3 mm in diameter visible on the cotyledons (Fig. 1). Histopathologically, cotyledonary lesions were distinctive and consisted of multiple foci of necrosis. There was focal microgliosis in the brain tissues of aborted fetuses.

## DISCUSSION

Present study revealed that the whole herd of 30 goats was affected with Toxoplasmosis, resulting into abortion in 18, stillbirth in 10 and

foetal mummification in 2 goats. Although ,the source of infection could not be determined, *Toxoplasma gondii* (*T. gondii*) is considered one of the most common causes of infectious abortion in goats world-wide (Pugh and Baird, 2001) causing abortions, birth of weak kids, stillbirth, birth defects and fetal mummification (McGavin and Zachary, 2006; Dubey, 2010). The clinical findings, gross and pathological lesions observed during present investigation were identical to those reported earlier (Pugh and Baird, 2001; Radostits, 2007; Sirios and Hendrix, 2007; Buxton and Rodger, 2008; Matthews, 2009). The diagnosis was confirmed by the documentation of sero-conversion of affected does.

The identification of *T. gondii* as a major cause of abortion and fetal loss in goats in Palestine warrants the initiation of a national control and educational programs to minimize the economic losses associated its spread among various livestock species and to limit its public health impact in Palestinian communities.

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## FIGURES

Fig 1. Intercotyledonary edema and numerous white foci of necrosis on the cotyledons of fetal membranes in a doe aborted because of *T. gondii* infection

