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Clinical characteristics of recumbent cows with varying duration of recumbency

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Abstract

Recumbency in dairy cattle has multifactorial condition in which prognosis largely depends on the duration of recumbency and quality of nursing care. This study documented the signalment profile and clinical presentation of recumbent dairy cows with varying durations of recumbency. Eighteen recumbent cows presented to the large animal outpatient unit of the Veterinary Clinical Complex and Department of Veterinary Medicine, VCRI, Orathanadu and recumbent cows were categorized into three groups based on duration of recumbency as Group A (2-5 days), Group B (6-10 days) and Group C (> 10 days), with six animals in each group. Jersey crossbred cows predominated among cases followed by Holstein Friesian crossbreds and non-descript cattle, with most animals being multiparous and in early lactation. Prolonged recumbency was associated with progressive deterioration in clinical status, characterised by a shift from good to fair or poor body condition, development of decubital ulcers and maggot infested wounds, altered mentation and higher frequency of non-alert animals in Group C. Lateral recumbency and abnormal postures such as opisthotonus were more common in cows recumbent for more than 10 days. Respiratory rate was significantly increased in prolonged recumbency. The findings highlight the cumulative impact of prolonged recumbency and emphasise the need for early recognition and intensive nursing within the first 5 days to limit secondary complications and improve recovery.

Keywords: Cow, recumbency, bed sore, postpartum complication

Introduction

Recumbency in cattle arises from a wide range of primary disorders including metabolic deficiencies, abdominal dysfunction, musculoskeletal trauma, infectious conditions such as mastitis and metritis and various neurological diseases (Burton *et al.*, 2009; Sivaraman *et al.*, 2019) [2, 15]. Earlier, the term down cow was used to describe a bright and alert recumbent animal of one day duration (Eddy, 2004) [3]. Malmo *et al.* (2010) [9] subsequently characterised the downer cow as an animal in which pressure induced tissue damage and associated pathology develop secondary to sustained recumbency. Fenwick *et al.* (1986) [5] further distinguished alert recumbent cows with musculoskeletal injury, nerve paresis or spinal cord compression from non-alert cows in which recumbency is associated with metabolic derangements, systemic inflammation or sepsis and neuroinflammatory lesions of the brainstem and cerebral cortex. Although recumbency may result from diverse primary aetiologies, the secondary damage that develops with increasing duration of recumbency is often difficult to manage and worsens the prognosis. Reshma and Unnikrishnan (2024) [11] highlighted that prolonged recumbency in cows predisposes to extensive muscle and nerve injury owing to sustained pressure from the animal's own body weight on dependent muscles and the consequent development of compartment syndrome secondary to venous engorgement and impaired lymphatic drainage. They further observed that decubital ulcers along with trauma to muscles, nerves, bones, joints and tendons markedly exacerbate pain and complicate clinical management. In this context, the present study documented the distribution of breed, age, parity and production status in recumbent cows over prolonged periods of recumbency and evaluated how extended recumbency contributed to progressive deterioration in clinical

signs and development of severe secondary lesions in animals that had already been treated for the primary cause but were subjected to inadequate management and nursing care.

Materials and Methods

The study was carried out in the large animal outpatient Medicine unit of the Veterinary Clinical Complex and Department of Veterinary Medicine, Veterinary College and Research Institute, Orathanadu. A total of 18 recumbent cows that failed to respond to initial treatment were enrolled. These animals were further categorized into three groups each six based on the duration of recumbency as Group A (2-5 days), Group B (6-10 days) and Group C (more than 10 days). A structured questionnaire was prepared to collect and record information on breed, age, parity and physiological status at the onset of recumbency (lactating, dry or pregnant), calving history (date of calving and whether eutocia or dystocia occurred), post-parturient complications (retained fetal membranes, mastitis, metritis or calving paralysis) and details of previous treatments along with their outcomes.

