

Nutritional Management and Feeding of Sick and Hospitalized Horses

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Introduction

When a horse comes in to a veterinary hospital, there are a number of nutritional or feeding challenges. You want to keep the horse eating and not lead to a change in the hind gut microbiota or an increased risk of colic. This is best accomplished by feeding familiar feeds, giving multiple small feeds and having a reduced concentrate and increased forage intake. However, a hospital cannot keep all feeds that horse owners may use so they need to choose common forages, and popular concentrate feeds in the area. The concentrate feed should be palatable, be low to moderate starch content and a moderate energy feed. A higher protein feed is desirable if there is a significant number of growing horses and broodmares admitted to the hospital. It should be well fortified with minerals and vitamins that can offer nutritional support to recovery. Some horses may need a high protein, mineral and vitamin feed balancer pellet as the main concentrate feed.

A feeding program for a horse in hospital should aim to avoid weight loss, unless it is required eg Equine Metabolic syndrome case. A negative energy balance can lead to changes in the intestinal microbiota, reduce immunity and increase incisional complications as well as lead to unhappy owners. Some horses with peracute or chronic disease can lose substantial amounts of body weight and need to be in a positive energy balance to gain weight during recovery. This can be especially challenging when they have a limited appetite.

How Much to Feed

If a horse stays at an ideal body weight and has plenty of energy for the exercise program it is on, the owner can usually assume that the horse's feeding program is adequate. However, feed management is not so simple when horses are sick, injured, or recovering from illness.

Usually, moving a pastured horse into 24-hour stabling will decrease its energy needs because free exercise has been curtailed. Also, athletic horses that have sustained minor injuries, are recovering from elective orthopaedic surgery, or have mild bacterial or viral infections should have a reduction in energy intake. During convalescence and until resumption of training, most of these horses can be maintained on a diet composed primarily of hay fed at 1.5 to 2.0% of body weight per day, a vitamin/mineral supplement, and salt, either loose or in a block. To facilitate the return to full grain feeding upon return to training, it may be desirable to continue feeding a small amount of grain each day.

In contrast, metabolic rate can rise significantly for some hospitalized horses. Confined horses that are healing from a severe injury or illness may need more than a one-third increase in dietary energy, and those that have endured serious infections or major burns might require up to 1.7 times the normal amount as they recover. These horses will also need more protein as they rebuild damaged tissues. Some diseases involve

extensive protein loss which needs to be covered by an increased dietary protein intake.

Another situation exists with sick foals. Premature foals and those that have been diagnosed with neonatal maladjustment syndrome (NMS) may have metabolic rates that are only about 50% compared to healthy, age-matched counterparts. This may be due to the sick foals lying down most of the time, while healthy foals are active during most of the hours they are awake. Despite their low rates of metabolism, these foals can be in negative energy balance because of very low milk intake.

Feeding levels should be based on the horse's body weight, previous exercise program, and current state of health. For horses that can't or won't eat willingly, it is often difficult to meet maintenance requirements. Nonetheless, delivery of even part of the maintenance requirement is likely to be beneficial in sick horses. The primary goal is to prevent further loss of body weight.

If a sick horse is willing and able to eat, this should be encouraged, even if the animal doesn't consume the amount usually eaten. If the horse consumes at least 85% of its optimal intake, no other form of nutritional support is required unless the illness is prolonged and the horse begins to lose an unacceptable amount of weight.

For horses that have not been eating, only small amounts of these feeds should be offered initially to avoid problems such as diarrhoea and laminitis. Increases in grains or concentrates should be limited to less than 0.5kg per day for an average-sized 500 kg mature horse. Various types of forage and feed can best be provided in small, frequent meals throughout the day.

Improving Appetite and Feed Intake

Several conditions in adult horses can cause rapid weight loss, either because the horse is not eating enough to offset metabolic processes or because ingested material is not being digested for some reason.

