"Salmon Poisoning" in Dogs

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Class of 1941

The disease, "Salmon poisoning," in dogs and foxes was known before America was settled by white people. Dr. E. F. Perrot was one of the first to work with the disease and in 1925 concluded that salmon poisoning was due to an amoeba. At this time he recommended calomel as the curative agent.

The disease is found west of the Rocky Mountains in the territory of Southwest Washington, Oregon, and Northwest California. It seems to be confined to that area.

Etiology

Dr. B. T. Simms and F. W. Miller, following the findings of E. F. Perrot, concluded that the disease was due to a small intestinal fluke, *Nanophyetus salmincola*, today known as *Troglotrema salmincola*.

A cystic form of the fluke is found in the muscles, kidneys, liver, gills, and practically every part of the fresh water salmon and trout. The cysts can only be found in the salmon in fresh water, but never in those of salt water.

Salmon are hatched in fresh water, where they stay for one year and then migrate to the ocean, where they stay for three or four years. After the salmon come back to fresh water and spawn, they die. The dogs eat the infected salmon, the cysts grow to mature flukes in the small intestine of the dog, and in seven to ten days eggs are found in the feces.

The life cycle is not definitely known, but snails harbor the larval flukes; and the dog, coyote, raccoon, mink, lynx and probably other carnivores are primary hosts.

Transmission

The usual method of transmission is by ingestion of raw fresh water salmon. Kennel exposure does not produce the disease in susceptible animals.

B. T. Simms and O. H. Muth at the Oregon Agriculture Experiment Station, Corvallis, Ore., experimenting on the transmission of the disease, have revealed some of the characteristics of the causal agent, possibly a virus, although the nature of it remains unknown. Freezing, drying, heating to 140°F. for five minutes and exposing to 0.5 percent phenol for two days apparently destroy the agent. It is possible that this agent, a virus, is passed from the mature fluke through the eggs to the miracidia and that eggs from flukes in hosts other than canidae do not carry the agent. This evidence opens up a new field for both the parasitologist and epidemiologist in that a helminth is a vector of a transmissible disease. However, neither the nature nor the origin of the causal agent of salmon poisoning has been definitely found.

Symptoms

1. It takes seven to ten days for the symptoms to develop after ingestion of the raw fish. It also requires seven to ten days for a cyst to become an adult fluke.

2. The disease begins with a sudden onset, a high temperature of 105-107°F. with complete anorexia, followed by a very marked depression and listlessness.

3. An edematous swelling of the eyelids and a purulent discharge from the eyes are usually present early in the course of the disease.

4. Later there is a severe hemorrhagic diarrhea which usually results in
the passage of practically pure blood.

(5) Vomition may be a prominent symptom and in such cases the thirst is very marked; consequently the dog drinks large quantities of water with apparently little or none retained.

(6) In the latter stages of the disease the affected dog becomes extremely weak, emaciated and is usually unable to stand.

(7) The dog generally dies six to eight days from the onset of the symptoms. Just before death the temperature is usually subnormal. The mortality rate is usually 60-90 percent.

Diagnosis

(1) History of dog eating fresh salmon or being in a fluke-infested territory with symptoms of sudden onset, high temperature, anorexia and a hemorrhagic diarrhea.

(2) Fecal examination readily reveals eggs in the feces.

(3) At necropsy the flukes can be seen with difficulty with the unaided eye in the intestinal content, but rather easily if some of the material is suspended in water in a glass container. There is an acute hemorrhagic enteritis with swelling of the ileo-cecal lymph nodes.

Immunity

Permanent immunity is produced in

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Mineral Poisoning
in a Dog

Lew Llewellyn
Class of 1941

On Oct. 15, 1940, a male Labrador Retriever, 2½ years old, was presented at the Stange Memorial Clinic. The pulse was 90, respiration 30, temperature 99.7°, and the general condition of the dog was fair. The owner kept the dog in a kennel but exercised him daily. When he took the dog on a hunting trip to some of the alkali swamps in South Dakota, the dog was very active and normal in every respect at the beginning of the hunt but soon left the owner and ran into the swamps. Upon his return about ten minutes later, the dog was weak and unsteady, and showed evidence of having been drinking from the shallow, stagnant, alkali pools in the vicinity, since muddy alkali material was noted about and in its mouth. The owner took the dog to the nearest farmhouse where it showed a ravenous desire for water, and voided dark muddy masses of vomitus. The dog was brought to the clinic three days later.

