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MILK FEVER (Parturient Hypocalcaemia) IN THE DAIRY COW

By C. R. TOOP, B.V.Sc., Chief Veterinary Surgeon

THE condition known as milk fever is almost essentially a disease of parturition or calving and principally affects those animals which are noted for heavy milk production. The earliest cases of the disease were recorded in the year 1806, and it is interesting to note that their occurrence was coincident with the period when it became customary to feed dairy cows more liberally for the purpose of increasing production.

Since that time, in association with improved agricultural methods resulting in a much heavier growth of crops and pastures and the evolution of a type of dairy cow with a capacity for high production, the incidence of the disease has steadily increased and it may therefore be regarded as a concomitant of high production, coupled with generous feeding. Consequently, the beef breeds and the poorer types of dairy cattle are rarely affected, whereas breeds, or individuals noted for their heavy yields, are especially susceptible. Even among the latter, however, the attack does not usually occur until the peak of production has been reached. Hence, we find that the disease rarely affects heifers and is uncommon amongst cows in their second season. Mature cows on the other hand are quite frequently attacked, susceptibility being greatest between the sixth and tenth years of age, i.e., the period during which maximum production has been reached and over which it is usually maintained. Older animals in which the milk yield has commenced to decline are less susceptible.

OCCURRENCE

The great majority of the cases of milk fever occur within the first three days after calving and the animal may become affected at any time during this period. Exceptionally, the attack occurs immediately before calving, or even while calving is actually in progress. This disease is not, however, wholly confined to the parturient period. Occasionally it affects animals which have been milking for a period of weeks or months. These cases of so-called "Delayed Milk Fever," mainly occur when cows are running on succulent pastures, and are often associated with the period when the animal is in season.
CAUSE

For more than a century the cause of milk fever remained a mystery and it was not until the year 1925 that the British workers, Dryerre and Greig, succeeded in demonstrating the true nature of the condition. They were able to show that the disease was always associated with a fall in the calcium content of the blood; this important part in regulating and maintaining the blood calcium level. It has, therefore, been suggested that the disease has its origin in a temporary failure on the part of the parathyroid glands to function. Proof of this is, however, lacking.

SYMPTOMS

The affected animal is usually in good condition being known as hypocalcaemia. During the examination of a large number of cases of milk fever it was found in every instance that there was a definite reduction of the calcium content of the blood, which corresponded with the severity of the symptoms. In severe cases the blood calcium had fallen to as much as 70 per cent. below its normal level, while in mild cases the reduction was correspondingly smaller. Moreover, following upon the inflation of the udder with air, the blood calcium steadily rose, until the normal level was reached, this rise corresponding with the improvement of the condition of the animal, and the gradual disappearance of the symptoms. Finally, it was shown that affected animals could be restored to health by the injection of calcium solutions into the jugular vein.

Calcium is stored in large amounts in the bony structures of the body. It is present in the blood in small, but fixed and definite amounts and is essential for the maintenance of certain of the vital functions of the body. Should the blood calcium fall appreciably below its normal level these functions cannot be maintained and symptoms make their appearance. How this sudden fall in the blood calcium level is brought about is not definitely known. Calcium occurs in high concentration in the colostrum or first milk secreted and it might therefore be expected that a heavy drain upon the calcium contained in the blood would occur when lactation commences. Normally, this depletion would be made good by a rapid transfer of calcium from the reserves stored in the bones, this being brought about by the secretion of the parathyroid glands, which play an important part in regulating and maintaining the blood calcium level. It has, therefore, been suggested that the disease has its origin in a temporary failure on the part of the parathyroid glands to function. Proof of this is, however, lacking.

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(1) The Inflation of the Udder with Air.

This method consists of inflating each of the four quarters with air, until they are firmly distended. A milk fever outfit is used for this purpose. This consists of a pump similar in type to a bicycle pump to which is connected in series, an air filter, and a teat syphon (tube).

Immediately before use, the air filter and teat syphon are sterilised by immersion for ten minutes in boiling water, and the air filter, which consists of a hollow metal cylinder, is packed with dry cotton wool. Meanwhile, the udder is prepared by thorough washing with an antiseptic solution such as lysol or dettol in the strength of two ounces to five pints of water, and a cloth which has been steeped in this solution and then wrung out is placed beneath it.