In many sick horses, treatment of the primary problem is essential for restoration of normal appetite. Disease conditions that may cause rapid weight loss include sepsis, pleuropneumonia, and deep-seated bacterial infections such as pulmonary or abdominal abscesses. Factors involving proper function of the gastrointestinal tract include diarrhoea, colic surgery involving bowel resection, and intestinal disorders characterized by protein loss and nutrient malabsorption. Severe trauma of any kind can also cause rapid weight loss. Any horse in one of these situations needs to eat voluntarily, or have nourishment provided in some other way.

As long as they stay hydrated, well-conditioned horses that are not pregnant or lactating can usually withstand two to four days of eating very little. On the other hand, regardless of the duration of illness, very thin horses and those that have recently lost a substantial amount of body weight will require immediate nutritional support.

For some other horses, brief periods without eating are unusually dangerous. Obese equines, especially fat ponies and miniature horses, can't tolerate even short periods of anorexia because of the risk of hyperlipaemia. Newborn foals are also poorly tolerant of short periods of undernutrition. Particularly during the first week of life, foals have negligible reserve energy stores, and negative energy balance can quickly result in hypoglycemia, generalized weakness, and death.

In many sick horses, treatment of the primary problem (such as pain or sepsis) is essential for restoration of normal appetite. Relief of pain and fever by administration of nonsteroidal anti-inflammatory drugs may improve feed intake in some horses. Horses

that are reluctant to eat can sometimes be tempted by feeds that are especially appealing. Although hospitalized horses should ideally be offered feeds similar to those fed at home, it is often necessary to provide a variety of feedstuffs to encourage intake.

Pain and fever can depress appetite, and suitable medications can improve the horse's comfort in many cases. Although hospitalized horses should be offered feeds similar to those fed at home, it is often necessary to provide a variety of feedstuffs to encourage intake. Highly palatable feeds such as fresh grass, leafy hays, and small amounts of grain or bran mash containing some grain can be offered. In healthy horses, addition of molasses to grains improves voluntary intake, and this approach has been successful in some sick horses. Feeding oils or high fat supplements such as stabilized rice bran will increase energy intake in the face of suboptimal feed consumption.

If all attempts to get the horse to eat voluntarily end in failure, the next step is delivering nutrients through a nasogastric tube. If possible, this method of feeding is preferable to intravenous nutrition because it helps to preserve intestinal function, and a greater quantity of food can be delivered.

Laminitis

As there are many causes of laminitis, there is no one size fits all approach to feeding in hospital. The lactating mare with laminitis subsequent to retained foetal membranes needs a very different approach to the fat pony with laminitis related to equine metabolic syndrome (EMS).

If grain or fructan (pasture) overload is the initiating factor then that should be removed from the horse's diet. In the initial stages of management of an acute laminitis case, the horse doesn't necessarily have to be put on a low energy diet. Pain leads to an increase in metabolic rate and daily energy requirement, and amino acids are needed for tissue repair so don't automatically put a laminitic case on low quality hay. Lucerne hay can be fed in the initial stages as this supplies more energy, protein and amino acids than grass hay, has a lower sugar content and will often be more palatable. Oaten hay is less desirable as it often has a high sugar and fructan content which can lead to hind gut disturbances. A low starch but high protein, mineral and vitamin balancer pellet should be fed to ensure requirements for these nutrients are met.

For EMS cases weight loss is an important contributor to increased insulin sensitivity. This means a negative energy balance is required and feeding a low sugar, low energy hay is desirable, as this allows more dry matter to be fed without increasing the risk of hind gut disturbance or slowing weight loss. Ideally nutrient testing will identify a suitable low sugar, low energy hay. Hay can be soaked for 12h to reduce the sugar, starch and dry matter content of the hay. If hay is soaked in hot water, shorter soaking times are needed. Excessive soaking can lead to bacterial or mould overgrowth. Soaking also leads to loss of water soluble minerals hence the need for supplementation with a balancer pellet to ensure a balanced diet. No grain, treats or pasture should be fed until insulin sensitivity returns to normal. Super fibres such as beet pulp or soy hulls should be avoided unless they are needed to mix with supplements, as they have a higher digestible energy (DE) content than regular forages, and may reduce weight loss.