On examination the dog showed pain and distress when pressure was applied over the diaphragm; he was depressed and listless. Ulcerations were present in the oral mucosa. A diagnosis of gastro-enteritis with an accompanying stomatitis was made.

On the morning of Oct. 15, 250 mg. of nicotinic acid were injected subcutaneously to guard against the possibility of vitamin B₂ deficiency, and 2 ounces of milk of bismuth were given per orum. In the afternoon, 1000 cc. of 5% dextrose in normal saline solution were administered subcutaneously. The next morning the dog was still depressed, pulse 86, respiration 30, and the temperature was elevated to 103.6°. There was a bloody exudate coming from the dog's nostrils, the mucous membranes were very congested, and the feces passed were greenish-black. He was given 1½ ounces of milk of bismuth and 2 drams of liquid peptone.

The dog died on the afternoon of Oct. 16, and was posted at once. The necropsy revealed acute catarrhal enteritis and moderate hemorrhagic enteritis, severe hepatic toxicosis with icterus, acute nephritis and acute lobar pneumonia (first and second stages). The history of the case and the lesions observed pointed toward a mineral poisoning.

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the dogs that recover. No natural immunity occurs.

Prevention and Control
The only satisfactory means of prevention known at the present time consists of confining dogs (and foxes) in such a manner that they will not have an opportunity to consume any raw salmon or trout from fresh water streams of the infested area.

<table>
<thead>
<tr>
<th>Treated by</th>
<th>No. of Dogs</th>
<th>Age</th>
<th>Breed</th>
<th>Number of Grains of Sulfanilamide Per lb. of Body Weight in 24 hours</th>
<th>No. Doses Daily</th>
<th>No. Days Treated</th>
<th>Total Dosage Per lb. of Body Wt.</th>
<th>Recovered</th>
<th>Died</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaw, Simms, and Bolin</td>
<td>11</td>
<td>3-5 Mo.</td>
<td>Mixed</td>
<td>1-3</td>
<td>2</td>
<td>2-4</td>
<td>3-4</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Snodgrass</td>
<td>7</td>
<td>5-18 Mo.</td>
<td>Mixed</td>
<td>2</td>
<td>2-3</td>
<td>3-6</td>
<td>4-12</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Seagraves and Phelps</td>
<td>1</td>
<td>7 yrs.</td>
<td>Mixed</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Several veterinarians have reported success following the use of apomorphine within a few hours after the dog had eaten parasitized fish, thus preventing the flukes from becoming established in the intestine. Many treatments have been used but apparently none are successful except sulfanilamide. Some of the drugs giving negative results are calomel, carbon tetrachloride, Epsom salt and castor oil per orum; neo-arsphenamine and sulfarsphenamine intravenously. Some of the dog owners on the West Coast make a practice of feeding the fish to puppies, and occasionally one will recover and is then immune for life.

Sulfanilamide has proven to be the most valuable drug yet used to treat the disease. In an experiment carried on by the Oregon State Agricultural Experiment Station and various practitioners in the fluke infested territory, some very interesting data was collected:

The dogs used in the experiment were of all breed and ages. They were known to have the disease by the presence of the fluke eggs in the feces. The treatment was begun seven to ten days after ingestion of infected fish, and at the onset of symptoms. Results of treatment are shown in the table below.

Most of the dogs were given two grains of sulfanilamide per pound of body weight, t.i.d., with an average of four days' treatment, followed by recovery. Improvement accompanied by a drop in temperature and return of appetite, was usually noted in 24 to 48 hours after the treatment. Therefore, sulfanilimide is the most specific drug known today to combat this disease. Detrimental aftereffects from the treatment were not noted.

References