

Case report:

A Heavily Infected Camel with Cystic Echinococcosis

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تم تسجيل حالة نادرة في ناقدة مصابة بأعداد كبيرة من الأكياس العدارية (الطور البرقي لدودة الكلاب ، المتشوقة الحُبيبية) حيث وجدت مصابة بأحدى وخمسون كيساً توزيعها كالأتي : 43 كيساً في الرئتين وأربعة أكياس في الكبد وكيسين في الطحال وكيس في كل من الكليتين. لم تظهر أي أعراض مرضية على الحيوان قبل الذبح. هذا العدد الكبير من الأكياس يدعم التقارير التي تشير إلى أن الجمال عائل وسيط هام لدودة المتشوقة الحُبيبية في السودان مقارنة ببقية الحيوانات.

A rare case of a she-camel heavily infected with *Echinococcus granulosus* cysts, is reported. Fifty-one cysts were found to be distributed in four organs, 43 cysts in the lungs, 4 cysts in the liver, 2 in the spleen and one cyst in each kidney. The animal showed no apparent clinical signs prior to slaughter. This high number of cysts encountered supports the previous reports that described camels as an important intermediate host for *E. granulosus* compared to other animals in the Sudan.

Cystic echinococcosis (CE) is caused by the larval stage of *Echinococcus granulosus*, which has a much greater reproductive potential and requires two mammalian hosts. In Sudan, the parasite is transmitted in a synanthropic cycle involving dogs and livestock (sheep, cattle, camels, and goats). The camel-dog cycle was reported to be the main cycle and the most important in the epidemiology of the disease (Saad and Magzoub, 1989b).

A number of *E. granulosus* strains have been described in the past based on the diversity of morphology, development and host range. Recent genetic studies had led to the recognition of 10 strain-types (G1–G10); the camel strain was described as strain G6 (Thompson *et al*, 1994; Eckert and Thompson, 1997; Lavikainen *et al*, 2003).

During camel hydatidosis survey at Tamboul slaughterhouse, a she camel of about 10 years old with no apparent clinical signs at ante-mortem, was inspected for the presence of hydatid cyst. The internal organs including lungs, liver, spleen and kidneys of the slaughtered animal were inspected. The pathological findings, including cyst size, fertility and organ localisation were recorded. A total number of 51 cysts was counted, and found to be distributed in the lungs, liver, spleen and kidneys.

The lungs contained 43 cysts of various sizes, ranging from 3 to 17cm in diameter (Fig. 1). Some of the cysts were degenerated and filled with a yellow granular caseated material.

The liver contained 4 cysts ranging from 8 to 14 cm in diameter, two of them were fertile and the others were degenerated. The two cysts found in the spleen were 6 and 9 cm in diameter and they were sterile. There was one cyst in each kidney, 10 and 16 cm in diameter and they were round to elliptical in shape with a smooth transparent cyst wall; both cysts were fertile with viable protoscoleces.

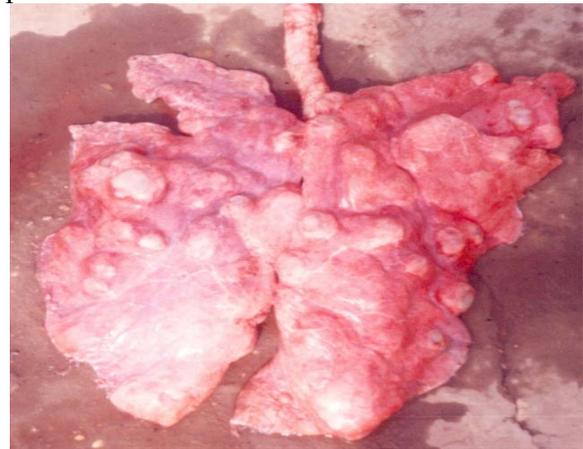


Fig. 1: Lung of the camel with a generalized hydatid cyst infection

In Sudan, the importance of ruminants, particularly camel, as an intermediate host for hydatid disease has been demonstrated in previous studies (Eisa, 1962; Elkhawad *et al.*, 1979a;b; Saad and Magzoub, 1986; Saad; Magzoub 1989a;b; Osman, 2002; Elmahdi *et al.*, 2004). Prevalence of hydatid cysts in slaughterhouse in different regions of the Sudan, revealed an overall infection rate of 12.9% in sheep and 4.4% in goats (Saad and Magzoub, 1989a), and 3.84% and 48.69% in cattle and camel respectively (Saad and Magzoub, 1989b).

Stray or roaming dogs are the main definitive hosts for *E. granulosus* in the Sudan. The infection pressure and the intensity of *E. granulosus* in dogs were studied in Tamboul by Saad and Magzoub (1986); they found that 51% of dogs were infected, with an intensity of 7 to 28, 400 worms per infected dog. The high prevalence of echinococcosis in dogs and the high proportion of stray and free roaming dogs had led to a very high pollution of the environment by *E. granulosus* eggs (Saad and Magzoub, 1986). The infection pressure in camels is higher than that of sheep and goats. The reason for this could be due, partly at least, to the grazing behaviour of camels resulting in the ingestion of a large number of eggs from the environment than sheep, or goats, thus resulting in considerable aggregation of cysts in camels. The high prevalence rate and high cysts fertility in camels are indications of their acting as important intermediate host of the parasite in Sudan. Thus, unhygienic disposal of infected ofal will provide dogs with sources of infection.

The *E. granulosus* camel strain G6 was detected in humans in different parts of the world (Harandi *et al.*, 2002). Five isolates from human patients in Sudan were determined as *E. canadensis* G6 by PCR and sequencing (Omer *et al.*, 2010). Despite the fact that G6 is the dominant strain in Sudan, an additional evidence for its pathogenicity to man may be present, but further molecular

epidemiological data are needed before a conclusion can be drawn.

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