It is important to know the weight of the horse and the hay so hay intake can be restricted to 1 – 1.5% BW on a dry matter (DM) basis before soaking. Hay and chaff are usually around 90% DM so divide the weight by 10% to get a dry weight. Haylage can be 40 – 80% DM so you can feed a larger wet weight and fermentation after baling

leads to lower sugar content. However, haylage is more digestible than hay so its DE content is higher on a DM basis. This amount is less than appetite so use of a small hole or double hay net will slow intake and make the hay last longer.

Feeding horses with laminitis related to PPID varies according to their insulin resistance status and body condition. Horses which are obese and insulin resistant should be fed the same way as a horse or pony with EMS. If a PPID horse is in poor body condition, they need more than just forage. Higher energy but low glycemic feeds are needed such as lucerne hay, soaked beet pulp or soybean hulls, stabilized rice bran (KER Equi-Jewel), added oil or Low GI concentrate feeds (eg KER Low GI Cube). Small but frequent meals will reduce the glycemic response to a concentrate meal but increase daily DE intake and aid weight gain.

Colic

Horses that have had a colic episode that responded well to routine medical therapy are usually best managed with an additional 2-3 days of dietary modification. Whenever colic occurs, it is useful to review if anything has changed in the horse's life that may have led to colic, such as cold weather that may have decreased water intake or a change in hay or concentrate feeding (different source or an increased amount). Fasting for 12-24 hours is a good practice to decrease the amount of feed material in the horse's gut and allow the gut to rest. Horses can be offered small, frequent drinks of water to maintain hydration. A period of feed restriction and decreased concentrate feeding for 1-2 days after a colic episode is generally recommended. Short hand grazing sessions (5-15 minutes) are excellent to allow some feed intake and walking generally promotes movement of feed through the intestine. Refeeding the horse with several frequent (every 4-6 hours) small meals for 1-2 days gradually transitions the horse back onto full feed. If hay is restricted, it can be sprinkled throughout the horse's stall so that it takes the horse longer to eat and this simulates grazing.

Small Intestine.

Horses that have had surgery are more complicated to begin feeding and how soon and what the horse eats depends on the extent of surgery. No surgical case is exactly the same and feeding recommendations will vary based on the lesion identified at surgery, whether a resection and anastomosis or bypass procedure was required, and surgeon experience and opinion. Healthy adult horses can tolerate many days of feed deprivation as long as they are kept hydrated. Horses that had a resection and anastomosis or any type of gastrointestinal bypass will require a longer period of fasting and a more gradual return to full feeding. Initially, the strength of the surgical repair depends solely upon the suture material and the repair becomes gradually stronger as intestinal healing occurs. For this reason, most surgeons will completely fast the horse for 2 days before a gradual return to feed if a bypass, resection, or anastomosis was performed. If no gut was removed and the intestine appeared fairly healthy, then the horse may be fed as for a routine colic with no feed for 12- 24h after surgery. Excessive fasting time can lead to weight loss, reduced immune function, atrophy of the intestinal mucosa, delayed wound healing and increased risk of infection and diarrhoea.

Initially offer water in 1litre amounts per hour to asses reflux and assist rehydration. Then introduce feed if the horse has no reflux, normal gastrointestinal motility and appetite. It is important to avoid bulk in the intestine for several days to ease strain on the intestinal repair site and to allow the best chance for a strong and healthy return to gut function. Horses that have had small intestinal surgery benefit the most from small

and frequent meals for several days post operatively. Regardless, it is important to not rush the horse back onto feed to rest the gut and allow healing to occur. Access to fresh grass or chaff is better than hay in the early stages. Fresh grass should be offered in short grazing sessions and hay can be reintroduced 3 – 4 d after surgery. Leafy lucerne hay can be introduced after 2 weeks. Surgical colic cases have oxidative stress in the affected gut and antioxidant therapy is indicated including iv Vitamin C and 5000 – 10,000 IU doses of natural Vitamin E (KER x Nano E).

