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# Infectious Enterohepatitis

(Blackhead)

C. D. LEE, D.V.M., M.S.\*

**B**LACKHEAD has probably caused more losses to the turkey industry in this country than any other single disease. First described by Cushman in 1893, it has since led to the abandonment of turkey growing in many sections of mid-western and eastern United States. No turkey disease has been more often described and discussed. The early researches of Salmon, Higgins, Smith, and Graybill paved the way for the later studies by Tyzzer, Pettger, Billings, Van Es and Olney, and others, which have proved that the disease can be prevented by proper attention to sanitary details to be mentioned later.

## Cause

Blackhead is caused by a protozoan (one-celled animal) parasite called *Histomonas meleagridis*. This parasite has an unusual life history, one which for many years baffled some of the best American scientists. It is harbored by the common poultry cecum worm, *Heterakis gallinea*, found in the ceca, or blind pouches, of a large percentage of chickens. This, together with the fact that chickens are not, as a rule, highly susceptible to the parasite, has frequently been responsible for the transmission of the disease from apparently healthy chickens to turkeys.

The parasites are resistant and capable of living for long periods in the cecum worm and its egg. It has been found that the infection remained in vacant yards from the middle of November until the middle of June during each of five years when turkeys were reared in the yards from June to November.

## Symptoms

Blackhead, the common name for infectious enterohepatitis, is a misnomer.

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Sometimes the head does become darkened, but this symptom is not characteristic of blackhead alone. Drowsiness, weakness, drooping wings and tail, a lowered head, ruffled feathers, and a constant sulfur-colored diarrhea are characteristic symptoms. As a rule, adult birds are sick for several days before dying and become very much emaciated. Young poults may have a very acute type of the disease and may die soon after symptoms are noted. Although turkeys of all ages are susceptible, the heaviest losses occur during the first twelve weeks of life. Another peak of mortality is often observed just after the birds are put on the finishing ration to prepare them for market. Sometimes a third peak of losses occurs during the breeding season, probably because of relapses from early infection.

The mortality is high, often approaching 100 percent of the flock, and averages about 50 percent unless kept under control. Once the disease attacks a flock, occasional birds are liable to die between the intermittent periods of heavier losses, especially if the flock is not moved frequently to uncontaminated grounds. The period of incubation after contact with infection is 15 to 21 days.

## Autopsy Findings

The liver and the ceca are the principal organs showing marked changes caused by blackhead. The severity of these changes varies with individuals. The cecal lesions are apparently the primary ones, and one or both ceca may be affected. The lesions consist of marked inflammatory ulcers, sometimes involving most of the organ. A single ulcer may pierce the serous membrane and form an opening through the entire wall. The mucous lining often becomes necrotic, much thickened, and covered with a characteristic foul-smelling, yellowish-green, semicase-

ous exudate; or a dry, hard, cheesy core may fill the cecum.

The affected liver presents a characteristic appearance, with areas of necrotic and degenerated tissues on the surface. These are more or less circular, have a yellowish to yellowish-green appearance, and, in contrast to tumors and tubercles (tuberculosis), are somewhat depressed below the liver surface. They extend deeply into the tissue and are more or less confluent with the healthy tissue. In older birds the individual lesions are often merged. Evidence of healing is seen in the large amount of scar tissue in older birds.

Occasionally peritonitis and involvement of the other organs in the vicinity of the liver may be observed.

### Prevention

Blackhead is a filth-borne disease dependent on carriers, including not only chickens and turkeys but probably other birds as well. These carriers eliminate the causative organism in the feces alone or within the cecum worm and its egg. When the organism is ingested by susceptible stock, the disease breaks out. As there is no practicable method of identifying carriers, all chickens and turkeys must be under suspicion.

The greatest need for prevention is during the most susceptible age, from hatching to twelve weeks. It is suggested that the following methods be observed in preventing losses from blackhead:

1. Artificial incubation in order to escape the hazard arising from close association with the parent bird in the same environment.

2. Brooding in an enclosure from which all infection hazards have been previously excluded by attention to such details as hardware-cloth floor covering, and all other measures by which actual contact with soil can be avoided.

3. Maintenance of the poults at least up to twelve weeks old, on clean ground not previously occupied by either turkeys or chickens.

4. Provision of a wide range for the maturing bird—if possible, one not previously occupied by blackhead-infected fowls. If such an environment is not

available and the turkeys must be confined in more constantly occupied enclosures, yards should be covered either with coarse gravel or with 1-inch hardware cloth.

