



ANAEMIA

by Dr Jennifer Stewart

It's not an illness - it is a symptom of something wrong elsewhere in the horse's body.

In both acute and chronic anaemias the signs will vary with the cause and the rate at which the anaemia develops. Horses with mild -to-moderate anaemia often have no signs or they may seem slightly lethargic and have slightly pale mucous membranes (gums, eyelids, nasal passages). In cases of severe anaemia, the clinical signs will vary depending upon the cause and rate at which anaemia develops. In acute, sudden-onset anaemia, horses may have increased heart and respiration rates, weakness, prolonged capillary refill time, low body temperature, weakness and eventually cardiovascular collapse.

WHAT TO LOOK FOR

Although the primary presenting sign of anaemia in horses is pale mucous membranes, depending on the underlying cause of the anaemia, horses may show any of the following:

- depression/lethargy/poor performance
- increased heart and/or respiration rate
- pale or jaundiced (yellowish) mucous membranes in the gums, nostrils and eyelids - but this can also be seen in anything that causes loss of appetite
- discoloured urine
- fever
- a heart murmur due to thinning, decreased viscosity and increased turbulence of the blood
- small haemorrhages in the gums
- weight loss

WHAT IS ANAEMIA

Anaemia is a decrease in the number of circulating red blood cells (RBC). It is an abnormality in the blood caused by an underlying disease process. According to many leading equine veterinarians anaemia is possibly one of the most over-diagnosed conditions in horses. If the underlying cause is not identified and diagnosed, treatment may fail, leading to frustration for the owner - and most likely the horse as well!

Anaemia is due to loss (haemorrhage), destruction (haemolysis) or reduced production of red cells. If you think your horse may be anaemic, it's important to find and treat the cause of the anaemia as well as the anaemia itself.

ACUTE ANAEMIA: a steep drop in the number of red blood cells.

CHRONIC ANAEMIA: commonly occurs with infections, chronic illnesses, inflammatory disorders, or cancer.

Unlike other animal species and humans, when a horse has reduced red blood cells, it doesn't release immature red cells from the bone marrow to boost the number in the blood.

DIAGNOSIS

Once anaemia is suspected a blood sample is required to measure packed cell volume (PCV), red blood cell count (RBC) and haemoglobin concentration. Haemoglobin contains iron – iron binds oxygen. Because blood iron levels are not a good indicator of body iron levels, your veterinarian may request measurement of blood ferritin levels. There are some features unique to the equine red cell and your veterinarian will also be able to advise on these. PCV should always be interpreted in light of the horse's age, breed, use and level of hydration and excitement.

The spleen is an important reservoir for red blood cells - stress, exercise and excitement can cause the spleen to contract, expelling red cells into the blood and increasing the packed cell volume by up to 50%.

Anaemia can be masked by temporary elevations in PCV due to exercise or excitement, and for this reason your vet may want to assess PCV in the rested horse. Similarly, horses with dehydration

have a relative increase in PCV that can mask anaemia. Older horses, foals, Warmbloods, Quarterhorses, Clydesdales and ponies have a lower PCV than Standardbreds and Thoroughbreds, and fit horses have a higher PCV.

It's important in diagnosing the cause of anaemia to determine whether the bone marrow is increasing the production of red cells. In other species and in humans this can be done by looking at a blood smear to see what the red cells look like – young, new ones are still immature and under the microscope are easily identified. Because horses don't move the new red cells into the blood until they are fully mature, the only way to assess whether the horse is responding to a reduced number of red cells is with a bone biopsy or aspirate.

REGENERATIVE AND NON-REGENERATIVE

Often the underlying cause of an anaemia is not easy to find and explain to your veterinarian, who may perform a bone marrow aspirate (collect) or biopsy to determine if the bone marrow is responsive. If the anaemia is classified as 'regenerative', i.e. the horse is responding, a further step is made towards diagnosing the cause. Anaemia caused by blood loss (haemorrhage) or red cell destruction (haemolysis) is regarded as 'regenerative', whereas anaemia due to decreased production of red cells is 'non-regenerative' because the bone marrow isn't responding by generating more RBCs.

Continued

Jenquine
BRINGING SCIENCE TO YOUR FEED BIN
Equine Clinical Nutrition

NEW PRODUCT

Ask your local
produce store or
Vet clinic to order
some.

DR JENNIFER STEWART'S

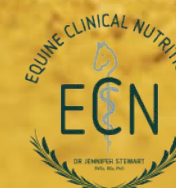
all-4-feet®

**YOUR ALL-IN-ONE NUTRIENT-DENSE FEED REPLACER
- JUST ADD FIBRE +/- EXTRA ENERGY / SALT AS NEEDED**

LOW IN STARCH, SUGAR, NSC & IRON

HIGH IN AMINO ACIDS, BIOTIN, ANTIOXIDANTS, OMEGA 3, VITAMINS & MINERALS

www.jenquine.com



Anaemia continued...

