

RECOMMENDATIONS FOR THE FEEDING AND MANAGEMENT OF HORSES WITH POLYSACCHARIDE STORAGE MYOPATHY (PSSM)

Overview

Polysaccharide Storage Myopathy (PSSM) is a type of tying up that is becoming increasingly common amongst horses throughout Australia, and is a cause of poor performance and early retirement in many working horses. Also known as Equine Polysaccharide Storage Myopathy (EPSM), Azoturia, or 'Monday Morning Disease' it is common to the heavier, and often quieter breeds such as Quarterhorses and Warmbloods. With adherence to the dietary and exercise recommendations below, at least 80% of horses show notable improvement in clinical signs and may return to acceptable levels of performance.

Causes of PSSM

PSSM is caused by an accumulation of glycogen in skeletal muscles and occurs when glucose is pulled from the bloodstream and deposited into the muscle tissue more quickly than normal, possibly due to insulin sensitivity of muscle tissue. Type 1 PSSM horses have a mutation in a gene (GYS1) which appears to cause unregulated synthesis of glycogen. Type 2 PSSM horses have abnormal glycogen storage however do not possess the GYS1 mutation.

Breeds Affected

PSSM primarily affects breeds that are characteristically calmer, well muscled and often 'good doers'. The condition has been diagnosed in the following breeds: Quarter Horses, Paints, Appaloosas, Warmbloods, Draft Horses and crossbreeds of these breeds.

Symptoms

A range of symptoms to varying degrees can be displayed, including:

- Muscle firmness and pain, cramping, twitching and stiffness
- Sweating, stretching as if to urinate
- Intolerance to exercise, poor performance and related behavioural changes
- Rolling or pawing following exercise
- Muscle weakness and atrophy
- Abnormalities with gait or movement, eg. reluctance to collect and engage the hindquarters or poor rounding over fences

There is a wide range in the severity of clinical signs shown by horses with PSSM. Those horses with severe or recurrent clinical signs will require stricter adherence to diet and exercise recommendations in order to regain muscle function.

Diagnosis

Diagnosis is confirmed by muscle biopsy displaying glycogen concentrations 1.5 to 4 times greater than normal. Genetic testing can reveal horses that have the GYS 1 mutation (Type 1 PSSM). When blood tested, PSSM horses generally (but not always) display elevated CK and AST muscle enzymes, regardless of when the blood was taken post exercise.

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Michelle Meylan, 0429 107 790

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Nutritional Recommendations

- Monitor body weight carefully and provide the correct energy intake to maintain a suitable condition.
- If the horse is overweight, reduce forage intake to 1.5% of body weight by restricting from pasture and providing low sugar grass hay. Provide a balancer pellet such as **Pegasus Equibalance** or **KER Gold Pellet** to supply nutrients without adding calories to the diet.
- Once the horse has achieved the desired body weight, energy should be provided using fat and fibre sources and avoiding starch and sugars. **Pegasus Liberty** is a low starch, high fat, high fibre pellet ideal for such diets.
- Because pastures high in sugar are best avoided, a grazing muzzle may be required if the horse's turnout area contains lush pasture.
- Good quality grass hay is acceptable for horses taking part in regular exercise (at least 5 times a week for 30 to 45 minutes of work). Clean, low to moderate quality grass hay is more suitable for horses at maintenance or in light work. Hay with an NSC content of less than 12% is recommended and some hay may need to be soaked to reduce the sugar content to this level.
- Avoid grain based hays such as oaten or barley due to the higher sugar content. If these are the only type of hay available, the sugar content can be reduced by soaking the hay prior to consumption.
- In general, avoid lucerne hay although some lucerne chaff can be fed.
- There is a great deal of variation in individual tolerance to dietary starch & sugar, however horses with more severe clinical signs of PSSM appear to require the greatest restriction.
- Hard working horses require a feed with significant fat and fibre levels to meet energy requirements, with as little energy supply coming from starch and sugar as possible. 15% starch or less is considered a 'low starch' feed. **Pegasus Liberty** contains 7% starch, while **Pegasus Equibalance**, **Coolmax** and **Sweetmax** all contain approximately 16-20% starch.
- Low starch feed ingredients supplying digestible fibre include beet pulp.
- Vegetable oil can be included in the diet to increase fat levels and Canola oil has the most ideal omega 3: 6 fatty acid ratio.
- Stabilised rice bran such as **KER Equi-Jewel** provides highly palatable, low starch, high fat energy.
- Electrolytes are essential to replace minerals lost through sweat in working horses eg. **KER Restore**. Salt should always be available in a salt block.
- Antioxidant supplementation with selenium and water soluble vitamin E has also shown to be useful when included in the diets of horses suffering from either of these myopathies eg. **KER Preserve**. Natural vitamin E has been shown to effectively increase vitamin E content and antioxidant function in the muscles eg. **KER Nano-E**.
- Co Enzyme q10 is a powerful antioxidant which and protects against oxidative stress in muscle and exercise induced muscle damage eg. **KER Nano-Q10**.
- Dietary changes need to be made slowly over a period of 7-10 days to allow the horse's gastrointestinal tract to adjust.

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Exercise

- Both nutrition and exercise management factors should be adjusted in order to give the horse all chance of recovery and minimize risks of future muscle soreness.
- PSSM horses should be turned out 24 hours a day and spend as little time confined as possible.
- Always provide adequate time for adaptation to a new diet before starting increased exercise.
- Exercise should be regular and structured. Daily exercise is needed and adequate warm up and cool down periods are essential.
- Gradually increase duration and intensity of work to match the horse's fitness level. Avoid over working the unfit horse before the dietary metabolic changes have had time to work.
- Time periods of work, and surface worked on should remain consistent, or increase and decrease slowly. For example, any progression from working on flat ground to hilly terrain.

Prognosis

- Give any changes in management time to take effect. Because the muscles can take a significant amount of time to adjust to a change in energy source, symptoms usually fade as metabolic changes occur over the course of several months.
- Prognosis depends on the severity of the disease however is generally good for horses suffering from mild, and even some from severe forms of PSSM. Success is dependent on a well constructed, high fat, low starch diet combined with daily free choice exercise.
- All management factors should be combined with veterinary advice for optimum results.

Medical treatment of PSSM should be discussed with your veterinarian. Detailed diet advice based on the individual horse is an effective management tool for horses diagnosed with PSSM. Contact Milne Feeds' equine nutrition advisor, Michelle Meylan, on 0429 107 790 or pegasus@milne.com.au for dietary advice.

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