All the selected recumbent animal were subjected to a comprehensive clinical examination, which included assessment of mental status, body posture, type of recumbency (sternal or lateral) and vital parameters such as rectal temperature, heart rate, respiratory rate and conjunctival mucous membrane. Additional observations were made on feeding behavior, fecal voiding pattern and attempts to rise

(alert or non-alert). The skin and coat were also examined for the presence of bed sores, decubital ulcers and maggot infestation as described by Roussel (2018) ^[12]. Further, neurological evaluation was performed in a systematic manner to assess cranial nerve function and spinal reflex activity. Examination of spinal nerves included assessment of withdrawal, patellar, perineal and panniculus reflexes as well as cranial nerve function following the guidelines of Roussel (2018) ^[12] and Simpson *et al.* (2019) ^[14]. One way ANOVA was performed to check the relationship of vital parameters between the different duration of recumbency in cows.

Results and Discussion

This study aims to report the incidence and deterioration of clinical status of dairy cows based on the duration of recumbency irrespective of their primary Etiology for recumbency (Table 1). Across all groups, recumbency was most frequent in Jersey crossbreds (N=13), followed by Holstein Friesian crossbreds (N=3, one per group) and non-descript cattle (N=2, in Groups IIA and IIB). Most affected cows were 6-10 years old and this age class predominated in all recumbent groups, in agreement with Beder *et al.* (2020) ^[1] who noted higher risk in cows over 7 years and Thamizharasi *et al.* (2023) ^[16] who reported increased no. of recumbency during summer season in Jersey crossbreds, particularly at 6-8 years of age.

Table 1: Distribution of recumbent cows according to breed, age, sex, number of calvings, productive status and treatment history across different durations of recumbency

S. No	Parameters	Group A (N=6)	Group B (N=6)	Group C (N=6)
1.	Breed			
	Jersey Cross	4/6	4/6	5/6
	Holstein-Friesian Cross	1/6	1/6	1/6
	Non-descript	1/6	1/6	
2.	Age			
	3-5 years	1/6	1/6	1/6
	6-10 years	5/6	4/6	3/6
	>10 year		1/6	2/6
3.	Sex			
	Female	6	6	6
4.	No. of Calving			
	1 Calving	1/6	3/6	2/6
	2-3 Calving	2/6	1/6	1/6
	4-5 Calving	3/6	2/6	3/6
5.	Productive status			
	Pregnant	1 (7 month) /6		
	lactation	4/6	5/6	6/6
	Dry	1/6	1	
6.	Previous treatment			
	Yes	5/6	4/6	6/6
	No	1/6	2/6	

Where, Group A (2-5 days of recumbency; N=6), Group B (6-10 days of recumbency; N=6), Group C (>10 days of recumbency; N=6).

Tereso and Martens (2014) reported that recumbency was more common in multiparous cows (5-7.5 percent). In this study, cows with 4-5 calvings predominated among cases, followed by those with 2-3 calvings, while primiparous animals were least affected. In line with earlier reports that most downer cows were lactating (Green *et al.*, 2008; Labonte *et al.*, 2018; Beder *et al.*, 2020) ^[6, 8, 1], the majority of affected animals here were in early lactation, with only one late-

pregnant cow and few dry cows. Most cases had also received treatment before referral. Prolonged recumbency (2-30 days) has been associated with emaciation with severe dehydration, weakness, anemia and anorexia. While fecal and urine voiding were normal in all groups, all Group A cows in the current study had normal appetites, only one animal each in Groups B and C displayed moderate hyporexia and one cow in Group C was anorectic.

