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A Clinical Discussion of Diagnostic Tests for Paratuberculosis

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animal quiet, providing a laxative and adequate diet, and combating dehydration. It was felt in this case, that the warm water and laxatives administered via the stomach tube and the enema were very helpful in speeding recovery.

G. Petkus, '52

A Clinical discussion of diagnostic tests for Paratuberculosis. It is the purpose of this paper to present a single diagnostic procedure which can be utilized by practitioners in confirming a diagnosis of Johne’s disease. Field tests for this disease have been neglected to such an extent that incidence data is unavailable. A report issued by the Secretary of Agriculture in 1952 stated paratuberculosis had been recognized in all states except Arizona, Maine, New Hampshire, Rhode Island, Utah, and Wyoming. Unofficial estimates in a neighboring state have placed the herd incidence at fifteen percent. Because a significant number of affected animals remain asymptomatic, prompt diagnosis of the clinical cases is imperative if the disease is to be controlled in the herd. Bacterial culture of the feces, intradermal Johnin skin sensitivity, complement and micro-complement fixation, and acid-fast stains of the rectal mucosa are diagnostic tools which can be used in susceptible species. However, these tests are reliable only when applied during a certain stage of the disease. Early in the course of Johne’s disease the skin sensitivity test is reliable; later the other tests are more dependable. The exact mechanism(s) involved in false negative skin sensitivity tests is unknown but the following explanations have been suggested. (1) In advanced stages of all diseases, including tuberculosis, the allergic skin tests may fail to react. This condition is called anergy and has been considered a consequence of an exhaustion on part of the tissue cells. (2) If the skin sensitivity tests are carried out in treated animals, the suppressive agents (irradiation, cortisone) might well interfere with the inflammatory response nonspecifically, aside from whether or not the subject has responded immunologically. (3) Lack of reaction indicates absence of infection with the following qualifications: the animal may be in the pre-allergic state during early infection (a period not exceeding one month), or may have lost allergy due to overwhelming infection or to unrelated infections. (4) In the fulminating infections when large numbers of organisms are spilling over into the blood stream, the intradermal reaction may fail due to the overwhelming toxic condition of the animal.

Domestic animals reacting to a test recognized by the Secretary of Agriculture for paratuberculosis must be branded with a “T” on the left jaw and some type of state reactor tag attached to the left ear. Interstate shipment of grade animals can be made only for immediate slaughter. Purebred animals which have been moved interstate for breeding purposes and which react subsequent to such movement, may be moved interstate to their point of origin after provisions have been made with appropriate local authorities for their quarantine or segregation until death by slaughter or from natural causes. Branded animals may remain within the herd of origin under intrastate regulations and the complete herd and premises shall be under quarantine. Complete regulations are found in subchapters B and C of chapter 1, Title 9, Code of Federal Regulations.

CASE HISTORY

A two year old shorthorn bull was admitted to the clinic on September 20, 1961, with a history of recurrent diarrhea which was refractory to treatment. Physical examination was essentially negative except for marked dehydration, slight enlargement of both hocks, and fluid feces. History obtained from the owner indicated the animal had suffered attacks of diarrhea in the fall of 1960, May of 1961, and again in the fall of 1961.

CLINICAL FINDINGS

The bull was afebrile (101.2° — 102.° F.) while observed at the clinic. The diarrhea remained profuse, with consistency and color resembling pea soup, but was without offensive odor. Appetite was fair until the terminal stages of the disease;
however, water intake was adequate. Progressive emaciation occurred and the animal was recumbent most of the time. Rectal examination revealed a ballooned and thickened rectum and colon. Palpation of visceral structures was difficult due to the slick mucosa and thick walls. Only nematode ova were found in the fecal examination.

**DIAGNOSIS**

The day following admission to the clinic a fingernail scraping of the rectal mucosa was made and stained for acid-fast bacteria by the Ziehl-Neelson method. Typical clumps of small acid-fast bacilli around epithelial cells were found in many microscopic fields. Saprophytic, acid-fast organisms are found in scrapings from normal animals but are differentiated from the bacillus of Johne's disease by their singular occurrence among the epithelial debris. Johnin injected intradermally the 21st was negative at 24 and 48 hour readings; however, a diagnosis had been established on September 21 when the bacteriological report was received on the mucosa stain.

**GROSS LESIONS**

Permission was obtained from the owner to euthanize the bull on September 22. The bull was maintained in the clinic until September 29, pending preparation of special cultural media by the Animal Disease Eradication branch of the National Animal Disease Laboratory, Ames, Iowa. Necropsy revealed the following gross pathology. The entire intestinal tract was thickened, especially the caecum and colon. Transverse folds of the mucosa producing the typical corrugated appearance were prominent in the small and large intestine. Extreme hyperemia of the rectal mucosa was noted. Mesenteric lymph nodes were slightly enlarged.

**MICROSCOPIC LESIONS**

Tissue sections were obtained from the rectum, colon, caecum, jejunum, ileum, and mesenteric lymph nodes and prepared with the Ziehl-Neelson acid-fast stain. Histopathologic studies demonstrated the organisms in each of the above tissues.

**SUMMARY**

In recently infected herds the Johnin tests is relatively reliable, particularly if
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.

Howard H. Gonnerman, '62

Cutaneous Bovine Lymphomatosis
On September 21, 1961, a year-
ling Hereford-Angus cross heifer was ad-
mitted to Stange Memorial Clinic with a
severe skin involvement. (Fig. 1). This
animal had been treated for a skin infec-
tion, even though it did not show hyper-
sensitivity of the involved areas, nor had
shown pruritis at any time.

Fig. 1. Severe skin involvement seen in lymph-
matosis.

Upon physical examination many nod-
ules and raised plaques of the skin were
evident over most the body, but were espe-
cially 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 tis-
sue. Hair was lost on the larger plaques. A
biopsy study of affected skin indicated it
to be a neoplasm, probably a lymphosar-
coma. Examination of the blood revealed:
hemoglobin 5.7 gms/100ml, hematocrit
19.2 per cent, total red cell count 4.5 mil-
lion/mm³. The leukocyte total and differ-
cental 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 re-
action 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 edema-
tous. The cardiac musculature was under-
going coagulative necrosis. The liver was
greatly enlarged, with many areas of lym-
phocytic 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 hemorr-
hagic.

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

The above case is the second cutaneous