

# Therapeutic induction of parturition in beef heifers to aid in the prevention of dystocia

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This report details the therapeutic use of dexamethasone sodium phosphate induction of parturition in a herd of beef heifers to aid in the prevention of dystocia.

## Introduction

Majority of the calf deaths (64%) with 96 hours of calving are due to dystocia, resulting from malpresentation or foeto-pelvic disproportion [1]. With a higher rate of dystocias having been reported in primiparous (heifer) animals when compared to multiparous animals [2]. Beef herds with a high incidence of dystocia associated with mismating can have significant economic consequences due to calf losses, veterinary cost associated with intervention and the effects on the dam [1, 3].

Having appropriate joining records and/ or pregnancy testing results may assist beef operators to predict the timing of calving of the herd. This in turn enables labour to be concentrated to allow availability of appropriate personnel to assist any heifers or cows with. Early intervention and obstetrical assistance may prevent up to 50% of calf losses [4].

In herds that are experiencing a large number of dystocias, the practice of induction of parturition may be applied for therapeutic and economic reasons. Administration of a long acting corticosteroid mimics the normal hormonal events that occur under natural circumstances and results in the reduced gestational period of the cow. [5]. The timing of induction and type corticosteroids used to induce parturition greatly influences the chance of survival of the calf [6, 7]. Most studies regarding the induction of parturition with corticosteroids involve cattle of 211 days gestation or more [6, 8-16]. Some studies have shown there to be an increased risk of retention of foetal membranes, high calf mortality rates and reduced calf vigour and ability to thrive [6, 17]. However other studies have not found a significant effect of induction with a corticosteroid on the rate of retained foetal membranes, reproductive performance [16, 18] or the growth performance of calves [18].

## Case report

The clinical cases of dystocia occurred on a beef property in Northern Victoria. A herd of 32 rising 2 year old pregnant Poll Hereford heifers, weighing approximately 400kg in bodyweight, were due to be calving in the spring over an 8 week period. The heifers were joined with a Poll Hereford bull with an unknown estimated breeding value (EBV) for calving ease. The bull was chosen to join this group of heifers, because the previous year

the bull joined a group of mature cows and these cows' calved without intervention.

The first heifer in this calving group calved naturally and unassisted however the calf was stillborn with evidence of protracted calving. The following 9 heifers to calve required intervention due to foetopelvic disproportion. Of the 9 that required intervention, 3 were assisted by the farm managers, 4 required veterinary assistance (1 dead bull calf and 3 live heifer calves) and 2 required caesareans (1 live bull and 1 live heifer calf).



Due to the high percentage of calving requiring assistance, induction of the remaining heifers was deemed necessary for their welfare and that of the unborn calves.

The aim of inducing was to and reducing calving assistance rate and maximizing calf survival. Heifers selected for induction were within 4 weeks of calving. The heifers were examined to determine the size of their pelvis and calf (via rectal palpation), as well as the degree of mammary development

The heifers were examined and the heifers with a sufficiently large pelvic size, large calf and significant mammary development were selected for induction. The heifers were induced by single intramuscular injection of 20mg of dexamethasone sodium phosphate. The heifers were monitored closely (checked every 3 hours) and obstetrical assistance was provided when required. The first batch of heifers induced consisted of 11 heifers and 8 days later a second batch of heifers were induced, consisted of 7 heifers. One heifer that was not induced required veterinary assistance calving between the two batches of induced heifer. This heifer had a live bull calf. Results presented in table 1 below.

90.9% (n= 10) of the heifers that were not induced required assistance to calve (by farm manager or veterinary) where 44.4% (n=8) of the induced heifers required assistance to calve (Table 1). Both groups of heifers (total induced and total non-induced heifers) had one calf death and one heifer from the induced group had retained foetal membranes (Table 2). The overall mean calving time for the 18 induced heifers was 43 hrs  $\pm$  13.84 hrs (Table 2), with a range of 12 - 64.5hrs.

No illness was reported in the group of induced heifers following parturition. One non-induced heifer developed a mild surgical wound infection following a caesarean and subsequently made a full recovery.

