CASE REPORT

AN OUTBREAK OF CYSTICERCOSIS IN FEEDLOT CATTLE

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Introduction

Cysticercus bovis is the larval stage of the human tapeworm *Taenia saginata*. Cyticerosis is manifested by presence of cysts (cysticerci) in the striated muscles of cattle. These cysts may be 6 to 9 mm in length by about 5 mm in diameter when fully developed and are most commonly found in the masseter muscles, heart and pillars of the diaphragm, although in heavily infested carcasses heavy concentration may be found in skeletal muscles.

The condition is not observed frequently in Canada; in the fiscal year 1970–71, 13 carcasses and 307 portions were condemned on post-mortem inspection by the Meat Inspection Division of the Health of Animals Branch, Agriculture Canada, out of a total of 3.5 million carcasses inspected (1). Outbreaks have been recorded in some large feedlots in the United States (2).

This case history is of particular interest because of the large number of cattle infested with this parasite. The owner will be referred to as A.Z. in this report. He maintained cattle on four feedlots with a total capacity of about one thousand head, most of which had been purchased the previous fall at various community and feeder sales in Ontario.

History

The Ontario District Office of the Health of Animals Branch, Agriculture Canada, was advised on January 4, 1972 by the Inspector in Charge of a registered establishment in western Ontario, that *Cysticercus bovis* had been demonstrated in four cattle slaughtered on December 30, 1971; one of which was so heavily infested that it was condemned.

On February 21, 1972 the same Inspector in Charge again reported finding Cysticercus bovis in two steers slaughtered on that date, one of which was condemned. These two steers were part of a lot of 42 head purchased at a community livestock auction.

On February 23, 1972 the same Inspector in Charge reported finding cysts in eight out of ten steers purchased at the same livestock auction.

On the same date, the Inspector in Charge of another registered establishment reported finding cysts in four steers, the origin of which was definitely known to be the A.Z. feedlots, and again on March 22, 1972 cysts were observed in 28 steers slaughtered at a third establishment and again originating from the same feedlots.

Field Investigations

In Ontario, when slaughter cattle are purchased by packing companies they are frequently mixed into lots of 20 to 50, according to sex, size, condition, etc. Frequently, identity is lost by the time the cattle reach the slaughter floor, unless they have been tagged at some time and records maintained. This situation does not apply if cattle are sold on the "rail grade" basis. However, in each of the first two cases reported above, the identity of the feedlot owner was lost.

The Contagious Diseases Division, Health of Animals Branch, investigates the occurrence of *Cysticerus bovis* as cases are reported by the Meat Inspection Division. During these investigations, officers attempt to determine: 1) whether any of the attendants have ever had a history of tapeworm infestation or had any reason to believe that they might be infested, 2) whether the cattle on the premises may have had access to any land on which sewage or human excreta had been spread and 3) whether any of the feed or the water supply may have been contaminated with sewage or human excreta.

Eighteen owners had consigned cattle in the two lots slaughtered on December 30, 1971 and February 21, 1972. All of their premises were investigated. A.Z. had consigned cattle in both lots. It was also definitely established that the infested cattle slaughtered on February 23, 1972 were consigned by A.Z.

Our officers carried out an intensive investigation on these premises at this time. We gathered all possible information as to origin and identification of the cattle, and as much

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information as we could possibly obtain about feeding practices, husbandry and human sanitary practices.

At this time, it was impossible to determine whether or not the A.Z. premises were actually the source premises with regard to the infestation or whether indeed infested cattle had been brought onto the premises. All steers on the A.Z. premises were purchased in September and October 1971 at various livestock sales, except 66 head purchased in May 1971. These 66 steers turned out to be significant in our investigations. All purchases were checked through the various livestock sales to the premises of origin. In all, 32 premises were investigated, some more than once. The information collected by these investigations brought us to the conclusion that the infection must have taken place on the A.Z. premises.

Following the post-mortem findings on February 23, 1972 the local Medical Officer of Health (M.O.H.) was advised of our investigations and his cooperation solicited in arranging for the examination of stool samples from all members of the A.Z. family and hired help. The results of these examinations were negative.

On March 24, 1972 the local M.O.H. reported negative findings for the second time in stool samples from all the people on the A.Z. premises, including the hired man who had worked on these premises from November 1, 1971 until February 23, 1972.

On April 17, 1972 the M.O.H. reported that *Taenia saginata* proglottides had been demonstrated in two stool specimens from this hired man. According to the M.O.H., two previous examinations of this man had been negative. A further investigation on the A.Z. premises on April 17, 1972 revealed the fact that this man had worked on all four premises.

