

OCCURRENCE OF CYSTICERCOSIS IN CATTLE OF PARTS OF TIGRAY REGION OF ETHIOPIA

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ABSTRACT

Post-mortem examination of 3711 cattle done at three municipal abattoirs at Mekelle, Wukro and Adigret in Tigray region, Ethiopia for detecting infection of *Cysticercus bovis* revealed 308(8.29%) cattle positive for this infection. The cysts were observed either at one or more than one sites in the carcass with variable numbers. The sites showing cysts included tongue 0.61%, masseter muscles 0.59%, shoulder muscles 0.26%, heart 0.26% and liver, 7.45%. The economic loss calculated for six months period of this study on account of condemnation of carcass/organs was about Birrs 31952 (INR 1, 59760). The presence of cysts of *C. bovis* in beef may be a public health problem as the practice of eating raw or undercooked meat is not uncommon in the area of this study.

Key words: *Cysticercus bovis*, beef, muscles, carcass, organs

Parasitic worms in combination with malnutrition is a greatest adverse factor influencing animal husbandry. Many of these parasites have great zoonotic potential. Consumption of foods of animal origin like meat, milk and their products are the most common sources of transmission of such infections from animals to human beings. One of such parasites is *Taenia saginata* whose larval stage, *Cysticercus bovis*, is most commonly found in cattle and is responsible for taeniasis amongst people who eat the beef in an undercooked or raw state. Since people in Ethiopia are in habit of eating raw or undercooked beef, the present study was undertaken to know the occurrence of *C. bovis* in cattle population of parts of Tigray region.

MATERIALS AND METHODS

The present study was conducted between December 2006 and July 2007 on 3711 cattle slaughtered at three municipal abattoirs at Mekelle, Wukro and Adigret. The study animals comprised indigenous cattle slaughtered at these abattoirs. During postmortem inspection, the

cysts of *C. bovis* were looked at different sites in carcass viz. masseter muscles, shoulder muscles, tongue, heart, diaphragm and liver in particular and lungs, adipose tissue, lymph nodes and other organs in general. These cysts are usually round or oval and in fully developed stage, a scolex invaginated into a fluid-filled vesicle was seen as a white spot. Depending on the number of cysts at a site, the infection was categorized as low (less than 10), medium (10-20) and high (greater than 20). Economic losses due to presence of cysts was calculated in terms of total condemnation of carcasses or affected organs at their market cost price.

RESULTS AND DISCUSSION

Out of 3711 examined cattle, 308(8.29) were found positive for *C. bovis* infection. The prevalence of *Cysticercus bovis* is low in developed countries, being less than 1% of carcasses inspected (Onyango *et al.*, 1996). However, the infection rate is often around 30-60% in developing countries where cultural habits of eating undercooked or raw beef are common (Acha and Szyfres 1980). Cysticercosis in cattle is quite common in African countries like reaching a level of 30-36% in Kenya, 15% Rwanda, 20% in Guinea, 18% in

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Table 1
Bovine carcasses infected with *Cysticercus bovis* at different sites

Cysts present at one site		Cysts present at two sites		Cysts present at three sites	
Site	Number of carcasses	Site	Number of carcasses	Site	Number of carcasses
Meseter muscle	12	Meseter muscle+liver	05	Meseter muscle+ Shoulder muscles+ Heart	01
Shoulder muscle	05	Meseter muscle+tongue	01		
Heart	04	Meseter muscle+Shoulder muscles	01	Shoulder muscles+Tongue+liver	01
Tongue	10	Shoulder muscles+ liver	01	Shoulder muscles+Tongue	01
				Meseter muscle+Tongue+Liver	02
Liver	252	Heart+Tongue	01	Heart +liver	04
		Tongue+Liver	07		

Table 2
Intensity of *Cysticercus bovis* at various locations of bovine carcasses

Location	Number of carcasses having < 10 cysts (low intensity)	Number of carcasses having 10 - >20 cysts (medium intensity)	Number of carcasses having >20 cysts (high intensity)	Total carcasses
Meseter muscle	14	06	02	22
Shoulder muscles	07	02	01	10
Heart	05	01	04	10
Tongue	20	01	02	23
Liver	76	70	126	272

Table 3
Estimation of economic loss due to *Cysticercus bovis*

Condemned material	Number	Rate in Birrs	Total price
Carcasses(about 300 Kg. in weight)	03	32 /Kg.	Birrs 28,800/-
Heart (Average weight 2 Kg)	04	12/Kg.	Birrs 96/-
Tongue	02	16/piece	Birrs 32/-
Liver(average weight 3Kg)	126	8/Kg.	Birrs 3024/-
		Total Loss	Birrs 31952/- (INR 1,59760)

