

the initial test is followed by retest in sixty to ninety days. Johnin is available from state regulatory officials. Avian tuberculin is a fairly satisfactory substitute. Acid-fast stains of the rectal mucosa may be more reliable in late clinical cases. Often the diagnosis can be confirmed one to two days earlier with this procedure.

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Cutaneous Bovine Lymphomatosis

On September 21, 1961, a yearling Hereford-Angus cross heifer was admitted to Stange Memorial Clinic with a severe skin involvement. (Fig. 1). This animal had been treated for a skin infection, even though it did not show hypersensitivity of the involved areas, nor had shown pruritis at any time.



Fig. 1. Severe skin involvement seen in lymphomatosis.

Upon physical examination many nodules and raised plaques of the skin were evident over most the body, but were especially numerous on the neck, over the hips and on the thighs, even proceeding down to the hocks. The involved areas of skin were one to four centimeters in depth and up to seven centimeters in diameter. Some plaques had coalesced with others forming large masses of the abnormal tissue. Hair was lost on the larger plaques. A biopsy study of affected skin indicated it to be a neoplasm, probably a lymphosarcoma. Examination of the blood revealed: hemoglobin 5.7 gms/100ml, hematocrit 19.2 per cent, total red cell count 4.5 million/mm³. The leukocyte total and differential counts were within normal ranges upon admission. One week later the total leukocyte count and differential were still normal.

Other clinical signs were ventral edema, and swelling of the prefemoral and pre-scapular lymph nodes.

No treatment was attempted, but the animal was held in the clinic for further studies. Death occurred on October 5 after being in the clinic 15 days. No febrile reaction was shown at any time.

Upon postmortem the skin was found to be thickened and covered with nodules averaging 3.6 cm in diameter. There was extensive ventral edema. Edematous areas were present in the abdominal wall. All of the internal lymphoid tissues were grossly enlarged (Fig. 2). The lungs were edematous. The cardiac musculature was undergoing coagulative necrosis. The liver was greatly enlarged, with many areas of lymphocytic infiltration. The kidneys showed several infarcts believed to be due to tumor emboli. The forestomachs, especially the rumen were nearly empty. The abomasum showed hyperemia and edema. The first few feet of the duodenum were hemorrhagic.



Fig. 2. Grossly enlarged lymph node from affected heifer in comparison to the same node from a healthy animal.

Histopathologic studies showed fatty metamorphosis, focal areas of necrosis, hemorrhage and marked lymphocytic infiltration of portal triads and in some areas lymphocytic infiltration into the hepatic lobules. The cardiac and renal sections showed evidence of metastatic lymphosarcoma. The spleen showed marked neoplasia of lymphoid elements.

The above case is the second cutaneous

bovine lymphosarcoma condition seen within the last year at the Stange Memorial Clinic¹. Several of the other forms of bovine lymphomatosis are witnessed each year in the clinic. Because of the difficulty of diagnosis, especially of the nonsuperficial forms of the disease, it is believed many other field cases are not recognized.

In reviewing the literature it is most interesting to note the disease is legally required to be reported in Denmark⁴. The Danish workers call the disease bovine leukosis² and classify it into two types. In one type the disease is typically enzootic and is defined as a tumorous disease caused by a transmissible agent, probably of a viral nature. The second type is typically sporadic and includes leukosis of young bovine animals and the cutaneous form of skin leukosis in adults. An eradication program is in effect at the present time in Denmark. Blood samples are drawn and the lymphocytes examined quantitatively and qualitatively. The observation of prolymphocytes is considered pathognomonic. Bendixen² outlines the procedures and has been the key worker in the Danish program. Steere⁴ says the most common form in the U.S.A. is the so-called sporadic type in which the total number of leukocytes is essentially normal but with some prolymphocytes in the peripheral blood. In Denmark it was reported that 80 percent of the cases are the enzootic form (not believed to be transmissible). More acute cases are found within the enzootic numbers.

At the World Health Organization Conference on leukemia held in the spring of 1961 it was agreed that international exchange of bovine information and material, such as reagents and specimens will take place on a cooperative basis. It is of public health interest in that bovine leukemia may shed some light on the human leukemic problem.

The incidence of clinical bovine leukemia is high enough to warrant careful diagnostic procedures by field veterinarians. In cutaneous involvements such as the case presented here, biopsies can be examined by diagnostic laboratories. Rectal palpation should be a routine procedure to check the abdominal lymphoid tis-

sue. Blood samples may be drawn and checked by a laboratory for prolymphocytes. The total lymphocyte count is not always significantly affected.

The leukemia program in Europe and the high incidence of the disease both acute and chronic, brings up the question of incidence in this country. Because of parallel leukemic conditions in man it is of current public health interest.

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REFERENCES:

¹ Neal, Dr. Fred C.: Personal communication. Oct. 1961.

² Bendixen, H. J.: *Modern Veterinary Practice*. Vol. 42, no. 8,9,10, 1961.

³ Runnells, R. A., A. Monlux and W. Monlux: *Principles of Veterinary Pathology*. Iowa State University Press, Ames, Iowa, 1960.

⁴ Steere, J. L.: *Modern Veterinary Practice*. Vol. 40, no. 20, Oct. 15, 1959.

The AVMA Council on Research is again offering fellowships of \$100 a month upwards for postgraduate training in the academic year 1962-1963.

Applications for these fellowships are available from the Dean of the College of Veterinary Medicine or from the Council on Research, American Veterinary Medical Association, 600 South Michigan Avenue, Chicago 5, Illinois. It is suggested these forms be filled out by January 1, 1962; the deadline for applications is February 1, 1962. The committee on fellowships will meet in early March to consider the applications; the awards will be announced by April 15.

The amount of the fellowship is determined by individual need of the applicant, funds available for fellowship grants and other factors.

The recipient of a fellowship must be a veterinarian and a citizen of the United States or Canada. Veterinary students who expect to graduate at the end of the current school year and who wish to follow a career in research or teaching may apply for a fellowship.

Assistance in completing the application and other information may be obtained from the Dean or the school's advisor on AVMA Fellowships.