

## Incidence of Hydatid cyst disease in food animals slaughtered at Sokoto Central Abattoir, Sokoto State, Nigeria

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### Abstract

An abattoir based study was conducted to determine the incidence of hydatid cyst disease in cattle, camel, sheep and goats, over a one year period (Oct 2003- Sept 2004). Forty six thousand two hundred and twenty three (46223) cattle; 3545 camel; 16345 sheep and 14134 goats were examined at post mortem for evidence of hydatid cyst lesions. Incidences of 34 (0.07%), 318 (8.97%), 23 (0.14%) and 4 (0.03%) were found for cattle, camel, sheep and goats, respectively. Locations of the cyst lesions in the examined animals shows liver was the most predominant site in cattle 21(61.76%), sheep 18(78.26%) and goats 3(75.0%). For camels, lungs showed the most number of CE lesions 291(91.51%). Overall, the least number of hydatid cyst lesions were observed in the heart. There was significant association ( $p < 0.001$ ) between the species of animals and infection. The public health importance of the disease and the findings were discussed.

Keywords: Abattoir, Camel, Hydatid cyst, Public health, Food Animal, Parasite, Zoonosis.

### Introduction

Cystic echinococcosis, CE (also called Hydatidosis) is a widespread zoonosis infecting a large number of wild and domestic animals and humans. The agent of this disease is a tapeworm (*Echinococcus granulosus*) from dogs and other canidae whose larval stage develops as a liquid tumor, called a hydatid cyst (Bouree, 2001). Echinococcosis (Hydatidosis) is one of the most important of the forty or so canine-associated zoonoses (Cook, 1989) and among the most geographically widespread of the pathogenic parasitic zoonoses (Schantz, 1991). The causative parasite is distributed world-wide (Eckert *et al.*, 2001a) with an estimated 2-3 million patients (Craig *et al.*, 1996). The infection represents a problem of medical, veterinary, and economic importance in endemic areas (Schantz *et al.*, 1995). CE in farm animals causes considerable economic problems due to loss of the edible liver. Significant loss of meat and milk production and value of the fleece from infected sheep may also occur. These losses are of special significance in countries of low economic output where sheep production is of particular importance (Torgerson *et al.*, 2001).

Six species have been recognized, but four are of public health concern: *Echinococcus granulosus* (which causes cystic echinococcosis), *Echinococcus multilocularis* (which causes alveolar echinococcosis),

*Echinococcus vogeli* and *Echinococcus oligarthrus* (which cause polycystic echinococcosis). Two new species have recently been identified: *Echinococcus shiquicus* in small mammals from the Tibetan plateau and *Echinococcus felidis* in African lions, but their zoonotic transmission potential is unknown. Several studies have shown that these diseases are an increasing public health concern and that they can be regarded as emerging or re-emerging diseases.

In sub-Saharan Africa, various studies have shown that the disease is highly endemic (Daniel 1995; Bouree, 2001; Dalimi *et al.*, 2002), where *E. granulosus* is perpetuated predominantly by domestic cycle involving an array of livestock species which include cattle, camel, sheep, goats, pigs, donkeys and horses (Eugster, 1978).

Infections with *E. granulosus* cysts in intermediate hosts (sheep, goat, cattle, horses, etc.) are typically asymptomatic, except a few cases of long standing and heavy infections, for example in horses. There are no reliable methods for the routine diagnosis of the infection in living animals, but in rare cases cysts have been identified by ultrasonography alone or in conjunction with serum antibody detection (Eckert, *et al.*, 2001b).

A new Enzyme Linked Immunosorbent Assay (ELISA) with a high specificity and a sensitivity of 50 to 60% might be useful for detecting *E. granulosus*

Table-1: Overall incidence of hydatid cyst lesions in the species of animals slaughtered at the Sokoto central abattoir (Nov. 2003 – Oct. 2004).

Species of animals	No. of animals examined	No. and percentage of animals infected
Cattle	46223	34 (8.97%)
Camel	3545	318 (83.91%)
Sheep	16345	23 (6.07%)
Goat	14134	4 (1.06%)
Total	80247	379 (0.47%)

<sup>2</sup> = 5168.2

cysts in sheep on a flock basis but cannot be used for reliable diagnosis of infected individual animals (Kittelberger *et al.*, 2002). The most reliable diagnostic method is cyst detection during meat inspection or at post-mortem examination.

#### Material and Methods

**Study Area:** The study was conducted in Sokoto state, Nigeria. Sokoto state is located between longitude 11° 30 to 13° – 50 East and latitude 40 to 6° 40 North. The State shares common borders with Niger Republic to the North, Kebbi State to the South, and Zamfara State to the East.

The Sokoto metropolitan abattoir is a slaughterhouse that serves Sokoto town and neighbouring villages with meats. During post mortem examination, cystic lesions suspected to be larval forms of *E. granulosus* were identified and excised. The species of the animals and organ location of the cysts were recorded. Total numbers of animals (cattle, camel, sheep and goats) slaughtered on the days of collection were recorded. Examination and sample collection were done for a period of one year (November 2003 to October 2004). Visits were, on the average, 2 weeks (14 days) in a month. Identification of the viable metacestodes was carried out by adding a drop of 0.1% aqueous eosin solution to equal volume of protoscoleces in hydatid cyst fluid on a microscope slide on the principle that viable protoscoleces completely or partially exclude the dye, while the dead ones take it up (Smyth and Barrett, 1980; Macpherson, 1985). Cyst materials were labelled against the species of animal collected from as well as the organ on which it was found. Only metacestodes with viable protoscoleces were recorded and used in the investigations.

