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Induction of parturition in dairy cows: a survey from spring 1996 in the Waikato region

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ABSTRACT

Data were gathered relating to the practice of induction of premature parturition from farms in the central Waikato during spring 1996. A standard two-injection glucocorticoid treatment regime was employed. The reproductive tract of each cow receiving this treatment was examined 3 - 5 days *post partum*. Additional information relating to cow management was collected by interviewing participating herd-owners. Preliminary data relating to subsequent reproductive performance of a subset of the cows are also presented.

Accurate data were obtained for a total of 691 cows on 31 dairy farms. The mean induction rate was 10% (range 2 - 24%) of the cows in each herd. The distribution of the ages of induced cows was skewed, with 25% of cows being 3 yr old. Of the 35% of cows which calved to a single injection of glucocorticoid, 76% were within 30 days of full term based on expected calving dates. Inadequate progress in udder development following the first injection was seen in 11% of cows, of which 78% were more than 30 days premature. Only 56% of cows completed the routine two-injection regime.

Dystocia requiring at least moderate intervention occurred in 15 cows (2%). There were no cows with retained foetal membranes (RFM) on 33% of farms, but the overall incidence of RFM in cows receiving routine induction was 14%. No intervention was required for 43% of these, which resolved spontaneously within 48 h of calving. Milk fever was the complication most frequently reported (overall incidence 2.8%) and contributed to 3 of the 6 reported deaths.

Preliminary data from 11 farms indicated that 7% of cows were not presented for re-breeding. Only 12% required treatment for anoestrus. The mean calving to 1st service interval was 64 ± 2 days, and 53% had appeared to hold to 1st service.

Keywords: dairy cows; parturition; induction; survey

INTRODUCTION

As New Zealand's image in our international dairy markets is promoted as sensitive to both environmental and animal welfare issues, the acceptability of current farm management practices and the use of some technologies must be re-evaluated. One practice, induction of premature birth by the administration of drugs, is now regarded by many as ethically unacceptable. "Induction of parturition has been widely used to ensure that cows are in milk early in the spring, to make use of available feed and to have a better chance of conceiving and subsequently calving at the correct time in the following season. This practice has been regarded as unsuitable from an animal welfare perspective as it causes marked increases on the level of calf deaths." (New Zealand Dairy Board Environmental Task Force, 1996). Many dairy farmers also find inductions to be unacceptable. A survey of Taranaki herd owners found that 24% of farmers did not induce, mainly for ethical reasons (Bunny, 1992). A similar survey conducted in Waikato in 1995 found in excess of 50% of herd-owners considered inductions unfavourably, although many used the practice (Matthews, *pers. comm.*).

If the use of premature induction of parturition as a management tool is to be actively discouraged, then a co-

ordinated plan with support from sectors within the industry such as farmer groups and veterinarians, and a broad extension programme to farmers is needed. Herd owners must be informed of those procedures and practices which can reduce the need for induction, and of alternative management systems such as "carrying over" non-pregnant cows. An accurate economic analysis of the options available is fundamental to their acceptability to dairy farmers.

There is a paucity of information about current induction practices and their outcomes with which to characterise those groups within the dairy cow population which is induced. In a study from the Waikato region in 1982, it was noted that 31/35 (89%) of those farmers surveyed induced at least one cow, and that 10% of all cows were induced (Macmillan *et al.*, 1990). The fate of the induced cows was not examined. In the Taranaki study, 8% of cows from responding farms were induced (Bunny, 1992). Again data relating to outcomes for individual cows were not collected. The most recent published study of subsequent reproductive performance of induced cows in New Zealand was based on the 1979 calving season; 12% were not rebred for various reasons, while 17% of those which were bred failed to conceive giving a loss rate of 27% (Moller and MacDiarmid, 1981). Anecdotal information suggests

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that better management of treated cows over recent years has improved the outcome for induced cows. This is supported to some extent by information gathered in 1988 from south-west Victoria, Australia (Morton and Butler, 1995 a and b), where induction is widely practised for similar reasons to New Zealand. These authors found that 12% of induced cows were not re-bred, while 9% of those which were bred failed to conceive, giving an overall loss rate of 20%.

We undertook a survey involving three Waikato veterinary practices during Spring 1996, with the aim of establishing more recent data on management practices and outcomes associated with induction of parturition.

MATERIALS AND METHODS

Selection of participants: Herd owners were nominated by veterinarians from three practices in central Waikato, on the basis that they kept accurate records and would be prepared to co-operate. Those who agreed to participate were asked to proceed with their usual practices and decision-making regarding cow selection and timing of induction in relation to their calving programme.