Sierra Leone and 20% in Cameroon (Gebreab, 1995). In the present study, occurrence of cysticercosis in the study area was 8.29% which is lower than the reported from developing African countries. However, it is similar to 9.0% in animals slaughtered in Botswana (Perry *et al.*, 2007). Gebreab (1995) reported lower prevalence in Senegal (2%) and Sudan (0.8%). This lower prevalence may be due to the fact that the incidence of *C. bovis* varies from country to country and also reflects the expertise of meat inspectors. Moreover, in the routine inspection of beef carcasses, there is practical limitation to the degree of incision permissible because gross mutilation lowers the marketability of the carcass and as a result many infestations remain undetected.

The cysts of *C. bovis* were recorded at different sites including liver (7.32%) (Fig 1), heart (0.26 %) (Fig 2), tongue (0.61%), masseter muscles (0.59%) and shoulder muscles (0.26%) (Table 1). The cysts are usually not located throughout the bovine musculature, rather they are found in masseter muscles, shoulder muscles, heart, tongue, diaphragm, esophagus, adipose tissue, liver, lungs and lymph nodes. In the present study cysts were found in the masseter muscles, shoulder muscles, heart, tongue and liver. Liver predominated among all the sites showing a positivity of 7.32% of 3711. It has been reported that there is no particular predilection sites of *C. bovis* and the distribution of cysts is purely a mechanical one (Gracey *et al.*, 1999).

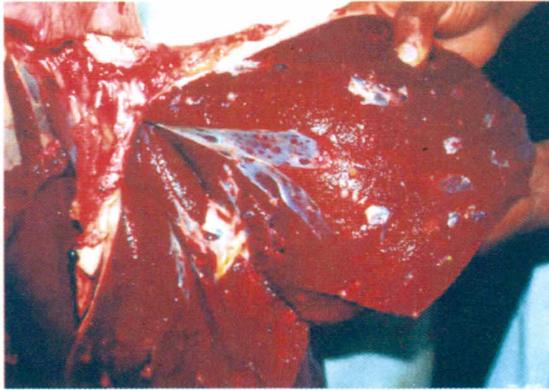


Fig 1. Liver of bullock showing cysts of *Cysticercus bovis*.

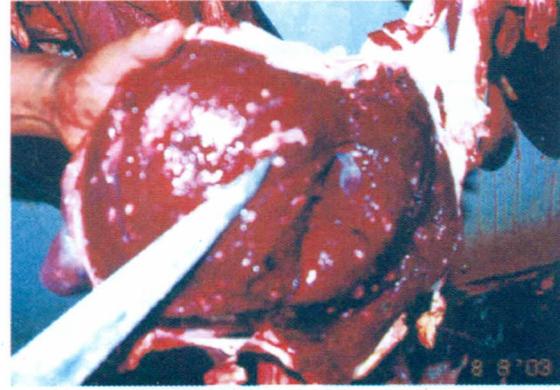


Fig 2. Heart of bullock showing cysts of *Cysticercus bovis*.

From the data of this survey, it is evident that in 283 (91.88%) of 306 positive animals, the cysts were found only at one site, while 21 (6.81%) and 4 (1.29%) on two and three locations respectively (Table 2). There is no data citing the number of sites in a carcass showing cysts of *Cysticercus bovis* in a positive animal. However, there can be more than one site where such cysts can be present in an infected animal. The approximate number of cysts counted in positive cattle carcasses are given in Table 2.

Cysticercus bovis has no serious harmful effects in infected animals. Its importance is economic because presence of *C. bovis* in the meat affects its exports. Its significant impact in meat trade is increasingly becoming important in view of drastic measures and very strict regulation of importing countries (Gebreab, 1995). Losses of meat due to bovine cysticercosis are caused by the total condemnation of carcasses with generalized infestation, partial condemnation of carcasses with localized infestation and reduced values of carcasses subjected to refrigeration, the cost of refrigeration, extra handling and transport. The total economic loss during the period of about six months' study was estimated to be Birrs 31952 (INR 159760) (Table 3). The incidence of cysticercosis is a considerable source of economic loss in African countries where beef is commercially produced on a large scale. It is reckoned that in Great Britain these losses amount to € 100 per carcass

or € 4.0 million annually (Gracey *et al.*, 1999). Based on the results of this study, it is evident that *C. bovis* is present in the beef available in Tigray region of Ethiopia. If such meat is inadequately cooked before consumption or is eaten raw, it will be a source of *Taenia saginata* infection in human population.

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