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MYCOTIC ABORTION IN CATTLE

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ABSTRACT

Mycotic abortion is an important reproductive problem of cattle all over the world. It is caused by a number of different species of fungi and yeasts. The epizootiology of the disease is not clearly understood but it is assumed that mouldy hay, straw and feeding stuffs are the most probable transmitting agents. Mycotic abortions in cattle have been recorded usually after first 6 months of gestation. Aborted animals usually suffer from retention of placenta. No treatment has yet been evolved for such abortions.

Key words: Mycotic abortion, cattle.

INTRODUCTION

Bovine constitute an important part of livestock sector in Pakistan. Being an agricultural country, about 67.5% of its population are living in rural areas and are directly or indirectly linked with agriculture for their livelihood. The role of livestock in rural economy may be realized from the fact that 30-35 million rural population are engaged in livestock raising especially cattle and buffaloe, deriving 30-40% of their income from it (Economic Survey, 2002). Cattle and buffaloes are used for various agricultural operations. They also provide animal proteins in the form of beef and milk for human population.

Abortion in cattle is a serious problem everywhere in the world where these animals are reared. The implication of fungi in abortion in cattle has received increasing attention during recent years and it is now recognized that mycotic infection contributes significantly to the annual losses from abortion.

Although, there has been no record on this aspect of abortion in Pakistan but in view of a high incidence of abortion, it is just possible that mycotic abortion does occur in this country. Mycotic abortion can cause great economic loss to the stockholders and also a loss of animal proteins to human population which is already facing a very serious problem of shortage of animal proteins.

Mycotic abortion, also known as fungal abortion or mycotic placentitis, is caused by different species of fungi and yeasts. About 35 different species of fungi have been known to cause abortion, *Aspergillus fumigatus* being the most commonly diagnosed casual organism (Jenson *et al*., 1993). Some of possible pathogens of mycotic abortion include: *Mucor rhizopodiformis, Absidia corymbifera, Absidia ramosa, Aspergillus flavus, Aspergillus nidulans, Aspergillus terreus, Mucor psillus, Rhizopus arrhizus, Aspergillus niger, Rhizopus boyinus, Allescherica boydii, Aspergillus versicolnr, Kontospora lanuginose, Mortierella polycephala, Polystictus versicolor, Mucor disperses Mortierella zychae, Mortirella wolfii, Aspergillus fumigatus, Candida tropiculis, Nicardia asterodies* and *Mortirellla wolfii*.

MYCOLOGY

The chief fungus associated with mycotic abortion is *Aspergillus fumigatus*, which has been recorded from over 60% of cases. *Absidia ramosa* and *Absidia corymbifera* are also frequent isolates, but the remaining species are rarely reported. Fungi have been recovered from the placenta, amniotic fluid, foetal stomach contents and skin lesions. Very rarely have isolations been made from other organs of aborted foetus.

Austwick and Vann (1957) found that the best isolation method for foetal stomach contents was to smear them, using a glass spreader on to malt agar plate (containing 20 units of penicillin and 40 units of streptomycin per ml) and incubate at 37ºC. Colonies frequently appeared within 24 hours depending on the species of fungus involved. Experimentally, abortion can be induced by inoculation of fungal spores intravenously, abortion taking place 1-2 months after inoculation. Experimental feeding of cultures of fungi has been shown to be ineffective.

EPIZOOTIOLOGY

Geographical distribution and transmission

The disease has been reported from Europe, North America, South Africa, Australia and parts of Asia. The exact mode of transmission of mycotic abortion is not fully understood and route and source of infection remain unknown. There are indications that infection is originally derived from the spores of fungi present in large number in the mouldy hay, straw and feeding stuffs and hence in the air of cowsheds (Ainsworth and Austwick, 1959). However, there is no evidence of animal to animal transmission of the disease. Susceptible hosts include: cattle, sheep and mares.

Factors influencing susceptibility

It is assumed that housing of animals in relatively confined spaces predisposes them to infection due to the presence of higher concentrations of fungal spores in the air of cowsheds than that of its surroundings (Turner, 1965). Pregnancy in a cow with metabolic derangements from stress may predispose the pregnant cow to fungal infection (Dalling, 1966).

The incidence of the condition is high in late summer or early autumn, due to the presence of large number of fungal spores in pastures during this period (Stableforth and Galloway, 1959). There is also evidence of a winter rise of disease incidence. A study conducted in New York State showed that abortions occurred after third month of pregnancy, with the peak at 6 months and average 6.4 months. The average age of aborting cows was 5.4 years.

