The behaviour of calves tail docked with a rubber ring used with or without local anaesthesia

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ABSTRACT

This study monitored the behaviour of calves docked with a rubber ring with or without local anaesthesia. Forty five 3 to 4 month old Friesian heifer calves were divided equally into three groups *viz* control (C), docked using rubber ring (R) and docked following local anaesthetic (L). After treatment the calves were returned to a paddock where their behaviour was monitored continuously for 5 hours with scan sampling every 10 minutes. Standing, walking, grazing and ruminating behaviours were similar in the 3 groups. Within 30 minutes of the treatment tail shaking, and vocalization occurred in 10 and 5 R calves and of them 2 calves continued to tail shake and vocalise for a further 60 minutes. Tail shaking and vocalisation occurred in 7 and 5 of the L calves respectively at 150 minutes. Two of these calves vocalised at 180 minutes and one at 210 minutes following treatment. C calves did not shake their tails or vocalise. These observations suggest that mild distress was experienced by approximately two thirds of docked calves.

Keyword: tail docking; calves; rubber ring; behaviour; local anaesthesia.

INTRODUCTION

Tail docking of dairy cows is a common farming practice in New Zealand. The usual method of docking involves placing a rubber ring on the tail. The tail distal to the ring becomes ischaemic and dies and it may be cut off after 7 days. Although the responses of farm animals to apparently stressful husbandry procedures have been assessed by many biological parameters as yet there is no single reliable index of distress and it is recommended that several types of responses be monitored (Dawkins, 1980). A change in behaviour is often the first indication that an animal may be experiencing distress (Dawkins, 1980). Surgical tissue removals such as tail docking (Mellor and Murray, 1989; Molony *et al.*, 1993) have been associated with obvious behavioural signs of distress, behaviours which were probably induced by pain and could therefore assist in the identification of animals experiencing pain.

Wilson (1972) reported that cows were unconcerned by the presence of rings on their tails and continued to graze normally. Six hours after ring placement tail movements were greater in those cows with rings than in the controls but no exaggerated signs of pain or discomfort were observed in any cow after the application of a rubber ring.

The aims of the present study were to determine if any behavioural changes could be observed after the application of a rubber ring in three to four month old calves and to determine if the administration of an epidural local anaesthetic, designed to eliminate pain, modified these behaviours.

MATERIALS AND METHODS

Animals

Forty five female Friesian dairy calves, three to four months of age, scheduled for tail docking in accordance with the then usual farm practice were used in this study. On each of three experimental days the behaviour of 15 calves, five from each treatment, were monitored from 8.30 a.m until 1.30 p.m.

On the day of the study the calves were brought into a shed at 6.30 a.m., allocated to a treatment and sprayed with a number for individual identification. Those calves allocated to the local anaesthetic treatment were also clipped along the first three caudal vertebrae to enable hygienic epidural anaesthesia administration. Immediately after treatment (8.15 a.m.) the calves were walked as a group along a 50m race to the observation paddock. The observation paddock (20m x 35m) allowed *ad libitum* access to grass and water.

Treatments

The calves were allocated randomly to one of three treatment groups (n=15). **Control (C):** calves were handled as if for tail docking but were not docked. **Rubber ring (R):** calves were handled and a rubber ring was applied to each tail, at least 2.5cm below the level of the vulva. **Local anaesthetic plus ring (L):** an epidural local anaesthetic (3ml lignocaine hydrochloride) was administered between the first and second coccygeal vertebrae 10 minutes prior to the application of a rubber ring.

Behaviour Measurements

Instantaneous scan sampling of each animal was carried out every 10 minutes for 5 hours after calves returned to the paddock and recorded on data sheets which specified the following behaviours: ***Standing:*** calves standing still or walking. ***Grazing:*** calves grazing while standing still or walking. ***Ruminating:*** calves ruminating while standing or lying. ***Tail shake:*** seen as intermittent and vigorous movements of the tails. ***Vocalisation:*** any bawling made by the calves. ***Posture:*** standing and lying postures were noted. e.g. whether or not the calves were lying in sternal or lateral recumbency. ***Restlessness:*** the number of times a calf stood up and lay down; each instance scored included both standing up and lying down.

Continuous behaviour recording of the calves were carried out for 5 hours after treatment.

Presentation of Results

For each group the percentage (standing, grazing, ruminating) or number (tail shaking, vocalising) of animals exhibiting a behaviour was summed for 3 successive scan samples (30 minutes) and the mean calculated. The number of bouts of tail shaking, vocalisation and restlessness was determined for each 30 minute period. Bouts were separated by at least one minute of inactivity.

RESULTS

No between day differences in behaviour were detected and so the results from the three experimental days were pooled. Standing and grazing predominated in all three groups during the first three hours of observation with over 90% of calves engaged in these behaviours during the first hour. The percentage of calves engaged in these behaviours and in rumination were similar throughout the 5 hour observation period.

