

Question

The owner of a horse farm in the Southeastern United States calls you to come to his place two days after a huge wind storm that knocked down trees and power poles. There are seven ill horses. Upon examination you note lethargy, anorexia, dyspnea, coffee-colored urine, and icterus. Which of the following is the most likely cause?

- Red maple (*Acer rubrum*) poisoning
- Copper poisoning
- Rattlesnake bite
- Babesiosis
- Equine infectious anemia

Explanation – The correct answer is **Red maple poisoning**. Horses seem to eat the leaves when branches are available, and the plant contains an unidentified hemolysin in wilted leaves. Ingestion can be fatal.

Question

Consumption of yellow star thistle results in this lesion.

- Nigropallidal encephalomalacia
- Destruction of the pons
- Destruction of the lateral and medial geniculate nucleus
- Leukoencephalomalacia of the reticular system

Explanation - The correct answer is **nigropallidal encephalomalacia**. Consumption of yellow star thistle destroys the globus pallidus and the substantia nigra. These lesions will result in a characteristic **dysphagia**.

Question

In June, you are asked to examine an 8 year old horse which has been out in a California pasture for over a month. The horse is thin and mildly depressed. There is a tremor of the lips and tongue, and when feed is offered, the lips are pulled back indicating marked dystonia of the facial muscles. The horse is unable to prehend the feed. Which of the following causes should you look for to match these clinical signs?

- Ethylene glycol
- Yellow star thistle
- Lead
- Aberrant strongyle migration
- Sarcocystis

Explanation - Yellow star thistle is *Centaurea solstitialis*. In some horses which ingest large quantities, it can cause **nigropallidal encephalomalacia**, which is loss of the globus pallidus and substantia nigra, and extrapyramidal nuclei, which **control muscles of prehension**. Loss of these nuclei causes **tremors** and **dystonia of the lip muscles and tongue**. *Centaurea repens* (**Russian knapweed**) can also cause similar lesions.

Question

In the Spring of 2001, a syndrome later termed Mare Reproductive Loss Syndrome, MRLS, occurred in central Kentucky. This syndrome was characterized by early and late-term fetal loss, fibrinous pericarditis, neonatal foal death and unilateral uveitis. Which of the following was incriminated as a likely potential cause of MRLS?

- Exposure or ingestion of Japanese yew
- Exposure or ingestion of blister beetles
- Exposure or ingestion of eastern tent caterpillars
- Exposure or ingestion of red maple leaves
- Exposure or ingestion of black walnut
- Exposure or ingestion of yellow star thistle

Explanation - The correct answer is exposure or ingestion of **eastern tent caterpillars**. The exact pathogenesis of MRLS is still unknown, but the presence of eastern tent caterpillars was strongly associated with the disease. Later, experimental studies in which pregnant mares were exposed to or fed eastern tent caterpillars resulted in early and late fetal loss.

Question

A horse presents for ingestion of Jimsonweed which contains scopolamine. Which of the following is the treatment of choice against such an intoxicant?

- Atropine
- Physostigmine
- Epinephrine
- Acetazolamide
- Diphenhydramine

Explanation - The correct answer is physostigmine. Scopolamine is an atropine-like alkaloid and causes depression and is parasympatholytic to the autonomic nervous system. It can cause convulsions, respiratory failure, incoordination, mydriasis, and constipation. Treatment consists of activated charcoal, laxatives, diazepam to control convulsions and physostigmine (a parasympathomimetic).

Question

A horse gets into cow feed that contains the ionophore, monensin. What is your biggest concern?

- Hepatotoxicity
- Neurotoxicity
- Gastrointestinal toxicity
- Nephrotoxicity
- Cardiotoxicity

Explanation - The correct answer is **cardiotoxicity**. Monensin is a coccidiostat used to increase productivity in cattle. Horses are much more susceptible to toxic effects of monensin than cattle and mistakes in feeding or accidental access to cattle feed can lead to toxicity. Monensin toxicity results in **myocardial necrosis** and development of **dilated cardiomyopathy in horses**. Clinical signs include progressive respiratory distress, heart murmur, weakness, and hypovolemic shock. Acutely, mild colic and diarrhea can occur as well but is less of a concern than the cardiovascular effects.

Question

Which of the following toxins causes reproductive failure in mares?

- Pyrrolizidine alkaloids
- St John's wort
- Cantharidin
- Red maple
- Fescue

Explanation - The correct answer is fescue. Fescue ingestion leads to prolactin suppression and can result in thickened placenta, dystocia, or agalactia.

Red maple causes Heinz body anemia.

St John's wort causes photosensitization and hepatotoxicity.

Pyrrolizidine alkaloids cause photosensitization and hepatotoxicity.

Cantharidin causes colic.

Question

Which of these would be appropriate to give a horse with warfarin toxicosis?

- Vitamin K3
- 1-2 Liters of plasma
- Heparin
- Flunixin meglumine

Explanation - The correct answer is 1-2 liters of plasma. Vitamin K3 should never be given to horses as it is nephrotoxic. Vitamin K1 (0.5-1 mg/kg subcutaneously every 6 hours) is the correct therapy, and plasma can replenish clotting factors to give the horse time to synthesize them after vitamin K is replaced. Heparin would only exacerbate the bleeding tendency in warfarin toxicosis. Flunixin would be of no benefit.

Question

Consumption of fescue grass infected with *Neotyphodium coenophialum* by a pregnant mare may typically result in which of the following clinical signs?

- Prolonged gestation and decreased milk production
- Prolonged gestation and fetal mummification
- Shortened gestational length and fetal skeletal malformation of the cuboidal bones
- Shortened gestational length and fetal joint laxity

Explanation - Common clinical signs associated with fescue toxicosis include prolonged gestation and/or decreased milk production (agalactia). Ergopeptine alkaloids are ingested by the mare, which act as dopamine agonists. Dopamine serves to inhibit prolactin, thus inhibiting lactation. Placental thickening and weak or stillborn foals may also occur.