SYMPTOMATOLOGY

In the experimental disease, a period of about one month lapses between intravenous inoculation of fungal spores and abortion, but natural incubation period is unknown. No noticeable symptoms have been recorded in the dam either before or after explusion of dead foetus. A tentative clinical diagnosis can be made on the pathological appearance of placenta and particularly the cotyledons and also on the presence of foetal skin lesions.

PATHOLOGY

Pathogenesis

Principal entry of fungi is via the respiratory tract and the route of infection is via the blood stream in the lungs. Granulomatous lesions in the lungs could break down under stress, leading to invasion of blood vessels with hyphae. Small ulcers in the forestomach and abomasum in the cattle are well known and these may become invaded by the fungi. Spread of infection to the blood stream from such ulcers leads to either pneumonia or placentitis (Roberts, 1971).

Lesions

The placenta shows characteristic changes. The placental lesions are chiefly concerned with the adherence of maternal part of cotyledon to the chorionic part so that these organs appear as raised, solid, yellowish, cushion-like structures, often with a raised and thickened margin. Occasionally, the foetus shows skin lesions in the form of diffused white hair on the flanks, neck, axilla and inside the backs. Histological examination of the affected cotyledons shows extensive hyperaemia and haemorrhages in the early infection with scattered infiltration of polymorphonuclear leukocytes and eosinophils.

DIAGNOSIS

A provisional field diagnosis can be made by the sporadic nature of the disease, with appearance of placental and foetal skin lesions. Abortions usually occur late in pregnancy and the palcenta is usually retained.

Confirmation of mycotic abortion is made by microscopical and cultural examination. Hyphae may be detected by direct examination of wet preparations of affected cotyledons and abomasal contents. The fungi are isolated from abomasal contents and cotyledons. Foetal stomach contents provide more useful material for culture and produce a pure growth of causative organisms.

Differential diagnosis

Diagnosis of mycotic abortion presents great difficulties because a number of infectious and non-infectious agents are known to cause abortion in cattle. Abortion resulting from various infectious causes must be differentiated from mycotic abortion. Confirmation lies in the isolation of specific etiologic agent.

PROGNOSIS

There is conflicting evidence regarding the effect of uterine fungal infection on the subsequent breeding performance of the cow. Resumption of regular breeding is certainly not ruled out by mycotic abortion, but there is not sufficient information to estimate the future performance of an affected cow.

TREATMENT

No clinical symptoms have been observed in the dam either before or after abortion and no treatment has ever been given to the affected animals. To our present state of knowledge, very little is known about epizootiology of the disease and there appears to be no suitable, nontoxic, anti-fungal agent available for animal use.

Since the epizootiology of mycotic abortion is obscure, evidence on the methods of control is speculative. If mouldy hay and straw are assumed to be the commonest source of infection, a careful watch on the quality of these materials is essential, so that any sample that appears excessively dusty may be rejected. Dust has been shown to consist chiefly of fungal spores of various types, but more especially the spores of mycotic abortion. Treatment of hay with some suitable fungicide during haymaking should be done in order to reduce subsequent mould growth. Housing of animals in relatively confined spaces should also be avoided because some evidence indicates that air of over-crowded cowsheds is rich in spores of fungi and can cause abortion.

DISCUSSION

Bovine mycotic abortion causes great econmic losses to the individual farmer and cattle-breeding industry as a whole. It is known that among the species of fungi isolated from different cases of abortion, at least *Aspergillus fumigatus* produces an anti-bacterial substance which might kill any pathogentic bacterium within or adjacent to foetus but it is not thought that this provides a satisfactory explanation to this type of abortion.

The epidemiology of the disease is obscure and route and source of infection remain unknown. Further work is required on the port of entery of infection and level of spore intake which is likely to set up infection in susceptible animals.

The availability of viable elements is apparently related to widespread and abundant occurrence of fungi as natural saprophytes except in case of *Candida tropicalis.* Feed stuffs and the air within the cowsheds yield potential pathogens. It is assumed that all pregnant animals are exposed to approximately equal amounts of potential pathogens. It appears that there are certain conditions, as yet unknown, which might influence the pathogenic status of these organisms. The abundance of viable fungal elements during the periods of high and low abortion rates suggests indirectly that some predisposing factors exist for mycotic infection and subsequent abortion.

Conclusion

Efforts should be made to minimize the predisposing conditions by using suitable anti-fungal agents. The quality of hay and grass silage must be controlled and suitable measures should be made to minimize fungal growth.

Modern diagnostic laboratories with sufficient technical staff should be instituted in the country for the diagnosis of this disease. The standards of service by a diagnostic laboratory are directly proportional to specimens, history submitted and condition of the specimen upon arrival. Therefore, all specimens must be properly packed.

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