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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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ergic encephalitis due to Strain 19 vac-
cine has been observed.2

ETIOLOGY

Definition of Anaphylactoid Shock.
Simply, an anaphylactoid reaction is the
reaction in an animal to the parenteral
administration of a substance and re-
sembles in lesions and action the typical
anaphylactic shock reaction for that par-
ticular species. It is differentiated from
true anaphylactic shock in that it occurs
in animals that have apparently not been
previously sensitized to the causative an-
tigen or substance. Some of the substances
incriminated to cause the reaction include
peptone, trypsin, colloidal iron, rattle
snake venom, ascaris extract, hydatid
fluid, homologous plasma and bacterial
endotoxins.

The question pertinent to our condi-
tion is, what causes the anaphylactoid
shock where there is no antigen-antibody
reaction? A lot of work has been done
with various endotoxins12,25 and this could
be the triggering factor. Brucella endo-
toxins are known to cause an allergic re-
action in some animals. The effects of en-
dotoxins 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).11 The
phenomenon appears to depend on the hy-
ersensititive state of the individual animal.

The fact that the incidence is greater
in certain areas is very intriguing. The
tendency or predisposition to hypersensi-
tivity 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 previ-
sely 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.15

NECROPSY LESIONS

The lesions found on necropsy will be
typical for anaphylactic shock. The lesions
are usually in the lung and include pul-
monary 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 con-
sidered. A new allergic test using blood
basophils is being used in research and
may eventually be adaptable to field
use.20,29

DIAGNOSIS

The diagnosis is based on the occur-
rence 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. Im-
mediate use of antihistamines and 1-6 cc
adrenalin (1:1,000) is indicated. Gluco-
corticoids may be of some help. Addition-
al symptomatic treatment should be in-
stituted 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 specifi-
cally block the effects of SRS-A and kinins
(other substances found in anaphylactoid
reactions).3,4 Judging from this work,
aspirin is worthy of both a try in the field
and in experimental work.

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LAMINITIS

by Don Lucas*

DEFINITION

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 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.

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.

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