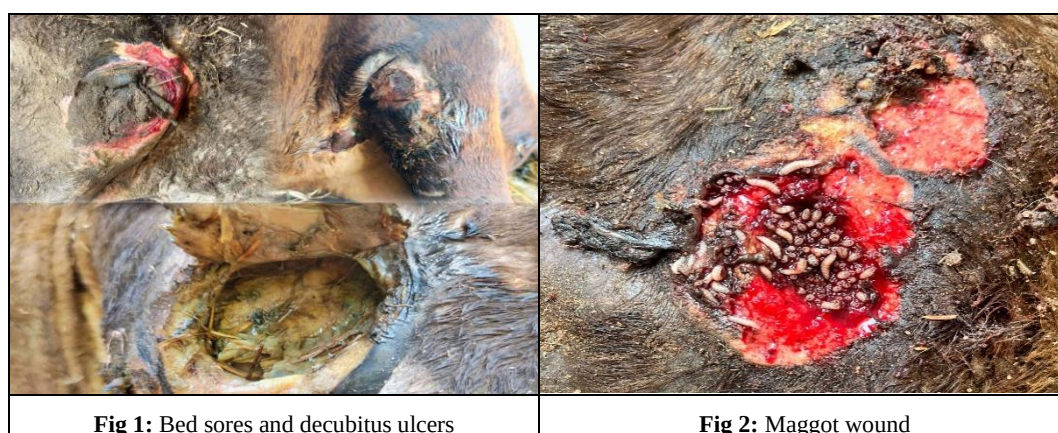
Table 2: Distribution of clinical signs and behavioral changes in recumbent cows across different durations of recumbency

S. No	Parameters	Group A (N=6)	Group B (N=6)	Group C (N=6)
1.	Bed sore or Decubitus ulcer			
	Present		1/6	4/6
	Absent	6/6	5/6	2/6
	Maggots			2/6
2.	Feeding			
	Normal	6/6	5/6	4/6
	Hyporectic		1/6	1/6
	Anorectic			1/6
3.	Defecation			
	Normal	6/6	6/6	6/6
4.	Urination			
	Normal	6/6	6/6	6/6
5.	Behavior			
	Normal	6/6	6/6	4/6
	Depressed			1/6
	Stupor			1/6
6.	Expression			
	Alert	6/6	6/6	2/6
	Non-alert			4/6
7.	Bodily condition			
	Good	5/6	2/6	
	Fair	1/6	4/6	3/6
	Poor			3
8.	Recumbency			
	Sternal	5/6	5/6	2/6
	Lateral	1/6	1/6	4/6
9.	Posture			
	Normal	6/6	6/6	3/6
	Opisthotonus			2/6
	Lateral kink of neck			1/6
10.	CMM			
	Pink & moist	3/6	4/6	1/6
	Congested	3/6	2/6	1/6
	Pale & moist			3/6
	Blanched			1/6

Where, Group A (2-5 days of recumbency; N=6), Group B (6-10 days of recumbency; N=6), Group C (>10 days of recumbency; N=6).

In this study behaviour was normal in all cows in Groups A and B and in four cows in Group C, whereas two Group C animals were depressed and two were stuporous (Table 2), similar to the mild to moderate depression in recumbent cows reported by Tharwat *et al.* (2025) [17]. All cows in Groups A and B were alert but only two in Group C were alert and four were dull. Body condition was mainly good in Group A (5/6), while most cows in Groups B and C were in fair to poor condition, supporting the observation of Beder *et al.* (2020) [1] that poor body condition increases the risk of recumbency. Sternal recumbency was predominately in Groups A and B, whereas lateral recumbency and abnormal postures such as

opisthotonus and lateral neck deviation were more frequent in Group C. Distribution of clinical signs and behavioral changes in recumbent cows across different durations of recumbency was showed in Table 2. Decubital ulcers and bed sores were recorded in 4 of 6 animals in Group C and in 1 animal in Group B, while the remaining animals were unaffected (Figure 1). Where, two of the animals in group C had maggots on their wounds (Figure 2). All animals in Groups A and B maintained a normal posture, whereas in Group C three animals were normal, two exhibited opisthotonus (Figures 3a and 3b) and one showed lateral deviation of the head (Figure 4).