It may be coincidental that it was carefully explained to A.Z. at a meeting on April 7, 1972 that one or even two negative stool samples may not be conclusive evidence that a person is free of *Taenia* spp. He was strongly advised that his family and the hired man should submit additional samples immediately to the M.O.H. The first positive sample received from the hired man was collected on the date of that meeting.

This man left the employment of A.Z. on February 23, 1972 worked for a few days for a friend, and on March 1 went to work for another cattle owner in the area. On April 13 and again on April 18 beef carcasses originating from this second owner were found to be infested with *Cysticercus bovis*; one of the carcasses was condemned.

This hired man, who had immigrated to Canada in April 1971, was hospitalized and treatment for taeniasis was commenced April 19, 1972. Treatment was declared successful in August 1972 after several negative stool examinations had been conducted.

Regulatory Action

On April 6, 1972 A.Z.'s feedlots were placed under quarantine by the Health of Animals Branch and all animals were ordered to be slaughtered in registered establishments under federal supervision. All animals were identified and were licensed for slaughter as they became ready for market. All purchases were made subject to inspection.

Further to this, on April 7, 1972 at a meeting attended by the Health of Animals Branch, the Ontario Beef Improvement Association, Ontario Ministry of Agriculture and Food, Veterinary Services and Livestock Branches and Mr. A.Z., all aspects of the disease, as well as the course of action relative to licensing these animals for slaughter were discussed and explained.

Between April 6 and July 24, 1972 all cattle on the A.Z. premises were licensed for slaughter to registered establishments. A total of 857 were slaughtered, 11 were condemned, 154 were frozen, held for 20 days and then released.

All four premises were thoroughly cleaned and disinfected. This operation consisted of removal of all manure and debris, spreading it on fields and plowing it down immediately. The barns were washed down with a high pressure sprayer, limewash containing approved disinfectant was applied to all barns and yards were cleaned out and either limed or limed and covered with concrete.

The second herd which the hired man apparently contaminated was a dairy herd and is being kept under surveillance, and as cattle from that herd are sold for slaughter, the Veterinarian in Charge of the slaughtering plant to which they are consigned is advised in advance of arrival.

Altogether, 72 investigations were carried out to determine the source of this infestation.

We were finally able to determine how the cattle became so heavily infested particularly on one of the A.Z. feedlots, and it will probably suffice to say that the personal hygenic habits of the hired man were reminiscent of the days before modern bathrooms were in common use on our farms.

Necropsy Findings

Cysts from several of the early cases were submitted to the Animal Diseases Research

TABLE I

INCIDENCE OF *Cysticercus bovis* CYSTS IN CATTLE FROM INFECTED PREMISES

Herd No.	No. of Animals Slaughtered	No. with cysts	Percent with cysts
1	222	110	49.6
2	238	115	48.3
3	301	191	63.4
4	96	20	20.8
Total	851	436	50.9

TABLE II

DISTRIBUTION OF *Cysticercus bovis* CYSTS IN 436 INFECTED CATTLE

Tissue[a,b]	No. infected	Percent of infected animals
Hearts only	233	53.4
Hearts and at least one other location	393	90.1
Heads only	26	
Heads and at least one other location	142	32.6
Diaphragm only	23	
Diaphragm and at least one other location	78	17.9

[a]In every infected carcass, at least one lesion was found in either the head, heart or diaphragm.

[b]282 animals (64.7%) had lesions in one location only; 134 animals (30.7%) had lesions in two locations; 20 animals (4.6%) had lesions in more than two locations.

Institute, Hull, Quebec and were identified as *Cysticercus bovis*.

At the time of post-mortem, location of the lesions in each carcass was recorded by the Health of Animals Branch staff and summaries of their reports are presented in Tables I and II.

Discussion

This report demonstrates the value of incising and inspecting all bovine hearts and masseter muscles on routine inspection of carcasses intended for human consumption. With modern practices of concentrating large numbers of meat producing animals in small areas, the possibility of infecting large numbers of carcasses with zoonotic diseases significantly increases the danger of transmitting such diseases to the human population. The necessity for cooperation between various Government branches and divisions to identify, control and eradicate a zoonotic disease such as bovine cysticercosis is also demonstrated.

As a result of this outbreak, *C. bovis* was made a "named" disease under the Animal Contagious Diseases Act, and consequently all known or suspected cases are to be reported to the Health of Animals Branch.

Summary

A serious outbreak of *C. bovis* in a feedlot is reported in which over 50% of the animals were infected. The disease was apparently introduced by an attendant who failed to observe desirable personal sanitary practices.

Résumé

L'auteur rapporte que 50% des bovins d'un parc d'engraissement étaient atteints de cysticercose. L'introduction de la maladie sur cette ferme serait attribuable à un employé qui avait négligé d'observer des règles élémentaires d'hygiène personnelle.

References

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