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Anaphylactoid Reaction To Strain 19 Brucellosis Vaccine in Calves

by KENNETH W. SCHUMANN, B.S.*

INTRODUCTION

Brucellosis is recognized as a disease affecting mainly domestic animals and as a mild to severe disease in humans. Transmission to humans is usually from the animal population; therefore control of the human form demands control in the domestic animals. In addition, the economic loss to the livestock industry due to Brucellosis is great, estimated at $25,000,000 annually.5

Since chemotherapy of the disease is relatively ineffective, prevention and eradication are the important means of control. With the discovery of the attenuated strain of Brucella abortus known as strain 19 by Buck,7 vaccination with this organism has become the standard prevention program. Calves are usually vaccinated between the ages of four and eight months.

Strain 19 is an attenuated rather than avirulent strain and has been known to cause the disease in cattle18 and humans.21,22 Vaccination with Strain 19 has been known to cause anaphylactic shock or an anaphylactoid reaction in calves.1,5,11,18

INCIDENCE AND OCCURRENCE

Anaphylactoid reactions to Strain 19 appear to be infrequent. I could locate no reports of this reaction in adult cattle. The reaction is peculiar to certain individuals but a higher incidence has been reported in certain herds or certain localities.11 It is not confined to the United States.

CLINICAL SIGNS

The anaphylactoid reaction usually comes on fairly suddenly, within a few hours after vaccination. A sudden and severe dyspnea develops accompanied by muscle shivering, weakness, and uneasiness. Edematous swellings are seen around the eye, udder, anus and vulva. Increased salivation, bloat and diarrhea may or may not occur. A drop in blood pressure and a decreased body temperature seem to be characteristic. Fluid sounds may be heard on auscultation of the thorax. The animals often die in a matter of hours but occasionally recover. A case of al-

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Etiology

Definition of Anaphylactoid Shock.

Simply, an anaphylactoid reaction is the reaction in an animal to the parenteral administration of a substance and resembles in lesions and action the typical anaphylactic shock reaction for that particular species. It is differentiated from true anaphylactic shock in that it occurs in animals that have apparently not been previously sensitized to the causative antigen or substance. Some of the substances incriminated to cause the reaction include peptone, trypsin, colloidal iron, rattlesnake venom, ascaris extract, hydantoin fluid, homologous plasma and bacterial endotoxins.

The question pertinent to our condition is, what causes the anaphylactoid shock where there is no antigen-antibody reaction? A lot of work has been done with various endotoxins\textsuperscript{12,25} and this could be the triggering factor. Brucella endotoxins are known to cause an allergic reaction in some animals. The effects of endotoxins are not all as antigens.

Relevant etiological considerations. Any connection to the particular vaccine used has been ruled out; it has been impossible to reproduce the typical shock in calves (even with material from the same vial that caused a reaction on the farm).\textsuperscript{11} The phenomenon appears to depend on the hyper-sensitivitive state of the individual animal. The fact that the incidence is greater in certain areas is very intriguing. The tendency or predisposition to hypersensitivity is inheritable and this may account for it. The possibility that this is true anaphylaxis has not been definitely ruled out. Perhaps the calves have been previously sensitized with Brucella in some way. Brucella abortus has shared antigens with Vibrio sp. It is possible that sensitivity could develop to these organisms or even to some common soil organism with a shared antigen. True anaphylaxis can be demonstrated with Brucella abortus.\textsuperscript{15}

Necropsy Lesions

The lesions found on necropsy will be typical for anaphylactic shock. The lesions are usually in the lung and include pulmonary edema and emphysema possibly with congestion. Hemorrhages may be found on the serosal surfaces.

Clinical Pathology

Increased blood histamine levels may be found. It would be interesting to study the blood picture, especially the eosinophil and basophil response. In experimental work specific sensitivity tests might be considered. A new allergic test using blood basophils is being used in research and may eventually be adaptable to field use.\textsuperscript{20,29}

Diagnosis

The diagnosis is based on the occurrence of typical clinical signs following vaccination and on the necropsy lesions found.

Treatment

The treatment of this condition is the same as for true anaphylactic shock. Immediate use of antihistamines and 1-6 cc adrenaline (1:1,000) is indicated. Glucocorticoids may be of some help. Additional symptomatic treatment should be instituted where necessary. Histamine is not the only active substance released in the shock reaction. Antihistamines specifically block the action of histamine but not the other active agents. Some recent work indicates that aspirin may specifically block the effects of SRS-A and kinins (other substances found in anaphylactoid reactions).\textsuperscript{3,4} Judging from this work, aspirin is worthy of both a try in the field and in experimental work.

Bibliography

LAMINITIS

by Don Lucas*

Laminitis is an inflammation of the foot. It may be caused by either infectious or noninfectious agents and is characterized by passive congestion of the laminae with blood. Severe pain results from the inflammation caused by pressure on the sensitive laminae.

ETIOLOGY AND PATHOGENESIS

Laminitis is caused by numerous etiological factors, not all of which are fully understood. Causes commonly recognized include:

1. Grain Founder.—Grain founder is caused by ingestion of greater quantities

2. Water Founder.—Ingestion of large amounts of cold water by an overheated horse is considered to be a cause of laminitis. The phenomenon may be due to gastroenteritis or possibly to histamine formation.

3. Road Founder.—This is the result of concussion to the feet from hard work or fast work on a hard surface. Unconditioned animals are especially subject to this type of laminitis, as are those horses having thin walls and soles.

of grain than can be tolerated by the horse. The amount varies, since a certain degree of tolerance develops in those horses accustomed to eating large quantities of grain. This type of founder is associated with gastroenteritis.

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