5. Maximum protection against the fecal contamination of food and water by the use of feeding and watering equipment specially designed for the purpose.

There have been various other sanitary methods suggested for control of this infection in both young and adult turkeys but regardless of the system used in rearing turkeys, the following precautions against blackhead must also be observed.

1. Keep the turkeys entirely separated from the chickens or chicken yards. Drainage from chicken yards to turkey yards is a common source of blackhead.

2. Do not rear turkeys on ground that has been fertilized with chicken or turkey manure.

3. Do not rear turkeys in yards where losses from blackhead have occurred until at least one year has passed after the removal of the last diseased bird.

4. Do not introduce new stock without quarantining it for three weeks before adding it to the flock.

5. Feed an adequate ration, with plenty of fresh, clean water.

6. In all instances where outbreaks occur in flocks that are on range, it is advisable to make attempts to run away from the infection by means of moving the range enclosures either daily, in cases of severe outbreaks, or every third day in cases of milder outbreaks.

The continual feeding of tobacco dust with the mash as a preventive has been suggested by several experiment station investigators. The principle of this plan is to prevent cecum worms from becoming established in the flock and thus to reduce the chances of transmission of the blackhead parasite by this means. It is recommended that 4 pounds of tobacco dust containing at least 2 percent nicotine to each 100 pounds of mash be used. This mixture is to be fed continuously from the time the poults are transferred from the brooders to the range. Such measures are

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## FAMOUS INDIVIDUALS—

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not recommended for general use where blackhead can be readily controlled by other measures not involving drugs. In certain instances where poultis cannot be reared free of the disease by a sanitary plan alone, tobacco dust deserves a trial. Before feeding it, however, one should definitely determine that blackhead and not some other disease is causing the losses.

## Pyometra in a Bitch

L. M. FORLAND

*Case of 1941*

ON APRIL 4, 1940, a Boston Terrier bitch, two years of age was presented at the Iowa State Clinic with a history of having had a vaginal discharge since her last estrus period in December. This discharge was quite copious and of a muco-purulent type. On the day of entrance her temperature was 102.2°, respiration 58, and pulse 140. After an examination with a vaginal speculum a diagnosis of pyometra was made. A hysterectomy was indicated.

### Operation

At 8:00 a.m. the bitch was given 2/3 gr. of morphine and 1/75 gr. of atropine sulfate as a basal narcotic. The operative site was shaved, cleaned with ether, and sprayed with tincture of merthiolate. At 10:30 a.m. the patient was ready to be operated. Ether was used to complete the anesthesia. (This bitch was quite susceptible to ether as her respiration was temporarily arrested on the second inhalation, therefore, the ether was administered very cautiously throughout the operation.) When the anesthesia was complete a median in-

cision one inch posterior to the umbilicus and about one and one-half inches in length was made through the abdominal muscles and peritoneum. The affected uterine horns, which were evenly distended and measuring about thirteen centimeters in length and three and one-half centimeters in diameter, were brought through this incision and the ovaries excised after clamping off the ovarian ligaments with an angiotribe. The ovarian vessels were ligated with No. 4 catgut. The cervical portion of the uterus was clamped with a forceps and the horns were cut off. This uterine stump was cauterized with phenol and a purse string suture was made just posterior to the forceps. The end of the uterine stump was then inverted after removing the forceps and the purse string suture was drawn up. The end of this stump was drawn together with a continuous suture to reinforce the purse string suture. The peritoneum was sutured with a continuous suture of No. 2 catgut and the musculature and skin were sutured with three interrupted sutures of No. 19 braided silk. A Duo-pack was put in place and the dog was returned to the kennel. A slight anemic condition of the conjunctiva was observed after the operation, which was due to surgical shock and hemorrhage during the operation.

### Post Operative Condition and Treatment

On the day following the operation the bitch was found to be in good condition, with a temperature of 101.4°, respiration 48, and pulse 120. No treatment was indicated.

On April 12, the Duo-pack was removed. There was a slight suppuration around the sutures and there was a slight vaginal discharge. The operative area was cleaned with ether and sprayed with tincture of merthiolate. Twenty cubic centimeters of homologous canine distemper serum were given subcutaneously—ten cubic centimeters in each flank.

On April 13, the silk sutures were re-