



International Journal of Veterinary Sciences and Animal Husbandry



ISSN: 2456-2912

NAAS Rating (2026): 4.61

VET 2026; 11(2): 544-546

© 2026 VET

www.veterinarypaper.com

Received: 23-11-2025

Accepted: 27-12-2025

B Karthikeyan

PG Scholar, Veterinary College
and Research Institute,
Orathanadu, Tamil Nadu, India

K Karthika

Assistant Professor, Department
of Veterinary Medicine,
Veterinary College and Research
Institute, Orathanadu, Tamil
Nadu, India

PK Ramkumar

Assistant Professor, Veterinary
Clinical Complex, Veterinary
College and Research Institute,
Orathanadu, Tamil Nadu, India

M Saravanan

Associate Professor and Head,
Department of Veterinary
Medicine, VCRI, Theni, Tamil
Nadu, India

M Veeraselvam

Assistant Professor, Department
of Veterinary Medicine,
Veterinary College and Research
Institute, Orathanadu, Tamil
Nadu, India

S Yogeshpriya

Assistant Professor, Department
of Veterinary Medicine,
Veterinary College and Research
Institute, Orathanadu, Tamil
Nadu, India

R Lakshmi

Assistant Professor, Veterinary
Clinical Complex, Veterinary
College and Research Institute,
Orathanadu, Tamil Nadu, India

Corresponding Author:

K Karthika

Assistant Professor, Department
of Veterinary Medicine,
Veterinary College and Research
Institute, Orathanadu, Tamil
Nadu, India

Therapeutic use of hydroxyprogesterone in the management of acute spinal cord injury in a bull: A case report

**B Karthikeyan, K Karthika, PK Ramkumar, M Saravanan, M
Veeraselvam, S Yogeshpriya and R Lakshmi**

DOI: <https://www.doi.org/10.22271/veterinary.2026.v11.i2f.3068>

Abstract

A 4-year-old black, non-descript bull was presented to the Large Animal Medicine Unit, Veterinary Clinical Complex, Veterinary College and Research Institute, Orathanadu, with a history of acute lateral recumbency and generalized stiffness. Clinical examination revealed dullness and congested mucous membranes, though vital parameters were within normal limits. Neurological evaluation indicated diminished thoracic reflexes and exaggerated pelvic limb reflexes, localizing the lesion to the cervical spinal cord (C6-T₂). Radiographic findings were unremarkable. The case was tentatively diagnosed as acute spinal cord injury. Initial treatment included antibiotics, corticosteroids, and methylcobalamin. From the third day, intramuscular hydroxyprogesterone was administered on alternate days. Marked improvement was observed, and by the seventh day, the bull was ambulatory without assistance. This case highlights the potential therapeutic role of hydroxyprogesterone in large animal neurology.

Keywords: Recumbency, spinal cord injury, hydroxyprogesterone, neurology

Introduction

Progesterone, traditionally recognized as a reproductive hormone, also functions as a neuroprotective steroid synthesized within the nervous system by glial cells and neurons (Guenoun *et al.*, 2014) [2]. Neurosteroids, including progesterone were involved in neuronal repair and regeneration through enzymatic steroidogenesis. In veterinary medicine, progesterone has been reported to support recovery in spinal cord injuries, particularly in dogs, due to its cost-effectiveness and minimal side effects compared to corticosteroids (Ramkumar *et al.*, 2023) [5]. This case report describes the clinical application of hydroxyprogesterone in the management of spinal cord injury in a bull.

Case Presentation

A 4-year-old black, non-descript bull was presented with lateral recumbency and generalized rigidity that began earlier the same day. The owner suspected trauma. On examination, the bull was dull with congested mucous membranes. Vital signs were normal. Neurologically, the animal was stuporous with an unstable head position, diminished thoracic reflexes, and exaggerated hindlimb reflexes. Hematology revealed neutrophilia and reduced LDH levels (Table 1 & 2). Tests for blood parasites were negative. Radiographs showed no skeletal abnormalities.

Based on neurological signs, the lesion was localized to the cervical spinal cord (C6-T₂). Neurological grading (modified from Scott, 1977) [6] categorized the bull as grade III. A presumptive diagnosis of acute spinal cord injury was made.

Treatment and Progression

Initial management included IV normal saline (2L), IV ceftriaxone-tazobactam (10 mg/kg), IM prednisone (0.5 mg/kg), IM ranitidine (2 mg/kg), and IV Methylcobalamin (60 mL). By the

second day, the animal could lift its head and eat, though it remained recumbent. A sling was used for support.

