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Case Reports

Diagnosis of Pregnancy Disease in Sheep
Differentiation From Central Nervous Disorders

Alvin D. Lebeck, D.V.M. and Norman Cheville

FIELD PRACTITIONERS are frequently confronted with the problem of diagnosis of disease of pregnant ewes that show weakness, depression, anorexia and a variety of central nervous disturbances as incoordination, circling, convulsions or coma. The frequent diagnosis of pregnancy disease in these cases may be misleading as to the prevalence of this condition. This syndrome may be confused with listeriosis, brain abscesses, enterotoxemia, hemorrhagic septicemia, plant and chemical poisons and rickettsial conjunctivitis.

In pregnancy disease there is insufficient glucose in the blood, depleted liver glycogen with excess catabolism of fat and the resultant production of ketone bodies. Although deficient rations in terminal pregnancy are incriminated, a complex endocrine imbalance is probably also involved. In man, lesions of the paraventricular nucleus of the hypothalamus as well as the hypofunction of the anterior pituitary and adrenal cortex have been shown to cause hypoglycemia. Whatever the cause, a permanent drop in blood sugar of any animal evokes a sympathomimetic response resulting in trembling and nervousness leading to convulsions, coma and death. All these effects depend upon the fact that the nervous system requires adequate glucose for proper functioning.

When catabolism of fat becomes excessive ketosis appears. The acidic nature of the ketones causes an interaction with the buffer systems of the blood. As ketosis becomes severe these defenses break down with the resultant salt depletion and dehydration, leading to coma and death. The blood picture is low blood glucose, increased ketones and normal calcium. Urinalysis reveals a large quantity of acetones, some albumin, and occasionally the presence of ammonia. Body temperature is usually normal throughout the course. The prime objective in treating pregnancy disease are the resumption of glucose utilization and restoration of fluids and electrolytes.

In listeriosis this same nervous syndrome appears, but there is an increased temperature which runs from 106-107 degrees F. early in the disease, falling to 103-104 degrees in the latter stages. In listeriosis a head twisted to one side will always return to the same side while it may not in pregnancy disease. Urinalysis reveals no excess of ketones. One confusing factor in diagnosis is lowered blood sugar which may occur in listeriosis. The therapeutic administration of glucose intravenously may evoke a response similar to that noted in pregnancy diseases. In these cases the symptoms may be due, in part, to the hypoglycemia. The normal blood sugar of sheep is very low (40-60 mg.%), and it may be more difficult for this species to maintain proper blood sugar levels during fasting and under stress than other animals.

The following cases showing similar nervous symptoms were presented to Stange Memorial Clinic for treatment:

Case No. 1: A 4-year old ewe was presented for cesarean section, during which, two lambs were delivered. Urinalysis re-

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vealed heavy ketones. The ewe expired the following day. At necropsy the animal was found to be in good flesh. There was extreme fatty metamorphosis of the liver with increased lipid content of the adrenal cortex. Also evidenced was a chronic pleuritis of the left thorax, congestion of the lung and numerous nodules in the intestinal wall. The diagnosis was established as pregnancy disease.

Case No. 2: A 5-year old western ewe entered the clinic showing paralysis with inability to rise. It expired the day of entry. Necropsy revealed an emaciated ewe with extensively worn teeth. The incisors were very short and several cheek teeth were missing, others loose, and many with sharp points. There were severe fatty changes of the liver, and otitis media of the left ear was found. A primary diagnosis of pregnancy disease was established.

Case No. 3: A 5-year old ewe was presented to the clinic under the presumption of having pregnancy disease. This animal was in a depressed state showing central nervous involvement with nystagmus of the left eye and a lateral rotation of the head. The temperature was 104 F. Laboratory tests revealed no urinary ketones but a blood sugar level of only 12 mg. per cent was found. Two hundred ml. of 50 per cent dextrose was administered and a fair response followed. A cesarean section produced a fully mature lamb. The temporary response to glucose administration every four hours suggested that some of the symptoms observed were caused by low blood sugar level. After glucose administration the ewe was able to stand, walk and attempted to eat small portions of feed. On discontinuing glucose therapy, weakness leading to coma developed and the ewe died. Histopathologic studies revealed an acute meningoencephalitis typical of listeriosis and *Listeria monocytogenes* was cultured from the brain stem.

Case No. 4: A 5-year old western ewe was presented in a semi-comatose state and showed central nervous involvement. It had been off feed for several days. There was some posterior weakness and complete anorexia. Urinalysis showed no evidence of ketones. The ewe responded slightly to glucose when 200 ml. were given intravenously. A cesarean section was performed and a young fetus that appeared to be about three months old was delivered. The ewe expired the same day. Lesions typical of pregnancy disease were not found at necropsy. There was a necrotic rhinitis and the nasal passages were completely filled with plugs of semi-solid, greenish pus. Histopathologic examination revealed a meningoencephalitis typical of listeriosis.

In the differential diagnosis of pregnancy disease from other similar conditions it is important to determine the ketones present in the blood or urine. Low blood sugar levels in listeriosis may be misleading, especially when noting the response to intravenous injection of glucose. Significant things to check would include body temperature, stage of pregnancy, teeth, irregularities in exercise and rations. Pregnancy disease occurs primarily in sheep in poor condition on a low carbohydrate diet, but it may also occur in fat sheep. The condition is usually precipitated by a radical change in diet or a cessation of feeding due to storms or a railroad journey. Pregnancy disease often occurs in several individuals in a flock thus giving the appearance of a contagion.

**SUMMARY**

1. Four pregnant ewes were presented to Stange Memorial Clinic showing depression and a variety of central nervous symptoms. All were suspected of having pregnancy disease.
2. Two of the ewes that had pregnancy disease showed excessive ketonuria. The sheep with listeriosis did not show an increase in urinary ketones. This is of primary importance in differentiating pregnancy disease from other nervous disorders.
3. Lowered blood sugar levels were found in three of the four ewes.
4. Pyrexia if often marked in listeriosis, while a normal temperature usually accompanies pregnancy disease.

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