The use of cloprostenol and prostaglandin $F_{2\alpha}$ to induce luteolysis in reindeer calves

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Expanded abstract:

Introduction

The pregnancy rate in reindeer is strongly related to body weight (1) and, in southern Norway, has been observed to increase from virtually zero to about 90 % when body weight increased from 40 to 50 kg (2). Reindeer calves can reach body weights of over 50 kg during their first autumn if they have access to high quality pastures. In order to increase the production capacity of a reindeer flock, growing calves and heifers with a body weight less than 60 kg should not be subjected to the risk of pregnancy (3) and the subsequent dilemma of the death of the newborn calf or the stress of lactation (4).

In other ruminants, prostaglandins can be used to cause luteolysis and induce abortion. The aim of the present study was to evaluate the effect of prostaglandins given to young reindeer calves at the end of the breeding season.

Materials and methods

A total of 126 young reindeer of about 7 months of age, were isolated from a flock during the last week of November 1987. Animals weighing more than 46 kg body weight were randomly allocated into two groups to be treated either with prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$), 12.5 mg (Dinolytic®, n=41) or 0.25 mg cloprostenol (Estrumat®, n=50). Thirty-five animals were left untreated and no restriction on live weight was used in this group.

Two blood samples were collected from all animals, the first immediately prior to treatment and the second 2 1/2 days later for the analysis of progesterone.

The response to treatment was evaluated according to the change in plasma progesterone concentration following treatment. Animals with a progesterone concentration > 2 ng/ml prior to treatment and < 1 ng/ml after treatment were regarded as «responders». Animals with a progesterone concentration < 2 ng/ml prior to treatment were excluded. Other combinations of progesterone concentrations indicated a negative response («non-responders»).

Results

The mean concentration of plasma progesterone in both treatment groups before receiving prostaglandin was 3.2 ± 0.4 (± SEM) ng/ml. The untreated group had significantly lower means for both plasma progesterone concentration and live weight than either treatment group had prior to receiving prostaglandin.

Treatment with prostaglandin resulted in a significant decrease in progesterone concentrations in both treatment groups. Although not significant (p=0.08), the mean concentration of progesterone in females treated with cloprostenol was significantly lower (0.8 ± (0.2 ± SEM)

ng/ml) after treatment than in females treated with $PGF_{2\alpha}$ (1.5 ± 0.3 (± SEM) ng/ml). No side effects were seen as a result of treatment.

Grouping the animals into responders and non-responders according to their progesterone concentrations prior to and after treatment (see Materials and methods) revealed a higher frequency of responders (81.5 %) in cloprostenol-treated animals than in $PGF_{2\alpha}$-treated animals (31.8 %).

Discussion

The significant fall in progesterone concentrations observed in treated animals indicated that prostaglandins could be used to induce luteolysis in reindeer.

The average progesterone concentration was lower after treatment, and the number of responders higher in the group treated with cloprostenol than in the group treated with $PGF_{2\alpha}$. The doses given (12.5 mg $PGF_{2\alpha}$ and 0.25 mg cloprostenol) were chosen on basis of the doses recommended for cattle (25 mg $PGF_{2\alpha}$ and 0.5 mg cloprostenol), and on the assumption that the given dose should be sufficient to cause lyteolysis in reindeer weighing about 50 kg live weight. The lower response-rate obtained with $PGF_{2\alpha}$ could be due to a lower effect of this compound in reindeer than in cattle. A similar phenomenon has been reported in sheep where the appropriate luteolytic dose of $PGF_{2\alpha}$ is 20 mg (5).

Treatment with prostaglandins was performed in the last week of November. At this time of the year the normal breeding season is finished. However, little information is available on the normal reproductive physiology of reindeer, and evidence exists that, in the absence of pregnancy, ovulation can continue into December - January (6). Pregnancy may therefore be better prevented by treatment at a later stage.

The limited availability in this study of reindeer calves with a high body weight required that restrictions on body weight could not be placed on animals in the untreated group. Therefore this group cannot be regarded to be a part of the same population as the treated animals.

In conclusion, prostaglandins would appear to be effective in causing luteolysis in reindeer and such compounds may be useful in preventing pregnancy in young animals. The further evaluation of the effect of prostaglandins in this species should address the treatment of animals at predetermined stages of the reproductive cycle and pregnancy.

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