Induction treatment: Induction of parturition was initiated by injection of 21 mg dexamethasone isonicotinate (Voren AP, Boeringer-Ingelheim(NZ) Ltd). A proportion of cows calved following this injection alone (single injection). Cows which had not calved were inspected 10 - 14 days later, and those showing satisfactory udder development continued with the routine induction treatment of 20 mg dexamethasone sodium phosphate (Dexadresin V, Pharmaco (NZ) Ltd) by injection (routine treatment). Alternatively, further Voren AP was administered to those contemporaries with inadequate udder development (repeat injection).

Reproductive examination: The reproductive tract of each cow receiving the routine two-injection regime was examined 3 - 5 days *post partum*, especially for the presence of retained foetal membranes (RFM).

Other information: Details of cow ages, breeds and expected calving dates were obtained after the first visit at which Voren AP was administered. Farmers were interviewed during the visit for reproductive examination about their management procedures, and further information for individual cows relating to the periparturient period was recorded. Breeding records from the treated cows were obtained during a follow-up survey which was carried out by telephone early in 1997. Data relating to subsequent breeding performance presented in this paper are of a preliminary nature.

Analyses of data: Records were examined from all cows and those for which there were apparent errors in expected calving dates (i.e., calculated gestational age at time of parturition exceeded 290 days) were removed from further analysis. Results are presented as mean \pm sem.

RESULTS

Survey population: A total of 825 cows on 37 farms were initially enrolled in the survey. Discrepancies in data

eliminated 16% of this population. The final group analysed consisted of 691 cows on 31 dairy farms. The mean proportion of cows induced in each herd was 10% (range 2 to 24%).

Cow age and breed: The arithmetic mean age of the induced cows was 5.7 ± 0.1 yr (range 2 to 16 yr). The distribution of ages of induced cows was skewed (Figure 1). The proportion of induced cows which were 3 yr old was greater ($P < 0.05$) than in the national herd (25% cf. 16%, respectively; Livestock Improvement Corporation (LIC), 1996). The proportion of induced cows older than 10 y was also greater ($P < 0.05$) than that proportion in the national herd (12.5% cf. 7.5%, respectively; Figure 1; LIC, 1996). The proportions of each breed in the survey population were similar to those in the national herd (62% Friesian, 16% Jersey, 20% crossbred and 2% Ayrshire; LIC, 1996).

Stage of gestation: The proportion of induced cows calving at various stages of gestation based on expected calving dates is presented in Figure 2. One third of induced cows calved within 20 days of their expected calving date.

Response to treatments: The proportion of cows responding to each variation of the induction treatment is shown in Figure 3. Only 56% of cows received the routine induction treatment. Of the 35% of cows which calved to a single injection of Voren AP, 76% were within 30 days of full term based on expected calving dates. Inadequate progress in udder development was seen in 11% of cows, of which 78% were more than 30 days premature.

FIGURE 1: Proportion of cows at each age in the survey group (n = 691) compared to the national herd in 1995/96 season (Livestock Improvement Corporation, 1996).

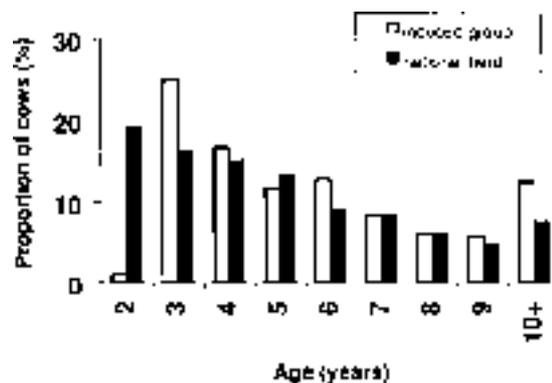


FIGURE 2: Proportion of induced cows (n = 691) calving at various stages of gestation based on data for expected calving dates.