On day 3, hydroxyprogesterone (5 mg/kg IM) was introduced. The following day, the bull stood unsteadily. Hydroxyprogesterone was continued on alternate days. By day 7, the animal was able to walk independently.

Discussion

Spinal cord injuries (SCIs) in cattle may arise from trauma, infectious causes, metabolic disorders, or congenital anomalies. Neurological deficits vary based on lesion location, with C6-T₂ lesions typically causing reduced forelimb reflexes and exaggerated hindlimb responses (Simpson *et al.*, 2019) [7]. Secondary spinal damage—such as edema, demyelination, and ischemia—may exacerbate injury severity via inflammatory mediators (Thomas, 2021) [8]. Spinal cord injury (SCI) in cattle is relatively uncommon but carries significant clinical and economic implications. In the present case, neurological examination localized the lesion to the C6-T₂ spinal cord segments, as evidenced by diminished thoracic limb reflexes with exaggerated pelvic limb reflexes, consistent with lower motor neuron involvement at the level of the lesion and upper motor neuron signs caudal to it. The absence of radiographic abnormalities suggests a functional or compressive spinal cord insult without overt vertebral fracture. In large animal practice, where advanced imaging such as MRI is rarely feasible, systematic neurological examination remains the primary diagnostic tool. Early recognition and grading (modified Scott grading - Grade III) indicated preserved deep pain perception, supporting a guarded-to-favourable prognosis with prompt therapeutic intervention.

Hematological evaluation revealed leukocytosis ($17.4 \times 10^3/\mu\text{l}$) with neutrophilia (60%), suggesting an acute stress or inflammatory response, possibly secondary to trauma and tissue injury. The absence of eosinophilia and basophilia ruled out parasitic or hypersensitivity etiologies. Red blood cell count, hemoglobin, and packed cell volume were within normal limits, indicating that anemia or hemorrhagic shock was unlikely. Serum biochemical parameters were largely within reference ranges, supporting systemic stability. Blood urea nitrogen and creatinine were normal, excluding renal compromise. Liver enzymes (AST 86 U/L; ALP 258 U/L) were mildly elevated, which may reflect muscle injury or stress-related hepatic enzyme induction. Lactate dehydrogenase (LDH 675 U/L), although not markedly elevated, can be associated with muscle and tissue damage following trauma. Electrolyte levels, including calcium, phosphorus, and magnesium, were within normal limits, ruling out metabolic causes of recumbency such as hypocalcemia or hypomagnesemia (Weiss and Wardrop, 2010) [9]. Thus, clinicopathological findings supported a traumatic-inflammatory etiology rather than metabolic or infectious neurological disease.

The multimodal therapeutic approach likely contributed synergistically to recovery. Corticosteroid therapy may have reduced spinal cord edema and inflammatory mediator release during the early phase of secondary injury. Methylcobalamin could have supported neuronal repair and remyelination. The introduction of hydroxyprogesterone on day three coincided with marked clinical improvement, with progression from sternal recumbency to assisted standing and eventual independent ambulation by day seven. Progesterone's recognized neuroprotective properties including anti-inflammatory action, membrane stabilization, reduction of

lipid peroxidation, and promotion of remyelination may have played a pivotal role in limiting secondary neuronal damage and enhancing axonal recovery. Further controlled studies are warranted to validate its clinical efficacy and establish standardized treatment protocols.

Accurate neurological localization is key in large animals, though diagnostic imaging is often limited due to logistical and financial constraints (Achard *et al.*, 2017) [1]. CSF analysis, though helpful, was not possible in this case due to the bull's temperament.

Therapeutic protocols typically involve anti-inflammatory agents, antimicrobials, and vitamin supplementation (Ramkumar *et al.*, 2023) [5]. Corticosteroids like prednisone are effective in reducing inflammation and secondary nerve damage (Lu *et al.*, 2016) [3]. Methylcobalamin has been used for neural regeneration and myelin repair (Nishimoto *et al.*, 2015) [4].

Recent studies suggest that neuro-steroids, particularly progesterone, have regenerative and neurotrophic effects, promoting remyelination and axonal regrowth (Ramkumar *et al.*, 2023) [5]. The favourable response observed in this bull supports the neuroprotective role of progesterone in managing spinal cord injuries.

