Scientia Review, Vol. 02(04), April 2026, pp. 26-29 ISSN: 3107-7919

Scientia Review

Website: www.scientiafoundation.in

POPULAR SCIENCE ARTICLE

Monday morning sickness in Horses

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Received: 14 April 2026
Revised: 16 April 2026
Accepted: 18 April 2026
Published online: 20 April 2026

Article ID: SR01111

Citation: Bhawsar, N., & Singh, A. (2026). Monday morning sickness in Horses. *Scientia Review*, 2(4), 26-29

Abstract

Monday Morning Disease often referred to as azoturia or exertional myopathy, is a significant exercise-associated muscular disorder affecting horses and generally appears during or soon after intense physical activity. The condition is frequently reported when horses are returned to heavy work following a rest period while continuing to receive energy-rich or grain-based diets. Clinically affected animals may show muscle rigidity, pain, excessive sweating, fatigue and unwillingness to move in more severe situations, the breakdown of muscle fibers releases myoglobin that can discolor the urine to a dark red or brown shade. The development of this disorder is influenced by several predisposing factors such as high carbohydrate feeding, poor physical conditioning, sudden increases in workload, electrolyte imbalances, inherited susceptibility and inappropriate feeding or management practices. From a pathogenic perspective the accumulation of glycogen in skeletal muscles followed by its rapid utilization during exercise leads to increased lactic acid production, metabolic imbalance and subsequent injury to muscle fibers. Effective management of the condition requires prompt rest, adequate fluid therapy, administration of anti-inflammatory drugs and proper dietary management, which together help in recovery and prevention of recurrence.

Keywords: Monday morning sickness, exertional rhabdomyolysis, azoturia, horse management, myoglobinuria.

Introduction

Morning Sickness in horses is a clinical condition in which animals develop muscle stiffness, fatigue, pain and cramping during or after exercise. The disorder occurs when the skeletal muscles experience metabolic disturbances associated with physical exertion, which results in impaired muscle function. In veterinary literature this condition is commonly described as exertional myopathy or exertional rhabdomyolysis (ER). Exertional myopathies include a group of muscle disorders triggered by exercise or strenuous physical activity. In many cases, these disorders lead to damage and necrosis of striated skeletal muscle fibers, a condition known as exertional rhabdomyolysis. Horses affected by this condition commonly show muscle rigidity, reluctance or inability to move, excessive sweating and an increased heart rate. In severe cases, the breakdown of muscle tissue releases myoglobin into the bloodstream, which may result in dark-colored urine (myoglobinuria).

Therefore, Monday Morning Sickness or exertional rhabdomyolysis, is now considered a syndrome rather than a single disease, encompassing multiple exercise-related muscle



disorders that share similar clinical manifestations but arise from different etiological and pathophysiological mechanisms.

Etiology of Monday Morning Disease

Monday Morning Sickness is a metabolic muscle disorder in horses that develops due to several nutritional, physiological and management-related factors that lead to damage of skeletal muscle during or after exercise.

1. Excess intake of carbohydrates

Feeding large amounts of grains or other non-structural carbohydrates increases glycogen storage in muscle tissue. During exercise, rapid breakdown of this glycogen produces metabolic by-products such as lactic acid which can contribute to muscle fatigue and fiber damage (Valberg, 2018).

2. Rest followed by intense work

If horses are rested but continue to receive energy-rich diets, glycogen levels in muscles rise. When strenuous exercise is suddenly resumed the altered muscle metabolism may trigger muscle cell injury and rhabdomyolysis (McGowan *et al.,* 2002).

3. Inadequate physical conditioning

Horses that are not regularly trained have lower muscular endurance and rely more on anaerobic energy pathways during work, which promotes lactic acid accumulation and increases the likelihood of muscle strain or injury (Hinchcliff *et al.*, 2013).

4. Abrupt increase in workload

A sudden rise in the intensity or duration of exercise without proper adaptation places excessive stress on muscle fibers and may lead to metabolic disturbances and structural muscle damage (Rivero & Piercy 2008).

5. Electrolyte imbalance

Minerals such as calcium, sodium, and potassium are essential for normal neuromuscular activity and muscle contraction. Deficiency or imbalance of these electrolytes can impair muscle function and predispose the animal to muscular disorders (Radostits *et al*., 2007).

6. Genetic susceptibility

Certain horses may have inherited variations in muscle metabolism or calcium regulation within muscle cells, which increases their vulnerability to exertional muscle disorders (Valberg, 2014).

7. Poor feeding and management practices

Improper feeding schedules, excessive concentrate diets, limited exercise, and deficiencies of nutrients like vitamin E and selenium may weaken muscle metabolism and increase the risk of this condition (Hinchcliff *et al.,* 2013).

Pathogenesis

Monday Morning Sickness usually develops when horses are fed a high-carbohydrate or grain-rich diet, which results in the excess accumulation of glycogen in skeletal muscles. When the animal remains at rest for a period with little or no exercise this glycogen continues to accumulate within the muscle tissues. If the horse is suddenly subjected to strenuous exercise after the rest period the stored glycogen is rapidly broken down to produce energy. This rapid metabolic activity leads to the excess formation of lactic acid, which disturbs the normal metabolism of muscle cells and reduces the effective oxygen supply to the muscle fibers. As a consequence, the muscle cells become damaged and undergo rhabdomyolysis, causing the release of myoglobin into the bloodstream. This ultimately results in clinical signs such as muscle stiffness, excessive sweating, pain, and dark-colored urine in the affected horse. This entire process can be easily understood with the help of a ray (flow) diagram.