Initially offer a slurry of 250g of a moderate starch pelleted feed (KER Low GI Cube or Barastoc Calm Performer), 150g lucerne chaff & 100g beet pulp every 3-4 hours (For a 500kg horse). Molasses may help improve palatability. The next day 750g can be fed per feed, then the next day 1 kg can be fed per feed etc. Do not exceed 1.5kg dry weight per feed while the horse is in hospital. Hay can be offered after 3 or 4 days on the soft feed in amounts of 1kg per feed. If the horse has lost a lot of weight, a high fat supplement such as oil, sunflower seeds or stabilised rice bran (KER Equi-Jewel) can be introduced slowly after 7d in amounts up to 125 ml/250g per feed. KERx EquiShure hind gut buffer can be fed to reduce the risk of hind gut acidosis related to the reduced capacity of the small intestine to digest starch. Special diets are necessary in the long term for horses with resection of 50% or more of the small intestine.

Large Intestine

Fast horses for 24- 48 hr after surgery but offer ad lib water. A salt block should be offered to allow salt intake which will drive thirst. After surgery, if there is normal gastrointestinal motility and no reflux, offer small feeds of grass (20 min) and/or small (< 1kg) feeds of grass or cereal chaff from 24 hr on to reduce risk of diarrhoea. Fresh grass & cereal chaff is better than hay in the early stages after surgery and Lucerne chaff can be added later.

If the horse is inappetant for more than 48 h, you can give a moderate starch pelleted feed (KER Low GI Cube or Barastoc Breed N Grow) in a slurry mixed with water by stomach tube. Give no more than 1 kg in 6L per feed 4 to 6x per day. As appetite returns, these feeds can be fed wet in feeds of less than 1 kg 4x per day with added chaff and or beet pulp from d 3 on. If required for extra energy, sunflower seeds or stabilized rice bran (KER Equi-Jewel) can be added at 250g per feed. After 3 weeks, high quality lucerne is the forage of choice.

It is best to avoid lucerne in enterolith cases and review the entire diet for mineral balance. Don't feed impaction cases until they have resolved. After impaction has cleared, feed fresh grass /lucerne chaff and reintroduce concentrates slowly after 7 days. Special diets are necessary for horses after resection of large portions of the caecum or colon.

Right Dorsal Colitis

Horses with right dorsal colitis need a low bulk/residue diet such as a high fibre pelleted feed and chaff or pelleted hay. The concentrate feed should have processed starch, low to moderate starch content, added fat and contain digestible fibre sources such as super fibres. The feeding program needs to avoid excessive starch or fructans which may pass into the large intestine and be fermented leading to hind gut acidosis. Basing the forage on lucerne hay and chaff ensures a high protein intake to replace protein losses in the colon.

Pysillium can be added to the diet as a source of short chain fatty acids and sucralphate is recommended as a 'band aid' over colonic ulcers. KERx EquiShure hind gut buffer will help reduce the risk of hind gut acidosis and long chain omega 3 fatty

acids EPA and DHA from fish oil (KERx EO-3) are useful additives for their anti-inflammatory effect.

Liver Disease

Hepatoencephalopathy occurs with decreased functional hepatic mass and reduced ability of the liver to clear gut-derived toxins or byproducts and microbially produced metabolites from the portal blood before they reach the general circulation. Some of these metabolites act as false neurotransmitters (aromatic amino acids) and others are directly toxic to the brain (ammonia, mercaptans, fatty acids, phenols).