The sterilised teat syphon is now introduced into the teat canal and air is pumped in until the quarter is firmly distended. Each quarter in turn is dealt with in this manner and when the inflation is completed the teats should be grasped firmly and the udder massaged. It is a common practice to ligature the teats with tapes for a period of two or three hours to prevent an escape of air. This procedure, however, is unnecessary, and it may lead to the development of a troublesome stricture, if the tapes are allowed to remain in position too long.

In carrying out this treatment great care should be exercised in the sterilisation of equipment and the cleansing of the udder and teats, otherwise infection will be introduced into the udder, which may result in an attack of mastitis.

The udder having been inflated, the cow is now propped up with the aid of bags filled with earth or sand so that she rests comfortably on the brisket. If the animal is allowed to remain prostrate, bloating will occur and death may result from asphyxia.

Medicines must on no account be given by the mouth. When the animal is in a state of coma, swallowing cannot occur and should a drench be administered it will flow directly into the lungs and may subsequently set up an attack of pneumonia.

Following upon the inflation of the udder, recovery is usually rapid and in the majority of cases the animal will have been restored to complete health within the space of a few hours. If recovery has not occurred within six hours, or should there be a relapse the treatment should be repeated.

It is interesting to note that this method of treatment is purely empirical, and that it was successfully practised for many years, before the actual cause of the disease became known. It was developed as the result of an erroneous conclusion on the part of the Danish veterinarian, Schmidt, who had formed the opinion that the disease was due to the presence of a ferment or virus in the udder tissues. He consequently injected a solution of potassium iodide which he believed to possess antiseptic properties. A rapid recovery occurred. When other solutions were employed the same satisfactory result was obtained. Equally good results were secured by the injection of sterilised water. This was in turn replaced by the inflation of the udder with air and when this practice became generally adopted the mortality rate was reduced to almost negligible proportions.

(2) The Injection of Calcium Borogluconate Solution.

This is a rational treatment which is based upon a knowledge of the cause of the disease, the purpose of the injection being to restore the depleted blood calcium to its normal level. It is preferred to udder inflation on account of the fact that it obviates the risk of mastitis, and is not followed by decrease in the milk yield, which is a common sequel when treatment by inflation is employed. Apart from this, both methods of treatment are about equal in efficiency.
The solution for injection is prepared by stirring a mixture of two ounces of calcium gluconate and three drachms of boric acid into 12 ounces of boiling water until it is completely dissolved. The solution is allowed to cool to blood heat before injection, and the whole of it is administered at one treatment. Making for greater convenience, calcium borogluconate may be purchased in carton form. Each carton contains the requisite dose of the drug which when dissolved in a given amount of water produces a solution which is immediately ready for use.

As it is necessary to administer a relatively large quantity of calcium borogluconate solution it is advisable to employ an outfit which will enable the injection to be made quickly and efficiently. An injector which will be found suitable for this purpose, and which may be made up at a comparatively small cost, is shown in Fig. 4.

The injections should be given at four points along the neck, approximately three ounces of the solution being injected beneath the skin at each of the sites selected. The needle and tubing should be sterilised by boiling before use. The hair over the site of the injection should be clipped and the skin cleansed by swabbing with methylated spirits. In making the injection a fold of skin should be taken up between the fingers and penetrated by a thrust with the needle which can afterwards be felt lying immediately beneath the skin.

When the injections have been completed the cow should be propped in the natural recumbent position and supported by bags of earth or sand placed alongside the shoulder. As is the case with udder inflation, a rapid recovery is usual, normal health being regained within the space of a few hours, in the great majority of cases. The treatment should be repeated if recovery has not occurred within six hours, or in the event of a relapse.

PREVENTION

It is a well established fact that the practice of milking cows completely out during the first 72 hours following calving may precipitate an attack of milk fever. Consequently, it is advisable to remove only small quantities of milk from the udder during this period and this procedure will be found of distinct value as a preventive. By allowing the calf to remain with its mother for a similar period and relieving the udder only when necessary, the same object will be achieved.

In the case of cows which are highly susceptible to the disease and are likely to become affected at each successive calving, an injection of calcium borogluconate given immediately after calving and repeated 24 hours later will generally succeed in warding off the attack.
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