High carbohydrate (grain) feeding
↓
Excess glycogen storage in skeletal muscles
↓
Rest period with little or no exercise
↓
Sudden strenuous exercise (work on next day)
↓
Rapid glycogen breakdown in muscle
↓
Excess lactic acid production
↓
Muscle metabolic disturbance & ↓ oxygen supply
↓
Damage to muscle fibers (rhabdomyolysis)
↓
Release of myoglobin into bloodstream
↓
Muscle stiffness, sweating, pain, dark urine

Clinical Signs of Monday Morning Disease

1. Muscle stiffness and pain

One of the earliest observable signs is rigidity of the skeletal muscles mainly affecting the back, loin, and hind limb regions. The discomfort develops because muscle fibers are damaged during exertion and metabolic waste products accumulate within the muscle tissue (Hinchcliff *et al.,* 2013).

2. Reluctance to move or stopping during work

Horses affected by this disorder may slow down, halt abruptly, or refuse to continue working. Movement becomes difficult since the injured muscles cannot contract normally and the animal experiences considerable pain (Radostits *et al.,* 2007).

3. Excessive sweating and discomfort

Animals commonly exhibit heavy sweating, restlessness, and visible signs of distress. These responses occur due to intense muscular pain and the metabolic imbalance associated with the condition (Valberg, 2018).

4. Hard and swollen muscles

The muscles located in the hindquarters and lumbar area may feel firm, tense, and slightly swollen when palpated. This change results from degeneration of muscle fibers and local inflammatory processes occurring during the disease (Hinchcliff et *al.*, 2013).

5. Abnormal or stiff gait

Affected horses often show a short and rigid gait, indicating difficulty in normal locomotion. In severe cases, the animal may remain stationary or avoid walking altogether because of pronounced muscle weakness and pain (McGowan *et al.,* 2002).

6. Dark-colored urine (myoglobinuria)

When muscle tissue breaks down, myoglobin is released into the bloodstream and later eliminated through urine. Consequently, the urine may appear dark red or brown, which is a typical sign of muscle damage (Radostits *et al*., 2007).

7. Elevated heart rate and respiration

Pain, stress, and metabolic disturbances frequently lead to increased pulse rate and faster breathing. These physiological changes represent the body's response to muscular injury and systemic strain (Valberg, 2018).

Treatment

Monday Morning Sickness is a serious muscular disorder in horses, therefore prompt treatment and proper care are essential as soon as symptoms appear. With appropriate management, the animal can recover more quickly and the chances of recurrence can also be reduced. The first and most important step is to stop the horse from work immediately and provide complete rest. Continued exercise can worsen muscle damage, so the affected animal should be kept in a calm and comfortable stall. Rest allows the injured muscles to recover gradually. During the disease process, the breakdown of muscle tissue releases harmful substances into the bloodstream. For this reason, adequate fluid therapy is important. Fluids help maintain proper hydration and assist the kidneys in eliminating waste products through urine.

To reduce pain and inflammation, anti-inflammatory drugs are commonly administered, such as Phenylbutazone or Flunixin Meglumine. These medications help relieve muscular pain and improve the comfort of the affected horse.

In some cases, the muscles become very tense and painful. Therefore, muscle relaxants or mild sedatives like Acepromazine may be used to reduce muscle stiffness and improve blood circulation in the affected muscles. Proper nutritional management is also an important part of treatment. High-grain or energy-rich diets should be reduced, and the horse should be provided with a balanced ration containing adequate roughage. Nutritional supplements such as vitamin E and selenium may help support muscle recovery.

After the horse begins to recover, it should not be returned to heavy work suddenly. Exercise should be reintroduced gradually with light activity at first, followed by a progressive increase in workload. Regular exercise and balanced feeding play an important role in preventing the recurrence of this condition.

Thus, timely rest, appropriate medication, adequate fluids, and proper dietary management together form the basis for effective treatment of Monday Morning Sickness.

Conclusion

Monday Morning Disease is an important exercise-related muscle disorder in horses that arises due to a combination of nutritional, metabolic, and management factors. The condition primarily develops when horses receiving high-energy diets are subjected to sudden strenuous exercise after a period of rest, leading to metabolic disturbances and damage to skeletal muscle fibers. Early recognition of clinical signs such as muscle stiffness, pain, sweating and dark-colored urine is crucial for prompt treatment and prevention of further complications. Effective management strategies including adequate rest, fluid therapy, anti-inflammatory medication, balanced nutrition, and gradual conditioning are essential for successful recovery. Proper feeding practices, regular exercise, and good stable management can significantly reduce the risk of this condition. Therefore, awareness and appropriate preventive measures are key to maintaining the health and performance of horses and minimizing the occurrence of Monday Morning Sickness.

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