Table 1: Haematological parameters of the bull affected with spinal cord injury

Hematology parameters	RBC $10^6/\mu\text{l}$	HGB (mg/dl)	PCV %	WBC $10^3/\mu\text{l}$	N %	M %	L %	E %	B %	Platelet /cmm
	7.92	13.7	40.9	17.4	60.8	13.1	31.9	0	0	4,05,000

Table 2: Serum bio-chemical parameters of the bull affected with spinal cord injury

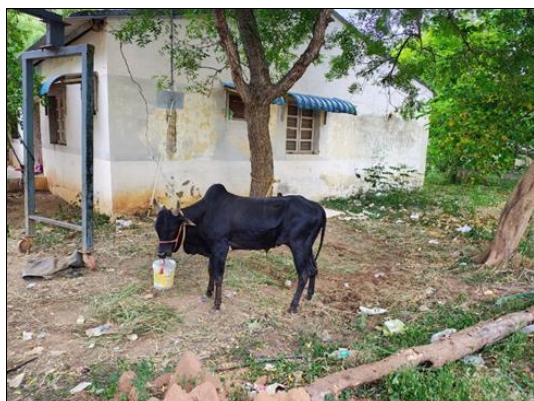
S. No.	Serum biochemical profile	
1	BUN (mg/dl)	22
2	Creatinine (mg/dl)	1.59
3	Glucose (mg/dl)	87
4	Total protein (g/dl)	6.32
5	Albumin (g/dl)	3.12
6	AST (U/L)	86
7	ALP (U/L)	258
8	LDH (U/L)	675
9	Calcium (mg/dl)	10.4
10	Phosphorus (mg/dl)	3.58
11	Magnesium (mg/dl)	1.93



Day 2: of presentation - sternal recumbency - animal supported with sling



Day 4: Post treatment- Animal could stand



Day 7: Post treatment - Animal could stand on its own and able to walk

Conclusion

This case demonstrates successful recovery from acute spinal cord injury in a bull using a multimodal approach, including hydroxyprogesterone. While advanced imaging is often impractical in large animals, clinical neurology and basic supportive care remain essential. Further research into the field application of progesterone for neurological disorders in large animals is warranted.

Conflict of Interest

Not available

Financial Support

Not available

References

1. Achard D, Steiner A, Meylan M. Neurological examination in ruminants: a review. *Veterinary Journal*. 2017;221:36-45. doi:10.1016/j.tvjl.2017.01.007
2. Guennoun R, Labombarda F, Gonzalez Deniselle MC, Liere P, De Nicola AF, Schumacher M. Progesterone and its metabolites as neuroprotective agents in CNS trauma and neurodegeneration. *Journal of Molecular Neuroscience*. 2014;54(3):366-377. doi:10.1007/s12031-014-0307-2
3. Lu J, Ashwell KW, Waite PM. Advances in corticosteroid therapy for spinal cord injury: Clinical relevance and translational potential. *Neuroscience Bulletin*. 2016;32(2):144-152. doi:10.1007/s12264-016-0012-1
4. Nishimoto S, Tanaka H, Fujita K, Nakamura S, Niimi H. Methylcobalamin: A potential treatment for peripheral

nerve degeneration and pain. *Current Neuropharmacology*. 2015;13(4):509-520.

doi:10.2174/1570159X13666150416221701

5. Ramkumar PK, Saravanan M, Vijayakaran K, Kamalesh SL, Abimanyu G. Medical management of acute spinal cord injury with aspiration pneumonia in a kid. *Indian Journal of Veterinary Medicine*. 2023;43(2):74-77.
6. Scott HW. Neurological grading of spinal cord lesions in dogs. *Veterinary Record*. 1977;101(14):288-290.
7. Simpson KM, Henthorn PS, Smith-Maxie L. Disorders of the bovine spinal cord. In: Smith RL, editor. *Large Animal Internal Medicine*. 5th ed. Elsevier; 2019. p. 1092-1097.
8. Thomas JA. Pathophysiology of spinal cord injury: Primary and secondary mechanisms. *Neurosurgical Focus*. 2021;50(1):E1. doi:10.3171/2021.1.FOCUS20793
9. Weiss DJ, Wardrop KJ, editors. *Schalm's veterinary hematology*. 6th ed. Wiley-Blackwell; 2010.

How to Cite This Article

Karthikeyan B, Karthika K, Ramkumar PK, Saravanan M, Veeraselvam M, Yogeshpriya S, *et al*. Therapeutic use of hydroxyprogesterone in the management of acute spinal cord injury in a bull: A case report. *International Journal of Veterinary Sciences and Animal Husbandry*. 2026;11(2):544-546.

Creative Commons (CC) License

This is an open-access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.