#### Results

Forty six thousand two hundred and twenty three (46223) cattle, 3545 camel, 16345 sheep and 14134 goats were examined during one year period (November 2003 to October 2004) for CE lesions (Table 1). Incidences of 0.07% (34/46223), 8.97%

(318/3545), 0.14% (23/16345) and 0.03% (4/14134) were found for cattle, camel, sheep and goats respectively. Locations of the lesions were: for cattle: liver 21(61.76%), lungs 10(29.41%), spleen 1(2.94%), and heart 2(5.88%). For camels: liver 21(6.60%), lungs 291(91.51%), spleen 5(1.57%), and heart 1(0.31%). For sheep: liver 18(78.26%), lungs 4(17.39%), spleen 1(4.35%) and heart 0(0%). For goats: liver had a prevalence of 3(75.0%), lungs 1(25%), spleen 0(0%) and the heart 0(0%), (Table 2). There was significant association ( $p < 0.001$ ) between the species of animals and infection.

Location of hydatid cyst lesions in the liver of cattle, sheep and goats shows liver to be the most predominant site in these animal species with cattle having 21(61.76%), sheep 18(78.26%) and goats 3(75%). In the camels, however, lesions were seen more on lungs examined 291(91.51%). For all species of animals studied, least number of hearts was infected with the cyst.

#### Discussion

Hydatid cyst disease is an important medical and veterinary problem in the world. It is a condition of livestock and humans that arises from eating infective eggs of the cestode *Echinococcus granulosus*. Domestic intermediate hosts (cattle, camel, sheep, goats and buffaloes) are major reservoirs for the disease in humans.

In this study, CE lesions of 8.97% in camels represented the highest. This is in agreement with similar studies in camels by Ajogi *et al.* (1995), where he advanced, among other reasons, that the one humped camel (*Camelus dromedarius*), the breed exclusively found in Nigeria is known to be versatile and opportunistic feeder on coarse and bulky perennial grasses. They are also efficient harvesters of small annual grasses growing on clays in seasonally flooded areas (Schwartz and Dioli, 1992). This is followed by sheep (0.14%) and cattle (0.07%). The least infection was seen in goats (0.03%). This indicates the significance of these species of food animal in the

Table-2: Organ distribution of hydatid cyst lesions in animals slaughtered at the Sokoto central abattoir (Nov. 2003 – Oct. 2004).

Animal species	No. of animals with CE lesions	No. of liver with CE lesions	No. of lungs with CE lesions	No. of spleen with CE lesions	No. of heart with CE lesions
Cattle	34 (0.07%)	21 (61.76%)	10 (29.41%)	1 (2.94%)	2 (5.88%)
Camel	318 (8.97%)	21 (6.60%)	291 (91.51%)	5 (1.57%)	1 (0.31%)
Sheep	23 (0.14%)	18 (78.26%)	4 (17.39%)	1 (4.35%)	(0.0%)
Goat	4 (0.03%)	3 (75%)	1 (25%)	0 (0%)	0 (0%)
Total	379	63	306	7	3

epidemiology of CE in the region, especially in Sokoto State, where camels seemed to be the second most important source of meat after cattle (Agaie *et al.*, 1997). And in areas where camels occur together with other livestock animals (Wachira *et al.*, 1993), humans are likely to be exposed to the camel strain as well as the sheep strain through contact with carnivorous definitive hosts, especially dogs. In Sokoto State, Nigeria, the most common disease of camel is hydatidosis. Being the cyst of the tapeworm of dogs, camels are most likely to be infested since most farmers or herdsmen use the dogs as guards when camels are in pasture (Garba and Maigandi, 1995).

According to Njoroge *et al.* (2002), in three selected areas of Northern Turkana, Kenya, CE was shown to be highest in camels, (61.4%, n=70), followed by cattle (19.4%, n = 381), goats 4.5%, n= 5, 752) and sheep (3.6%, n= 599). These figures were higher than those obtained in this study for all the species of animals studied. However, both Kenya and Nigeria were described as hyperendemic for CE (Macpherson, 1981; Wachira, 1988).

In general, livestock infection vary from one country to the other, but countries with known hyper endemic infection with cystic echinococcosis include Kenya, Nigeria, Somalia, Sudan, Swaziland, and Uganda. In these countries, hydatid disease occurs in more than 10% of cattle (Macpherson, 1981; Wachira, 1988).

In a survey carried out by Dada (1980), in the abattoirs in Kano (Sudan zone), Kaduna and Zaria (Northern Guinea zone) and Jos (Bauchi-Plateau zone), hydatid cysts were detected in all species of animals slaughtered at the abattoir in the Sudan zone where the prevalence was 55.5% for camels, 14.70% for cattle, 11.40% for sheep and 26.4% for goats. In the Northern Guinea zone, the prevalence was 50% for camels, 0% for pigs, 0.21% for sheep and 0.79% for goats. In Bauchi – Plateau zone, sheep were found to harbor hydatid cysts with prevalence of 1.4%, higher compared to that obtained in this study which was 0.14%.

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