

THE PREVALENCE OF THE LARVAL STAGE OF *TAENIA OVIS* AT THE PORT ELIZABETH ABATTOIR

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ABSTRACT

The prevalence of the larval stage of *Taenia ovis* and the origin of the animals were recorded for a period of 39 days at the Port Elizabeth abattoir. Cysticercosis was more frequently found in the *M. triceps brachii* of sheep, but the actual cysticerci were fewer than those found in the semimembranosus, semitendinosus, adductor, biceps femoris, vastus, rectus femoris and gracilis group of muscles of the hind limb (leg muscles). Most animals originated from farms in the Oudtshoorn district.

Key words: *Taenia ovis*; sheep; prevalence; skeletal muscles

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INTRODUCTION

Cysticercus ovis is the intermediate stage of the tapeworm *Taenia ovis* that occurs in this country in the small intestine of the dog^{2 3} and jackal (*Canis mesomelas*) (A. Verster 1988, Faculty of Veterinary Science, University of Pretoria, personal communication). It is sometimes found intramuscularly in sheep and goat carcasses at slaughter and is commonly referred to as a bladderworm^{2 3} or muscular cysticercosis¹.

Although the disease has a wide geographic distribution, the incidence is usually low and the clinical effects on sheep and goats are negligible. At abattoirs, however, infested carcasses are condemned or trimmed for aesthetical reasons and often hearts and heads of infested sheep are condemned, which occasionally results in considerable losses to sheep farmers. At the Port Elizabeth abattoir the most common site for the occurrence of the cysticercosis or cysts was found to be the myocardium (Burroughs, unpublished data).

Bladderworm or muscular cysticercosis occurs in all breeds and sexes of sheep, but young animals are usually more susceptible than adult sheep¹. Generally muscular cysticercosis is innocuous and affected animals usually show no clinical signs, but very heavy infestations of the heart and skeletal muscles may cause heart failure or weakness in these muscles¹. At necropsy, the cysticerci are clearly discernible and look like large cysts of *Taenia saginata*. They are found mostly in the myocardium, diaphragmatic crura, masseter muscles, and tongue but other skeletal muscles may also be affected¹.

Until April 1988, several sheep with muscular cysticercosis were found every week and occasionally also a number of goats in the Port Elizabeth abattoir, but no records other than total condemnations of carcasses were kept. In a consignment of 121 lambs, which originated from farms in the Oudtshoorn district, approximately 104 lambs were found to have cysts in the myocardium. The whole batch was detained for secondary meat inspection. In view of the increase in prevalence of the parasite, it was decided to trace the lambs to the district from which they had originated and to determine the distribution of the cysticerci in the carcasses of these lambs.

MATERIALS AND METHODS

Sheep and goats slaughtered at the Port Elizabeth abattoir were routinely examined for cysticerci of *T. ovis*. After April 1988, records were kept for a period of 39 working days, of the origin of 239 sheep and 9 Angora goats with muscular cysticercosis. The carcasses of 19 lambs that were condemned because they were heavily infested with cysticerci, were examined to determine the distribution of the cysticerci in the various muscles. Two additional incisions were made parallel to the routine incision across the *M. triceps brachii* on both sides. Six parallel incisions were made across the fibres of the leg muscles on each side, which included the *gracilis*, *adductor*, *semimembranosus*, *semitendinosus*, *biceps femoris*, *rectus* and *vastus* group of muscles. One long incision was made in the *M. longissimus dorsi* and *psoas* muscles on each side. The 1-5 cm pieces of diaphragm that usually remain in the carcasses, were examined by multiple incisions as well as the abdominal muscles and surface of the whole carcass in each case. One incision was made into the breast and shank on each side. The bladderworms were counted and tabulated. The heads and tongues of 75 other sheep where cysticerci were found in the heart, were examined for cysticerci. One incision was made into the *masseter* muscles parallel to the lateral aspect of the mandibular bone. The tongue was examined through a longitudinal incision along the length of the tongue.

Carcasses were passed when no cysticerci could be found on either of 2 deep incisions (one on either side) made across the fibres of the *M. triceps brachii*, similar to incisions made in pigs and cattle when inspecting for cysticercosis, and when all other visible cysticerci could be trimmed away e.g. on the muscles of the abdominal flanks, diaphragm, shanks and those occurring superficially on the carcasses.

RESULTS

During the 39 working days, cysticerci were found in the muscles of 239 sheep and 9 Angora goats. All animals, except for one Angora goat from Malmesbury, originated from the south east Cape, east Cape and Karoo regions (Table 1).

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Table 2: Distribution of the cysticerci of *Taenia ovis* in various muscles of 19 infected lambs

Lamb No.	Number of cysticerci								
	Leg	Shoulder	Outer surface of carcass	Diaphragm strip	Surface of abdominal muscles	Breast	Shank	M.longissimus dorsi	M. psoas
1	12	4	2	3	3	-	2	2	-
2	21	2	4	3	1	1	-	4	1
3	9	3	1	4	2	-	1	1	-
4	2	2	-	1	-	-	-	2	1
5	5	-	-	1	-	-	2	-	-
6	5	3	-	3	1	1	4	-	-
7	26	2	-	2	2	-	1	-	-
8	4	4	2	3	3	-	2	6	-
9	-	1	2	2	1	-	2	3	2
10	9	1	-	-	-	-	-	1	-
11	4	1	1	3	-	1	-	1	1
12	-	1	-	-	-	-	-	-	-
13	-	2	1	-	-	-	-	-	-
14	14	7	3	3	2	-	3	4	1
15	3	3	3	2	3	-	1	5	-
16	9	3	-	2	3	-	-	-	-
17	5	2	2	1	1	1	2	4	-
18	6	3	-	-	2	-	-	2	-
19	2	3	-	1	2	-	1	2	1
Mean no of cysticerci	7,1	2,5	1,1	2	1,4	0,2	1	2	0,4

