

EXERTIONAL RHABDOMYOLYSIS

Aka Azoturia, Monday Morning Sickness, Tying Up

- Most common muscle disorder in horses
- A complex syndrome with multiple causes
- Can be sporadic or chronic
- Chronic form is a frequent cause of poor performance in Thoroughbreds, Warmbloods, Drafts, Standardbreds, Arabians, Morgans, Quarter Horses, Appaloosas, American Paints
- Clinical signs
 - Stiff, stilted gait
 - Excessive sweating, high pulse & respiration rates during or after exercise
 - Signs seen after only 15-30 minutes of light exercise
 - Following exercise, horse may stretch out as it needs to urinate
 - May become extremely reluctant to move hindquarters & in severe cases may show signs of colic or become unable to move
 - Attempts to move severely affected animals may result in extreme pain, anxiety, and worsening of the condition
 - Firm painful muscles may be palpated over the back & hind limb muscles
 - Myoglobinuria (coffee colored urine) is a classic feature of severely affected horses. This dark urine results from the kidneys filtering myoglobin (a muscle protein) from the blood
 - Sporadic tying up should be considered a veterinary emergency if horses are sweating profusely, reluctant to move, or have dark colored urine
- Etiology
 - Number of factors seems to precipitate episodes of exertional rhabdomyolysis
 - Some successful athletic horses have experienced 1 or 2 episodes over their lifetime suggesting that environmental influences may play a role
 - Other horses, particularly young fillies, may have repeated episodes compromising their ability to compete. This probably indicates an inherent muscle dysfunction.
 - Classically observed in horses that are in training who are rested one or more days while receiving their full carbohydrate ration. Also sudden increases in duration or intensity of training can cause an episode.
 - Incidence highest in hot weather
 - Altering the blood supply of working muscles has been implicated
 - Dehydration
 - Low sodium, low potassium or high phosphorous content in urine has been associated with recurrent exertional rhabdomyolysis
 - Decreased thyroid function at one time thought to be predisposing factor but subsequent studies have failed to confirm this
 - Herpes virus infection in some racing stables has been associated with a high incidence of the condition
 - In some horses an underlying abnormality of the skeletal muscle results in high occurrence of the disorder
 - Certain bloodlines or families of horses are suggested to suffer from higher incidence rates suggesting a genetic basis
 - Quarter horses & related breeds
 - Deficiency in skeletal muscle glycolysis
 - Biopsy shows abnormal levels of glycogen & polysaccharide
 - These horses have a history of calm disposition & exercise intolerance
 - These horses show a reduced capacity for exercise at high speed with up to a 50% reduction in maximum oxygen uptake
 - In horses with intermittent episodes of exertional rhabdomyolysis increasing the fat content in the diet & using

rice bran & eliminating grain may allow these horses to compete in pleasure & hunter classes

- Standardbreds & Thoroughbreds
 - Abnormalities in coupling of muscle excitation & contraction
 - Especially in young fillies that are highly excitable
 - Muscles from these horses with recurrent episodes seem to have prolonged muscle relaxation times following muscle contraction
 - Abnormalities in the regulation of calcium across the cell membrane has been postulated to cause cramping in these horses
- Diagnosis
 - Most cases diagnosed on animals history & clinical signs
 - Elevations in serum creatinine kinase, aspartate aminotransferase, & lactate dehydrogenase. All indicate muscle cell damage.
- Treatment
 - Aims of treatment for severely affected animals are to
 - Limit further muscle damage
 - Reduce pain
 - Restore fluid & electrolyte balance
 - Reduce chances of kidney impairment where myoglobinuria seen
 - Discourage further exercise
 - If circulatory system not compromised tranquilizers to relieve anxiety
 - Nonsteroidal anti-inflammatories to reduce pain (ie. Bute)
 - In horses with severe cases, must establish fluid balance & promote kidney function (ie. Balanced electrolyte solutions IV or by nasogastric tube)
 - Do not force horse to stand
- Control
 - Reduce carbohydrate content of diet & provide high quality hay & balanced vitamin & mineral supplement. Provide additional calories with fat supplement such as rice bran or corn oil
 - 1 or 2 ounces of sodium chloride added to ration
 - In hot humid climates also 1 or 2 ounces of potassium chloride to diet
 - Vitamin E/Selenium supplement but not scientifically justified
 - Once serum levels of enzymes return to normal, gradual increase in exercise from 5 minutes to 30 minutes of longing over a 3 week period to get back in training
 - Daily turnout or exercise
 - Medication to regulate excitation-contraction coupling of muscles
 - Tranquilizers
- Causes of rhabdomyolysis in horses can be exercise related or NOT
 - Exercise related type
 - Diet: excess carbohydrate, low sodium, low potassium, high calcium with low phosphorous, low vitamin E & selenium combined with training
 - Infection: Herpes virus in combination with exertion
 - Overexertion: excessive training & postendurance riding
 - Inborn metabolic defects (chronic) that trigger the condition with exercise
 - Polysaccharide storage myopathy
 - Excitation-Contraction coupling of the muscle

- NON Exercise related type
 - Infection: Clostridium species, Equine influenza virus, immune mediated Strep infections
 - Vitamine E/Selenium deficiency
 - Ionophores
 - Anesthetic related myopathy