Fatty liver syndrome: Is my pony at risk?

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The warmth of summer time is gone, making way for winter and its many challenges. You've ensured that your pony is well-prepared for the cold months lurking, but might there be one more challenge waiting until the warmth of summer arrives again? The answer is yes and is known as hyperlipaemia, or fatty liver syndrome, a disorder of fat metabolism affecting pony breeds and donkeys.

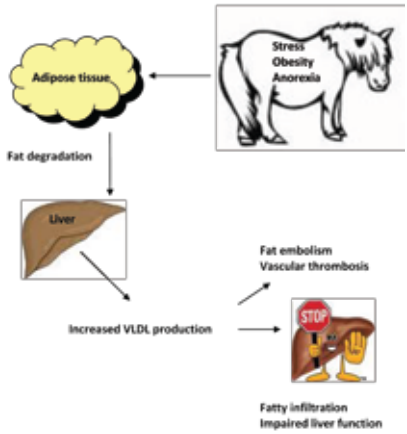
What is hyperlipaemia?

Hyperlipaemia is a life-threatening disease. Pony breeds are predominantly affected, with Shetland and Miniature ponies especially prone. Affected ponies are usually obese, have a history of recent stress or weight loss, or are in late gestation/early lactation during winter months.

Hyperlipaemia and your pony

The liver is the main source of energy in the body and utilises its storage capacity to provide the body with essential nutrients when energy demands are increased. Concurrently, excessive fats which are stored in fat tissue, undergo continuous degradation. In the liver, these fatty acids are metabolised into very low density lipoproteins (VLDLs), a suitable energy source required by peripheral tissues.

FIGURE 1: Hyperlipaemia and how it affects your pony



Under normal circumstances, the body is able to regulate excessive fat degradation through the action of insulin once energy demands are met. However, when the liver's energy storage capacity is depleted, as may occur during periods of stress including late pregnancy and early lactation (see photograph 1), starvation, or underlying disease, a negative energy balance sets in.

This negative energy balance results in the major source of energy being provided by excessive fats stored in fatty tissue. Obesity, as illustrated in photograph 2, sets the stage for hyperlipaemia by providing excessive tissue stores of fat. Any form

of stress, obesity, hormonal imbalance and starvation increases the release of fatty acids from fatty tissue and decreases the body's ability to inhibit excessive fat degradation through the action of insulin. Gastrointestinal parasitism has been identified as a predisposing factor.

Excessive fat degradation from adipose tissue, results in a reduced clearance of VLDLs from circulation with resultant fatty infiltration of the liver (photograph 3) and blood vessels. Fatty infiltration impairs normal liver functionality, resulting in decreased clearance of toxic substances from the blood. Further consequences include vascular thrombosis and fat embolism, most evident in essential organs including brain, lung and kidney which could be fatal.

Clinical signs and diagnosis

Clinical signs are non-specific and generally result from liver or kidney dysfunction. Affected animals may exhibit signs of initial weakness and depression, progressing to intermittent abdominal pain, diarrhoea, ataxia, muscle fasciculations, and ultimately recumbency and convulsions. Ventral oedema may also be evident.

1

Mares in late gestation and early lactation are at risk as a result of higher energy demands

2

Obesity is a high risk factor

3

Fatty infiltration of the liver from a pony diagnosed with hyperlipaemia. Note the swollen, orange-coloured liver

A preliminary diagnosis of hyperlipaemia cannot be made from clinical signs alone, due to their non-specific nature. The history and signalment, however, should alert owners and veterinarians to the possibility of hyperlipaemia among predisposed ponies. Confirmation is best achieved by quantification of serum triglyceride concentration.

Mortality is estimated between 60% and 100% among affected ponies. Early recognition of the disease is essential and adequate supportive therapy should be instituted immediately. Providing nutritional support during stages of hyperlipaemia is the main therapeutic objective in an attempt to inhibit fat mobilisation from adipose tissue.

Nutritional support reverses the negative energy balance, increases blood glucose concentrations, and promotes the inhibitory effect of insulin on adipose tissue. Other therapeutic goals include treatment of liver disease and elimination of stress or underlying disease processed amendable to treatment.

Preventative measures

Prevention is best achieved by identification of susceptible animals and risk factors, and implementation of appropriate management strategies. Modifiable risk factors include providing adequate nutrition without inducing obesity, avoiding unnecessary stressful situations and routine general health care (deworming).

Risk factors such as pregnancy and lactation that cannot be altered, requires close monitoring and preventative measures. Periodic sampling for triglyceride concentration determination can be used as a preventative measure in high risk animals.

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