Granulomatous encephalitis in a Canada goose caused by schistosome eggs

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Mortality of birds was observed at a water treatment facility in Alameda County, CA, in July 2008; 6 geese, 7 ducks, and 1 pigeon were found dead within 2 days. Clinical signs observed in these birds were weakness and inability to fly. The carcasses of three birds (1 Canada goose and 2 mallards) were sent to our veterinary diagnostic laboratory for postmortem examination. The submitter suspected botulism. Gross lesions consistent with emaciation (atrophy of the pectoral muscles, prominent keel bone, and hydropericardium) were seen at necropsy. Histologically, there was severe, diffuse granulomatous encephalitis in the goose. Multiple granulomas were scattered throughout the neuropil and also under the meninges of the cerebrum and cerebellum; most of these granulomas consisted of undulating, yellow to brown, intravascular or extravascular structures interpreted as remnants of egg shells from trematodes which were surrounded by many foamy, plump macrophages and multinucleate giant cells, some mononuclear cells, and few heterophils; few of these were mineralized. Rarely, viable trematode eggs were found within these foreign body type granulomas. In the small intestine, serosal and mesenteric blood vessels had marked myointimal hyperplasia with stenosis of the vascular lumen, and were surrounded by small to moderate numbers of mononuclear cells (hyperplastic, obliterative, nonsuppurative perivasculitis). Small numbers of identifiable schistosome eggs were found within the lumena of the blood capillaries from the lamina propria of the small intestinal mucosa. Lesions consistent with those of schistosomiasis (obliterative nonsuppurative perivasculitis and egg-induced intraluminal granulomas) were found in the two mallards but no brain lesions were noted in any of these ducks. A mouse bioassay was used for the screening of botulism toxin in the serum of one of the birds (goose) and in the livers of all the 3 birds. No botulinum toxin was detected in any of the livers tested. Signs suggestive of botulism were seen in those mice inoculated with the goose’s serum sample, the suspicion of botulism couldn’t be not confirmed as there was not enough serum available to perform the neutralization test.

Schistosomes are blood flukes that occur in mammals and birds, and cause schistosomiasis (bilharziasis). Allobilharzia, Bilharziella, Dendritobilharzia, Gigantobilharzia, and Trichobilharzia are the genera of schistosomes from waterfowl. Adult female worms living within blood vessels (mesenteric veins or arteries) lay eggs which pass through the intestinal blood vessel walls and mucosa and are excreted in the feces. Miracidia hatch from these eggs and penetrate water snails. Cercariae released from these snails actively penetrate the skin of waterfowl and gain the circulatory system. Cercariae of avian schistosomes can invade the skin of humans causing dermatitis (swimmer’s itch). Schistosoma mansoni and S. japonicum are the schistosomes of human