Only one cysticercus was found in the masseter muscle of each of 9 heads and two cysticerci in the masseter muscle of one head. None were found in the tongue. The numbers and distribution of cysticerci of *Taenia ovis* in 19 heavily infected carcasses are listed in Table 2.

DISCUSSION

Muscular cysticerci were mostly found in sheep originating from the south east Cape, east Cape and Karoo Regions (Table 1), except for one Angora goat from Malmesbury. The area in question stretches roughly from the Oudtshoorn district in the south to the Fish River in the north and as far inland as Fraserburg and Aliwal North. There was a sudden marked increase in the cases of skeletal muscular cysticerci since good rains had fallen in the areas from where these infested sheep originated (Weather Bureau 1988, personal communication). There were up to 20 cases of cysticercosis per day at that stage. *Taenia* eggs are very susceptible to dessication, but under wet conditions they are known to survive for much longer periods and that probably accounts for the increase in the incidence of muscular cysticercosis (Verster, personal communication).

Although cysticerci were most numerous in the leg muscles (Table 2) cysticerci were most frequently found in the shoulder muscles. Incisions in the *M. triceps brachii* would result in less damage to the carcass than incisions in the leg muscles. The finding of cysticerci on the flank, the surface of the carcass, parietal pleura and peritoneum, diaphragm and psoas muscles show that it is important to examine these sites visually. In 10 out of 75 sheep heads that were examined, cysticerci were found in the masseter muscles and therefore it may be advisable to examine these muscles as well. Examining the tongues of sheep however, appears to be of little advantage. These results show that in areas where *T. ovis* occurs, the offal of sheep that are slaughtered, as well as the offal and carcasses of animals that die, should be burnt or buried to prevent dogs being infested. Stray dogs and black-backed jackals should be discouraged from frequenting sheep pastures. All dogs on farms should be treated regularly with an effective taeniocide. At abattoirs, Thornton³ and Gracey² recommend that all affected organs should be condemned, while involvement of the skeletal muscle dictates total condemnation of the car-

cass. USDA regulations state that carcasses with 1 to 5 cysticerci can be trimmed, but those with 6 or more, must be condemned^{2 3}. At Port Elizabeth abattoir the inclination has been to follow the recommendations of Thornton³ and Gracey² with total condemnations if skeletal involvement is found. If cysticerci are found in the myocardium, the heart should be condemned and the carcass subjected to a very thorough visual examination. If cysts are found in the abdominal muscles and diaphragm, they should be excised. The skeletal musculature of the carcass should then also be examined as follows:

- (a) 3 parallel incisions across the thick part of the *triceps brachii* muscles of each fore limb
- (b) one incision through the *gracilis*, *sartorius*, *vastus medialis*, *semimembranosus* and adductor muscles of each hind limb, 2 cm from and roughly parallel to the *symphysis pubis* cutting at an angle in the direction of the head of the femur and just missing the *tuber ischii*. These incisions should be carried out on carcasses in a hanging position. Alternatively, as the larval stage of *T.*

Table 1: The origin of sheep and goats with muscular cysticercosis slaughtered at Port Elizabeth Abattoir from 9 March 1988 to May 1988

	Sheep		Angora goats	
	9/3/88 to 14/4/88	15/4/88 to 5/5/88	9/3/88 to 14/4/88	15/4/88 to 5/5/88
Aberdeen	3	11	-	-
Alexandria	2	-	-	-
Aliwal North	1	-	-	-
Beaufort West	6	3	-	-
Burgersdorp	1	1	-	-
Cradock	2	6	-	-
Dordrecht	1	-	-	-
Fish River	1	-	-	-
Fort Beaufort	1	-	1	-
Fraserburg	-	1	-	-
Graaff-Reinet	2	3	-	-
Grahamstown	1	3	-	-
Hofmeyer	2	2	-	-
Humansdorp	1	4	1	-
Jansenville	4	5	-	-
Kirkwood	1	1	-	-
Malmesbury	-	-	-	1
Oudtshoorn	-	107	-	-
Pearson	3	-	1	-
Plettenberg Bay	1	-	-	-
Port Elizabeth	4	1	-	-
Somerset East	4	6	3	1
Steytlerville	8	18	-	-
Uitenhage	1	6	-	-
Uniondale	1	1	-	-
Total	53	186	7	2

ovis may be killed by freezing, this measure should be considered as an alternative to condemning all carcasses with muscular cysticercosis. Unfortunately the cysts are larger than cysticerci in cattle and pigs and may be aesthetically objectionable to the consumer. All the cysts in most sheep carcasses with cysticercosis as seen at abattoirs, have already died off and become organised with dense yellowish white connective tissue measuring 3-6 mm in diameter. These degenerated cysts sometimes become infected by bacteria and form abscesses or they may become calcified.

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