BLOOD LOSS - HAEMORRHAGE

If the anaemia is due to haemorrhage the source of the blood loss must be identified. Other than surgery and injuries, acute sudden blood loss is usually due to rupture of a large blood vessel and requires emergency treatment. If the vessel is internal, your veterinarian may undertake ultrasound, endoscopic and rectal examinations and collect fluid samples from the chest and belly. Acute blood loss can also occur with exercise-induced pulmonary haemorrhage (EIPH) in any horse undergoing strenuous exercise – it also occurs in humans, camels, greyhounds and sled dogs. Chronic blood loss can be caused by bleeding gastrointestinal and urinary tract lesions, and also by what are known as haemostatic disorders – i.e. disorders of the blood clotting pathways and mechanisms.

RED CELL DESTRUCTION – HAEMOLYSIS

The causes of haemostatic and clotting disorders are many and identification is essential to allow correct treatment. They include immune-system dysfunction, some colics and laminitis, genetic abnormalities, kidney and liver disease, septicaemia, drug reactions (aspirin, phenylbutazone, phenothiazine, some antibiotics, warfarin (rat poison)), mouldy sweet clover toxicity, snake bite, mass bee stings, post-strangles infection, incompatible blood transfusions and neonatal isoerythrolysis (NI) in foals.

Your horse may require gastroscopy, manure blood tests, urinalysis, and additional blood smears and tests such as thrombocyte counts and clotting times to have haemostatic disorders ruled out.

We are very, very fortunate that our quarantine and biosecurity have thus far kept out the many blood parasites (babesiosis, anaplasma etc.) and viruses (equine infectious anaemia and viral arteritis) that result in red cell destruction in horses, humans and animals in other countries.



One indicator for severe anaemia could be the colour of the gums (they should be a healthy pink, not yellowish) and prolonged capillary refill time after you press on the gums.

Immune disorders (immune-mediated haemolytic anaemia, IMHA) occur when proteins that are part of the normal defence system get deposited onto the surface of the RBC. They also occur when a blood transfusion donor horse has a different blood group to the recipient horse and in foals that have a different blood type to their dam (neonatal isoerythrolysis, NI). The spleen, liver and bone marrow recognise and quickly remove the abnormal red cells. Abnormal red cells also occur with certain cancers, toxins, chemicals, allergies (penicillin or trimethoprim drugs) and after infections (strangles or viral infections). Acute haemolytic anaemia has been reported after oral administration of L-tryptophan in ponies. And in Fell and Dale ponies a genetic immunodeficiency syndrome that causes severe fatal anaemia has been identified.

NI is the most common form of IMHA. It occurs when the foal and dam blood types are incompatible and during pregnancy the mare's body produces anti-bodies against the foals RBCs. The anti-bodies accumulate in the colostrum and when the newborn foal drinks the colostrum the anti-bodies attack its red cells. The foal is born normal but develops progressive clinical signs of anaemia within 12 to 24 hours. Affected foals need veterinary care and must be rapidly identified and prevented from sucking for 48-72 hours. The prevalence of NI in Thoroughbreds is 1-2%. There are eight major blood groups in horses (A, C, D, K, P, Q, T and U) with 32 distinct red blood cell antigens. The majority of NI cases involve the antigens Aa and Qa - mares that are Aa and Qa negative are at a higher risk of producing a foal with NI.

The most common cause of anaemia in horses is inflammation or chronic disease (ACD = anaemia of chronic disease). Inflammatory compounds and oxidants released from the cells damaged by inflammation and disease can suppress the bone marrow and/or decrease the lifespan of the RBCs.

Red blood cells, damaged as they pass through inflamed and infected tissues, are destroyed and their iron content is stored.

Insulin-resistance is an inflammatory state and ACD is common in horses with Cushings. Although the effect on iron metabolism can lead to ACD eventually looking like iron deficiency, iron stores in domestic horses are typically many times higher than what they would need for a lifetime. Because the horses are not iron-deficient, giving them extra iron doesn't help.

Oxidant-induced haemolytic anaemia occurs when the RBCs become injured and damaged by certain plants, chemicals, minerals or drugs. Rarely, it is due to a genetic deficiency in the oxidant protection pathways. Many oxidants (e.g. red maple, iron, zinc, copper) cause the red cells to rupture (haemolysis). Other plants that have been shown to cause haemolysis in horses are onions, garlic (as little as 100g a day) and the leaves and seed pods of pistachios. Horses will voluntarily consume sufficient quantities of garlic to cause Heinz body anaemia. The potential for garlic toxicosis exists when horses are chronically fed garlic. Further study is required to determine the safe dietary dose of garlic in horses. DMSO is associated with intravascular haemolysis in some horses but the mechanisms are unknown.