Table 1. Effects of induction of parturition using 20 mg of dexamethasone in 18 Hereford heifers

Heifer identification	Time from induction to parturition (hrs)	Calving assistance	Calf viability and sex if recorded
G131	12	Yes	Alive
G168	19	No	Alive
G166	30	Yes <sup>b</sup>	Alive-F
NT	33	Yes	Alive
G180	35.5	No	Alive
G140	37	Yes	Alive
W863	39.5	Yes	Alive
G212	41.5	Yes	Alive
G175	42.5	No	Alive
G155	48.5	Yes	Alive
G193 <sup>c</sup>	64.5	No	Alive
1130	53	No	Alive
1224	48	No	Alive
1170	54	No	Alive
1137	48	No	Alive
1199	50	Yes <sup>b</sup>	Dead-M
1221	56	No	Alive
1194 <sup>c</sup>	62	No	Alive

<sup>a</sup> Calving assisted: was defined as the requirement to provide correction and traction to deliver a calf

<sup>b</sup> Veterinary assistance was required

<sup>c</sup> Heifer considered to have not responded to the induction (calved > 60hrs post treatment)

Table 2. Summary of herd history of the heifers that were not induced and those heifers that were induced

Measurement	Non-induced heifers	Induced heifers
Number of heifers (n)	11	18
Responded to calving induction <sup>a</sup> (n)	-	16
Mean calving time (hrs)	-	43 $\pm$ 13.84
Calved unassisted (n)	1	10
Calving assisted- manual correction and/or traction <sup>b</sup> (n)	8 <sup>c</sup>	8 <sup>d</sup>
Calving assisted – Caesarean (n)	2	0
Calf viability (n- alive)	10	17
Retained foetal membranes <sup>b</sup> (n)	0	1
Dam sickness	1	0

<sup>a</sup> Responding to calving induction: was defined as calving within 60 hours dexamethasone treatment

<sup>b</sup> Retained foetal membranes: membranes were considered to be retained if they were still present after 36hrs of calving

<sup>c</sup> Four heifers required veterinary assistance to deliver the calf

<sup>d</sup> Two heifer required veterinary assistance to deliver the calf

## Discussion

A single intramuscular injection of 20mg of dexamethasone sodium phosphate is a common induction protocol used in beef heifers. In this case study, 88.9% (n=16) of heifers were considered to have responded to the dexamethasone treatment (calving between 15 and 60 hours post induction). These findings are consistent with previous studies. This protocol has been shown to have a success rate of 81.1% [18] and 95.3% [4]. Although Barth et al. (1978) found that this protocol have a higher rate of failure to respond to treatment when compared to other protocols [19]. Bellows, Patterson [4], considered that heifers and cow that calve greater than 60 hours post injection animals that had failed to respond to calved naturally. In this report 11.1% (n=2) were thought to have calved naturally.

The mean time between induction of parturition and the heifers calving was 43hrs  $\pm$  13.84 hrs. This time interval was greater than Bellows, Patterson [4] study where the mean time interval was 39.4 hours and less than LaVoie, Winter [18] study where the mean time interval was 52.5hrs  $\pm$  3.1 hrs. However the results were similar to that of Ottobre and Inskeep [16] and Barth, Adams [19], 43.6hrs  $\pm$  3.5hrs and 47.7hrs  $\pm$  1.52hrs, respectively.

On this farm 44% (n=8) of induced heifers required assistance. The heifers were assisted if they were in labour for greater than 6 hours or were showing obvious signs of poor progress. This assistance rate was slightly lower than that reported by

Barth, Adams [19] and much higher than that of the Bellows, Short [3] and Ottobre and Inskeep [16], 54.2%, 11% and 0%, respectively. In this case report, the presentation of the calves during parturition and the sex of the calves was not recorded. Bellows, Short [3] however, reported that male calves were more commonly associated requiring assistance to be delivered. Bellows et al also found that the presentation of the calf at calving was not a significant factor for animals requiring assistance.

MacDiarmid [17] suggests that calf viability can be significantly affected through the practice of induction of parturition. In the current case study, calf viability was very high, 94.4%, with only one male calf being delivered dead via assistance. Bellows, Short [3], Ottobre and Inskeep [16] and Barth, Adams [19] reported high calf viability rates, recording zero calf deaths.

In the case study 5.5% (n=1) of heifers had retained foetal membranes- defined as still present after 36 hours post-partum. This rate was lower than that found by Barth, Adams [19], Ottobre and Inskeep [16] and Bellows, Short [3], where 33.3%, 33.3% and 42.4%, respectively, of heifers retained foetal membranes after 36 hours. In the study by Barth, et. al (1978) all heifers were treated with a single dose of penicillin.

In conclusion, the practice of therapeutic induction of parturition using 20mg of dexamethasone sodium phosphate intramuscularly was very successful in reducing the number of heifers presented for veterinary intervention, achieving high calf viability rates and was associated with a minimal incidence of retained foetal membranes. Therefore this practice may be appropriate to use in situations where mismating has occurred in heifers.

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