

All tied up?

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Recurrent Exertional Rhabdomyolysis (RER), commonly referred to as “tying up” is a condition which is most frequently seen in fit young fillies with very nervous temperaments, but may affect horses of any age, breed and gender. It affects about 5% of racing Thoroughbreds and these tying up episodes tend to increase in frequency as the degree of fitness increases. Several researchers have reported the syndrome as a heritable defect ^[1, 2] however there is increasing evidence to suggest that dietary management may be beneficial in affected horses.

Nutritional supplements for “tying up”

At last count there were over 30 supplements on the market aimed at reducing tying up, containing various combinations of electrolytes, B Group vitamins, vitamin E, selenium, and amino acids. Electrolytes are very important in neuromuscular function and supplementation using an appropriate electrolyte may reduce the frequency of “tying up” episodes or the prevention of further episodes ^[3]. Vitamin B1 has been shown to hasten lactic acid metabolism in humans ^[4] and B5 is necessary for aerobic metabolism and therefore may be helpful ^[5]. In certain individuals a concurrent vitamin E/selenium deficiency may be a contributing or a permissive factor but there is little scientific evidence to support their role in the pathophysiology of the syndrome. Certain amino acids have been reported to influence energy metabolism ^[6] and may postpone the onset or alleviate the severity of post-exertional myopathy in equine athletes susceptible to this condition.

All racehorses have a certain energy, protein/amino acid, vitamin and mineral requirement and deficiencies in any of these nutrients are likely to have an impact on performance. If the diet is already balanced and providing adequate levels of the nutrients mentioned above, it is questionable as to whether or not further supplementation will have any significant effect on reducing tying-up episodes.

A diet with a difference

In our experience, the most effective method of dealing with the chronic sufferer of tying up is by a complete transformation of the diet. Standard equine rations are generally very low in fat, usually containing only 2-3% fat by weight, and are high in nonstructural carbohydrates and starch due to the reliance on grains and grain based/sweet premixed feeds for energy. We have found by reversing this situation, i.e. by providing a ration higher in “fat” and significantly lower in “carbohydrate/starch” that this has a beneficial effect on reducing the incidence of the syndrome. Several scientific studies have been conducted which describe a reduced incidence of tying up in horses on high fat/low carbohydrate rations. In one paper, following an adaptation period of three to six months, 16 out of 19 horses prone to tying up did not have any episodes following a diet change

from high carbohydrate/low fat to low carbohydrate/high fat [7]. In a further study, post exercise serum CK (creatinine kinase) activity was significantly elevated (>3000U/l) when horses consumed a high starch diet but was within normal range (<400U/l) when they consumed a low starch/high fat diet [8]. And in more recent work, a high-fat, low-starch diet resulted in dramatically lower post-exercise CK activity in severely affected RER horses compared to a low-fat, high-starch diet without measurably altering muscle lactate and glycogen concentrations [9].

The major fat sources in equine rations are oils (e.g. corn oil, canola oil, and manufactured products from feed companies). Rice bran based manufactured feeds are also generally high in fat content and relatively low in carbohydrate. When formulating the tying up ration, we use these fat sources combined with low-starch feeds and roughage and then balance the ration with an appropriate vitamins and minerals. Oil is energy dense and is not cheap so the ration is invariably more expensive than the standard racehorse ration. There is a balance which must be achieved between fat/oil supplementation and carbohydrate, as an unnecessarily high dietary fat content may induce loose manure and decrease digestibility of other dietary components.

Expectations of dietary changes

The time required for improvement in signs of the syndrome is controversial. It has been suggested that a minimum of four months of supplementation is required and that relapses are associated primarily with disruption of supplementation. However, recent findings showed that significant reduction or normalization of post-exercise serum CK activity can occur within one week of commencing an appropriately formulated diet. The change in diet will only be effective providing an appropriate exercise routine and other management strategies are in place.

References

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