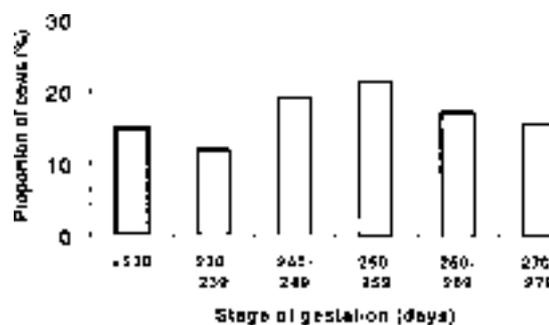
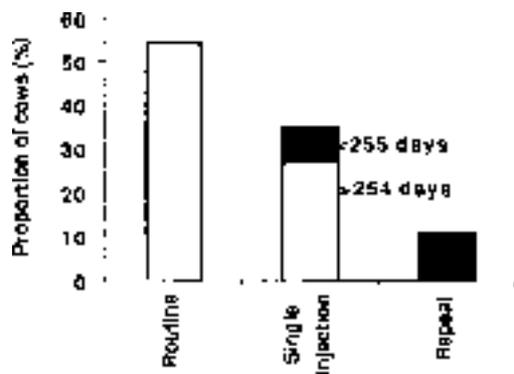


FIGURE 3: Proportion of induced cows (n = 691) responding to each variation of the induction treatment. Refer to Materials and Methods for definition of "routine", "single injection" and "repeat".



Retained foetal membranes: Although 33% of farms had no cows with RFM, the overall incidence in cows receiving routine induction was 14%. No intervention was required for 43% of these, which resolved spontaneously within 48 h of calving.

Treatment sequelae: Nineteen herd-owners reported no health problems with induced cows. Milk fever was the health problem reported most frequently (incidence 2.8%), although there was a nil occurrence on 60% of farms. The deaths of 2 cows were attributed to milk fever. One further cow which suffered milk fever subsequently died of yersiniosis. Dystocia requiring at least moderate intervention occurred on 14 farms for a total of 15 cows (2.0%). One cow suffered a prolapsed uterus and subsequently died. The incidences of acute metritis and mastitis were 1.4% and 2.3%, respectively. Although generally mild and responsive to treatment, one farm suffered a severe outbreak of *Staphylococcus* infection in their induced cows which affected 6 animals. One death was attributed to mastitis. In total, 6 of the 691 cows died (0.9%). Cause of death of the 6th cow was attributed to liver failure and scouring.

Periparturient management practices: Most herd owners employed vigorous strategies to ensure that induced cows received additional care. The majority ensured that body condition score of those cows selected for induction was at least 4.5 and all ensured that feed intake was maximised following the start of treatment. All herd owners either arranged for plasma selenium and copper levels to be measured before start of treatment, and/or were supplementing for these minerals as well as magnesium. There were high levels of supplementation with selenium on all farms on which nil RFM were recorded, but no significant correlations were established between plasma selenium level and incidence of RFM. On a number of farms, cows had been milked as their udders approached full development and teat hygiene was maintained. This practise was associated with a lower incidence of mastitis.

Subsequent fertility: Data for the subsequent breeding season are incomplete at the time of writing, having been obtained for only 11 herds, and not being confirmed by pregnancy testing. Of all the induced cows in these herds, 7% were not presented for re-breeding due to farmer

decisions to cull the animals. Treatment for anoestrus was applied to 12% of cows because they had not cycled at planned start of mating.

Across the 11 reported herds, the mean calving to 1st service interval was 64 ± 2 days. At the time of 1st insemination, 9% were less than 45 days from calving, 35% were between 45 and 60 days of calving, 49% were between 60 and 90 days, and 8% were greater than 90 days from calving. The latter group contained many of those cows which were reported with dystocia and metritis following calving. The proportions holding to each service were 53%, 30%, 12%, 4% and 1% for services 1 to 5, respectively.

DISCUSSION

In this survey we have examined the response to treatment and outcome of induction of parturition for 691 cows on 31 farms in central Waikato. Those target groups for which improved management strategies will lead to a reduced rate of induction have been identified. The high proportion of 3 y old cows must make this age group a key target for development of practices and treatments which will reduce the need for induction of parturition. Further analyses of the perceived advantage of inducing that one-third of the cows which were late inductions, i.e., within 30 days of normal parturition is also required. It is unlikely that many cows in this group will achieve a calving to 1st service interval of sufficient brevity to confer major benefits from using the procedure.

This information will serve as the basis for analysis of economic aspects of the practice of induction of parturition. The costs associated with procedures and management systems which reduce the need for inductions (e.g. strategic treatment of anoestrus and strategies for the management of carry-over cows) will need to be compared against the costs of induction. These analyses will form the basis of an extension programme across the dairy industry with the aim of achieving a substantial reduction in the induction rate. This programme will contribute to the continued promotion of the industry as sensitive to dairy cow welfare.

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