During scan sampling, tail shaking was seen in 10 of the 15 R calves during the first 30 minute period after treatment (Figure 1a). Thereafter, two of these 10 calves displayed the behaviour intermittently for a further 60 minutes. In R calves the frequency of tail shaking was highest during the first 30 minutes after application of the rubber ring (Table 1). Five of the 10 calves which tail shook also vocalised during the first two hours after treatment (Figure 1b). Two of the calves which tail shook and vocalised were seen to kick up their hind legs and attempt to bite their tails, behaviour not seen in C calves. Restlessness was observed in the R but not the C calves. The five R calves which tail shook and vocalised stood up and lay down repeatedly during the first hour after treatment (Table 1) and were observed to walk in a zigzag manner while the majority of the other calves were grazing.

All L and C calves behaved similarly during the first 1.5 hours after treatment. Thereafter, five of the L calves began pacing and repeatedly standing up and lying down (Table 1). Tail shaking and vocalisation were first observed in L calves two and a half hours after treatment (Figure 1). Seven of these calves tail shook and 4 also vocalised. One of the L calves attempted to bite at its tail one and a half hours after application of the rubber ring. Tail shaking was seen in one C calf when another calf sniffed at its perineal region. C calves neither vocalised nor were they restless.

FIGURE 1: The number of calves observed per 30 minutes (three successive scan samples) (a) tail shaking and (b) vocalising after control handling (C) and docking by rubber ring (R) with or without local anaesthesia (L).

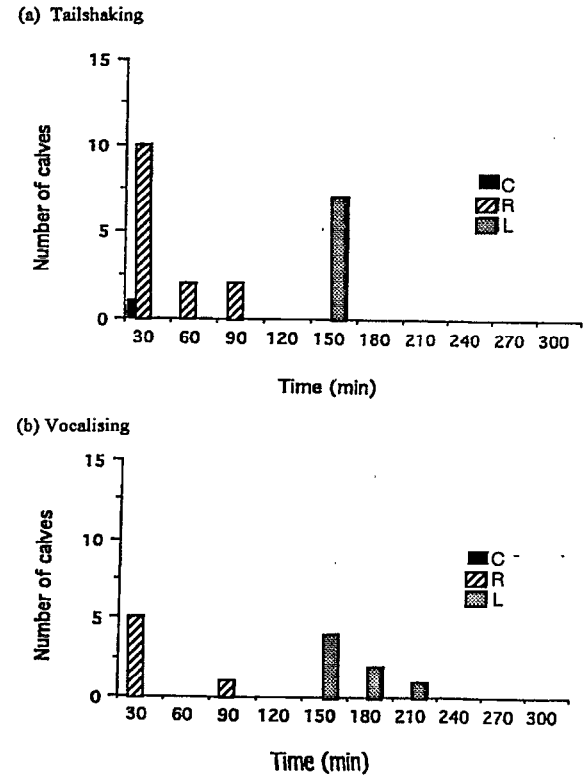

TABLE 1: The number of bouts every 30 minutes of tail shaking (TS), vocalisation (V) and restlessness (RS) in calves after control handling (Control) or rubber ring (Ring) application to the tail with or without local anaesthesia (LA + Ring)

Time	Control			Ring			LA + Ring		
(min)	TS	V	RS	TS	V	RS	TS	V	RS
30	3			45	12	12			
60				15		7			
90				18	7				
120									
150							34	5	4
180								12	6
210								3	3
240									2
270									
300									

DISCUSSION

The present study has shown that, (1) tail docking with a rubber ring elicits an immediate behavioural response in 67% of calves and (2) the administration of a local anaesthetic prior to the application of the rubber ring inhibited this response for about two and a half hours.

About 67% of calves docked with a rubber ring exhibited behaviours (tail shaking, vocalising, restlessness) not seen in control calves. These behaviours probably indicated discomfort and pain due to the pressure of the ring or the onset of ischaemic tissue damage. In the R calves these behaviours stopped after 90 minutes probably because at that stage blood flow to and from the tail had ceased along with afferent nerve discharges rendering the tail insensitive (Paletta et al., 1960).

The same sequence of physical events would presumably have occurred in the tails of the L calves. This raises the question of why L calves exhibited similar behaviours to the R calves after 2 hours when the local anaesthetic was expected to have worn off. Epidural anaesthesia results in desensitization of the area of the tail and croup (Hall, 1971). In a previous trial when the effectiveness and duration of epidural anaesthesia was tested by pin-pricking the tail (Petrie, 1994), it was found that in calves given an epidural anaes-

thetic before ring placement, the tail distal to the ring did not regain sensitivity to pin-prick within 8 hours after ring placement. The behaviour seen after 2 hours in the L calves may have been due to irritation caused by the local anaesthetic wearing off or to a return of sensitivity in the area immediately beneath or cranial to the ring or a return of sensitivity in the deeper tissues of the tail not detected by the pin-prick test. A further treatment group with calves that had only a local anaesthetic administered would have determined if the sensation due to the local anaesthetic wearing off caused the behaviours observed in the L calves.

It is difficult to quantify the degree of distress being experienced by animals. The observation that feeding and ruminating behaviour were similar in all three groups would suggest that the distress was not too severe but the distinct behaviours (vocalisation, tail shaking) in treated calves suggests that the experience does cause some distress. The tentative conclusion from this study is that tail docking by rubber ring caused mild distress to some calves which lasted for about two hours. This conclusion is supported by the quite minor changes in plasma cortisol levels seen in calves docked by the rubber ring (Petrie, 1994).

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