**Fig 1:** Bed sores and decubitus ulcers**Fig 2:** Maggot wound



Perineal and panniculus reflexes were consistently present in Groups A, B and C, indicating preserved sacrum and thoracolumbar segmental function and making a complete spinal cord lesion caudal to the thorax unlikely. Withdrawal and patellar reflexes were normal in Groups A and B, whereas Group II C showed a mixed pattern with predominantly normal to exaggerated responses and a few reduced to absent, with opisthotonus-associated cases showing clearly exaggerated reflexes, compatible with a mainly upper motor

neuron effect and occasional lower motor neuron or neuromuscular involvement, probably due to pressure-induced ischemic myopathy, femoral/sciatic neuropathy or electrolyte imbalance (Fecteau *et al.*, 2017; Simpson *et al.*, 2019) [4, 14]. Cranial nerve function was generally normal (Roussel, 2018) [12], except for one Group II C animal that lacked menace and pupillary light reflexes with sluggish palpebral and corneal reflexes but retained normal ocular position, nasal stimulation, gag and tongue retraction reflexes.

Table 3: Mean $\pm$ SE values of vital parameters in healthy and recumbent cows at different durations of recumbency

S. No	Parameters	Healthy animals	Group II A	Group II B	Group II C	F
1.	Body temperature ($^{\circ}$ C)	38.47 $\pm$ 0.21	38.38 $\pm$ 0.30	38.57 $\pm$ 0.17	38.57 $\pm$ 0.87	0.03 ^{ns}
2.	Heart rate (bpm)	86.33 $\pm$ 2.03	87.00 $\pm$ 5.58	91.00 $\pm$ 4.34	90.33 $\pm$ 7.11	0.21 ^{ns}
3.	Respiratory rate (bpm)	25.67 $\pm$ 2.33 ^a	37.67 $\pm$ 8.83 ^{ab}	42.00 $\pm$ 8.26 ^{ab}	59.33 $\pm$ 11.77 ^b	2.68*

Where, Group A (2-5 days of recumbency; N=6), Group B (6-10 days of recumbency; N=6), Group C (> 10 days of recumbency; N=6), $^{\circ}$ C-degree Celsius, bpm-beats per minute, Means bearing same superscript do not differ significantly otherwise significant between groups; NS-Not-significant ($p \geq 0.05$), * Significant at 5% level ($p \leq 0.05$), **-Significant at 1% level ($p \leq 0.01$).

Conjunctival mucous membrane colour differed between groups (Table 2). In Group A, three cows had pink moist CMM and three were congested; in Group B, four were pink moist and two congested; whereas in Group C only one cow had pink moist CMM, three were pale and one was blanched (Figure 5). Kumari *et al.* (2021) [7] similarly observed congested, normal and pale mucous membranes in recumbent cattle and related these changes to hemodynamic disturbance associated with prolonged recumbency and sepsis. In the present study, respiratory rate was significantly higher in Group C than healthy animals (Table 3). Body temperature and heart rate did not differ significantly between recumbent groups and controls. Beder *et al.* (2020) [1] reported hyperthermia, tachycardia and polypnoea as common but non-specific signs in downer cows, while Puerto-Parada *et al.* (2021) [10] described tachypnoea as a frequent finding

indicating respiratory compromise or a compensatory thermoregulatory response.

Conclusion

Recumbency was common in jersey crossbred cows aged 6-10 years of early lactating multiparous animals. Prolonged recumbency in dairy cows leads to progressive clinical decline characterized by emaciation with poor body condition, altered mentation and behaviour, conjunctival mucous membrane changes suggestive of systemic inflammation with anaemia and increased respiratory rate reflecting respiratory compromise secondary to prolonged recumbency. Although most animals were receiving treatment, the progressive worsening of clinical signs and development of severe lesions indicated inadequate management and nursing care of the recumbent cows prompt recognition and intervention with

good nursing management within the first 5 days are essential to minimise the consequences due to secondary complications and improve the likelihood of recovery.

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Conflict of Interest

Not available.

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