REDUCED PRODUCTION OF RED BLOOD CELLS

Non-regenerative anaemias can be due to starvation, nutritional deficiencies in vitamins or minerals, long term diseases, kidney disease and bone marrow diseases. Iron-deficiency anaemia in horses has only been reported following haemorrhage. Horses conserve and store iron, but because many vitamins and minerals are involved in red cell and haemoglobin synthesis, deficiencies in these can mimic iron deficiency. Copper and vitamin B6 deficiency and lead poisoning reduce production of haemoglobin and can cause anaemia in which there is abundant iron, but it can't be used. Providing additional iron in the diet reduces its absorption in the intestine – and wont help anaemia due to vitamin and mineral deficiencies. B12 and folate deficiencies could cause anaemia and horses on long term acid-suppression ulcer medications, or those with gut disturbances or reduced appetite may benefit from B12 and folate supplementation.

IRON SUPPLEMENTS

Iron never leaves the body, it is recycled. Iron supplementation may be needed when there has been haemorrhage and blood loss – although in most cases normal diet sources should be enough. Soil, grass, hays and sugar beet are all high in iron. Excessive oral and injectable iron supplementation can reduce absorption, damage red cells and cause low RBC counts in high-performance horses.

IRON TOXICITY

Because iron never leaves the body, iron overload can occur. Diagnosis is based on blood tests and your veterinarian may test for serum iron, transferrin and ferritin levels. The potential adverse effects of iron supplementation can be toxic to foals and iron injections often result in severe reactions and death in horses. Iron is toxic to the liver and levels in the spleen and liver can be very high in older horses. Raised blood insulin is the most common cause of laminitis in horses with metabolic disorders and insulin-resistance syndromes including Cushings. These horses are particularly sensitive to iron and adding more is not routinely recommended.

In mature horses, iron deficiency is extremely unlikely as most soils, forages, grasses, hays and grains have high levels and because of the innate ability of horses to conserve iron. For foals, colostrum, soil and their dam's manure are major sources of iron. Iron supplementation is not routinely recommended in foals, unless on veterinary advice. In any horse, a suspicion of anaemia needs to be thoroughly investigated to identify the type of anaemia and the underlying cause and to initiate correct treatment.

DISCLAIMER

All content provided in this editorial is for general use and information only and does not constitute advice or a veterinary opinion. It is not intended as specific medical advice or opinion and should not be relied on in place of consultation with your equine veterinarian.



DR JENNIFER STEWART

BVSC BSC PHD MRCVS DIP BEP AAIM
Equine Veterinarian and Consultant Nutritionist

An equine veterinarian with over thirty five years' experience, Jennifer is also a consultant nutritionist and has formulated feeds, custom mixes and supplements for leading international horse feed manufacturers in Australia and overseas. Dr Stewart is passionate about equine nutrition and its role in the management, treatment and prevention of many equine disease and she is committed to bringing 'science to the feed bin'.

www.jenquine.com

CAUSES OF ANAEMIA IN HORSES Table 1.

Bacterial infections
including Leptospira, Clostridia and E.coli

Blood loss, bleeding
haemorrhage internal or external

Bone marrow disorders
cancers or toxins

Certain drugs and medications
penicillin, sulphur-drugs

Chronic underlying disease
infection and inflammation

Diet deficiencies
vitamin B12, folic acid, copper and excess zinc

Endocrine disorders
Cushings and thyroid problems

Genetic disorders
low levels of certain enzymes

Immune disorders
incompatible transfusions or immune activation, mass bee stings

Infections
bacteria, virus

Inflammatory conditions
potentially any and all causes

Oxidants/iron excess,
inflammation

Kidney disease
can suppress bone marrow

Plant and other toxins
onion, garlic, red maple, pistachio;
snake bite, mouldy feed

Viral infections
no equine infectious anaemia in Australia.

HOOF HEALING AND HEALTH FOR YOUR HORSE



TUBBEASE
Soaking and Therapy boots all in one!



STRATUS
Premium therapeutic boot system with TheraPad and TheraRods



RX
For laminitis, thin soles, abscesses and floating



CLOUD
Instant relief and mobility for horses in pain



EASycARE DOWNUNDER
Australia's largest stockists of Equine Hoof Protection
Phone 02 4457 3022 for help and advice.
www.easycaredownunder.com.au
www.hoofbootsaustralia.com.au