Alberta

Outbreak of *Cysticercus bovis (Taenia saginata)* in feedlot cattle in Alberta

In April 2000, 11 of 139 cattle consigned for slaughter from an Alberta feedlot were condemned in a United States plant because of *Cysticercus bovis* infection. Subsequent lots slaughtered in Canada were also found to have infected cattle. This reportable disease is not common in western Canada; therefore, a field investigation was launched by the Canadian Food Inspection Agency (CFIA) in conjunction with provincial veterinary and human health officials.

Cysticercus bovis is a 2-host parasite. The encysted larva, known as *C. bovis,* is found in cattle, and the adult tapeworm, *Taenia saginata,* is found in man. The cycle is completed when eggs in proglottids shed from the human tapeworm are ingested by cattle, and viable cysts in undercooked beef are eaten by man. Financial losses can be considerable when large numbers of animals are affected, such as in a feedlot. Most incidents arise as a result of direct exposure to proglottids shed from farm workers, but there have been some reports of large scale outbreaks resulting from sewage-contaminated feeds or forage (1–4).

At final tally, of 2944 animals slaughtered under federal license, 67 were identified by visual carcass inspection to be infected. Two additional animals identified visually were later found to be negative. Assuming these 67 animals to be true positives, at this low apparent prevalence (2.3%), both the positive predictive value (97%) and negative predictive value (97–99%) of visual carcass examination are quite high, despite the reported low sensitivity of this test (50–75%), especially in lightly infected carcasses (5). At higher prevalences, such as in endemic areas, the negative predictive value of this test would drop substantially.

In this instance, all 67 animals were lightly infected, which suggested that eggs were dispersed widely throughout the feedlot and were likely disseminated through the feed or water. A single fecal test of the farm residents and workers was done, but no evidence of *T. saginata* was found. Feedstuffs consisted of homegrown barley silage, rolled barley, and a heat-treated supplement pellet. None of the barley fields had been irrigated with sewage; therefore, attention was focused on the water supply as the most likely source of contamination. Water for the feedlot was drawn directly from a creek through a perforated pipe buried under the creek bed. The intake was less than 1 km downstream from a town and from the entrance of 2 other creek tributaries that drained acreages and a large communal farm. From the intake pipe, water was fed to several pumping stations containing cisterns, and then distributed to the feedlot pens. As the pumping stations were interconnected, it was impossible to relate the water supply of particular pens to a specific pumping station.

Temporal analysis revealed that infected animals could have been exposed as early as October 1999, or as late as June 2000. However, the only time all animals could have been infected from a common point source was in February or early March. Traditionally, spring is the time of highest water flow in the creek. Samples of sediment trapped in the cisterns were collected in August, in the hope that eggs might still be present. This created quite a diagnostic challenge, as eggs tend to bind to sediment, making separation and identification difficult. Four hundred eighty-two flotation tests were conducted on the 20 × 0.5-liter samples collected. Degenerate taeniid eggs were found in 9 samples. In conjunction with other helminth eggs and coccidian oocysts also found in the samples, this demonstrated that the water system was vulnerable to fecal contamination from animals or people. During a conversation with the owner, it was learned that in the fall of 1999, water flow in the intake pipe dropped, so that the silt in the creek bed was scraped away. This may have removed a natural filtration system and left the water supply vulnerable to contamination. The human source of the infection has not been identified.

This case illustrates the need to consider water as a potential source of contamination for *T. saginata* eggs, and to ensure that water, as well as feed supplies, is protected from fecal contamination.

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