Nutritional management of liver disease is aimed at reducing dietary protein and the amount of ammonia and other gut-derived toxins that affect the nervous system. Dietary protein should be restricted as much as possible if the horse has signs of hepatoencephalopathy. Mature adult horses in light work require only about 8% protein in their diet. This amount of protein can easily be met with good quality grass hay or pasture. Feeding legumes (lucerne and clover), which are high in protein, should be avoided. Lower dietary protein will result in less intestinal ammonia production. Forage fed should be grass or oaten hay, oaten or wheaten chaff or pasture. Horses with photosensitization can still graze or be turned out at night to avoid sunlight. Dividing up the ration into several small meals will prevent large amounts of ammonia from leaving the gut and reduce the load of ammonia that the liver must detoxify.

Feeding protein with an increased ratio of branched chain to aromatic amino acids should improve clinical signs of hepatoencephalopathy. Branched chain amino acids can be used for energy and protein production. Aromatic amino acids (tyrosine, tryptophan, phenylalanine) are more likely to act as false neurotransmitters and produce neurologic signs. Choose feeds that have a high ration of branched chain amino acids (BCAA) to aromatic amino acids (AAA) eg sorghum, maize, bran and soy, but watch that soy doesn't increase protein intake too much. There are commercially available branched chain amino acid supplement pastes for horses that can be used to increase their proportion in the diet.

Easily digestible starch and sugar should be included to reduce the need for gluconeogenesis in the liver eg molasses, steam flaked, micronised or extruded maize or sorghum. Adopt a low fat diet to reduce any fat deposition in the liver and it is best to give no added oil or fat sources except the long chain Omega 3 fatty acids EPA and DHA from fish oil for an anti-inflammatory effect.

Folic acid, B vitamins, and especially fat-soluble vitamins (A,D,E and K) should be supplemented to meet requirements. Fat soluble vitamins should not be supplemented in excess, because they can accumulate in the liver and have adverse effects. It is more important to keep horses eating and maintain body condition, rather than make dietary adjustments that cause them stop eating. If the horse will only eat legumes such as lucerne, then pick a lower quality lucerne and it can be fed in moderation and divided into several small meals as chaff.

Hyperlipaemia is a serious and life threatening condition in any sick or inappetent miniature horse, donkey, or pony. The most important goal of therapy is to get the animal to begin eating and/or supplement calories by means of enteral nutrition or parenteral nutrition. Offering familiar feeds or a buffet of feed options is the best starting place. Niacin inhibits lipolysis in cattle and may be added to the partial parenteral nutrition solution by itself, or as vitamin B complex. Whatever primary

condition that predisposed the animal to inappetence and hyperlipemia should also be treated aggressively.

Kidney Disease

Most horses with acute renal failure recover with appropriate treatment. For these horses, it is important to keep them eating and drinking normally; specific dietary management is less essential. Dietary management of chronic renal failure is aimed at reducing calcium intake and avoiding excessive dietary protein. Mature adult horses in light work require only about 8% protein in their diet. This amount of protein can easily be met with good quality grass hay or pasture. The low blood protein in horses with chronic kidney disease is due to losses into the urine secondary to renal damage. Unfortunately, undue protein supplementation in these cases provides no real benefit to the horse. Excessive dietary protein will make the horse urinate more and may overwork already badly damaged kidneys. Legumes (lucerne and clover) are high in both protein and calcium so should be avoided in most cases. The only effective way to reduce blood calcium levels is to reduce dietary calcium and the amount of calcium that the kidneys have to excrete into urine. Salt supplementation may encourage horses to drink and urinate more. However, studies in several other species have shown that salt supplementation can worsen kidney disease. Regardless, horses with renal disease should have free choice access to salt. Some clinicians recommend supplementing omega-3 fatty acids to horses with kidney disease. Omega 3 fatty acids have good anti-inflammatory activity and may reduce renal inflammation without the possible adverse effects of non-steroidal anti-inflammatory drugs. Fish oil is the best source of long chain omega 3 fatty acids EPA and DHA. Feeding horses with chronic kidney disease to maintain body condition and quality of life is vital. It is more important to keep horses eating, rather than make dietary adjustments that cause them stop eating. If the horse will only eat legumes such as lucerne, then it can be fed in moderation.