Question

Which of these tests would be the best indicator of moldy sweet clover toxicity in a horse?

- Thrombin time (TT)
- Prothrombin time (PT)
- Activated clotting time (ACT)
- Partial thromboplastin time (PTT)

Explanation - The correct answer is prothrombin time (PT). Sweet clover can contain a number of fungi that create dicumarol, a warfarin-like toxin. It inhibits vitamin K and interferes with synthesis of factors II, VII, IX, and X. Because factor VII has the shortest half-life of these factors, it will be depleted first. Factor VII is involved in the extrinsic coagulation pathway and would therefore, be elevated first after ingestion of sweet clover. PT is a measure of the extrinsic pathway (and common). PTT is a measure of the intrinsic pathway (and common). TT is a measure of the final steps of coagulation taking fibrinogen to fibrin. Cattle are actually affected by moldy sweet clover toxicity more frequently than horses.

Question

A 9-year old Standardbred stallion comes to see you for evaluation of muscle atrophy. You examine the horse and note atrophy of the lateral thigh and gluteal muscles. When the horse is backed up, spasmodic

hyperflexion of either hindlimb occurs resulting in a high-stepping gait. Which of the following is most likely responsible for the observed signs?

- Senecio or groundsel intoxication
- Sweet pea intoxication
- Red maple intoxication
- Castor bean intoxication
- Black walnut intoxication

Explanation - This case describes a horse with stringhalt or sudden flexion (contraction of the lateral extensor tendons) of one or both hind legs. It is most evident when the horse is backing up slowly or turning. It can involve one or both hind legs. The etiology in some cases is unknown but the condition can be associated with chronic intoxication of sweet peas (*Lathyrus* spp.). Australian stringhalt has been associated with flatweed ingestion (*Hypochoeris radicata*). The precise pathogenesis is not understood, but a mycotoxin affecting the long myelinated nerves in the hind limbs has been suggested based on the types of nerve damage seen in affected horses.

Black walnut intoxication is associated with laminitis and colic after exposure to wood shavings of black walnuts. Red maple intoxication is associated with acute hemolytic anemia. Senecio or groundsel intoxication is associated with liver disease after chronic exposure. Castor bean intoxication is associated with severe gastrointestinal irritation and hemorrhagic diarrhea.

Question

A horse presents to you in respiratory distress. He has dilated pupils and bright red mucous membranes. You pull blood which is also bright red in color. What is your diagnosis?

- Cyanide toxicity
- Pleuropneumonia
- Nitrate toxicity
- Chronic obstructive pulmonary disease

Explanation - The correct answer is cyanide toxicity. The bright red-colored blood and mucous membranes with signs of respiratory distress are typical findings for cyanide toxicity. There are many plants that can accumulate cyanide to levels that are toxic to horses. They include Sudan and Johnson grasses, cherries (chokecherries), and Sorghum. Treatment is with sodium nitrate or sodium thiosulfate IV.

Question

You are examining a 5-year old pony for lethargy, anorexia, and mild intermittent colic. Upon physical examination, you notice the abnormal finding in the image. Consumption of which of the following can produce these clinical signs and physical examination findings?



- Black walnut (*Juglans nigra*)
- Oak leaves and acorns (*Quercus* sp)
- Red maple leaves (*Acer rubrum*)
- Yellow star thistle (*Centaurea solstitialis*)

Explanation - The sclera appears icteric. In combination with the clinical signs, ingestion of Red maple leaves would result in these signs due to hemolysis and low oxygen content of the blood. Oak is toxic but causes diarrhea and abdominal pain, whereas Black walnut is associated with laminitis. Yellow star thistle causes nigropallidal encephalomalacia resulting in CNS signs.

Question

A 19 year old Saddlebred gelding presents with a history of staggering and respiratory distress. On physical exam, it is noted the horse is sweating, has a heart rate of 52, and a respiratory rate of 44. Hemoglobinuria is identified on urinalysis. This horse lives in close proximity to cattle, and it is suspected that he may have been eating cow feed. What feedstuff additive is known to be very toxic to horses and result in cardiomyopathy if consumed at high enough doses?

- Salinomycin
- Monensin
- Selenium
- Lasalocid
- Copper

Explanation - The correct answer is monensin. Monensin is a commonly used coccidiostat in feedstuff of cattle. This ionophore is highly toxic to horses (the toxic dose for horses is 10 to 15 times less than for cattle) and will result in cardiomyopathy and myocardial necrosis. Unfortunately, there is no quick and easy antidote,

and treatment usually consists of trying to empty the intestinal tract by using mineral oil, activated charcoal, and fluid therapy. Lasalocid and salinomycin are also ionophores that you might worry about, but monensin is much more toxic to horses. Selenium and copper are usually added to feedstuffs as a result of being deficient in the soil. Lack of supplementation with these minerals may result in cardiovascular disease, such as white muscle disease with selenium deficiency, and excessive bleeding in aged parturient mares with copper deficiency. One way of determining prognosis is to evaluate the horse's fractional shortening via echocardiography. Normally the fractional shortening is 30-40%; if you calculate fractional shortening to less than 20%, the prognosis is poor.

Question

Which of the following causes liver failure when ingested by horses?

- Fiddleneck
- Astragalus
- Bracken fern
- Oleander

Explanation - The correct answer is fiddleneck. **Fiddlenecks** contain pyrrolizidine alkaloids as does **groundsel**, **ragwort**, and **senecios**. Pyrrolizidine alkaloids cause **secondary photosensitization** as well as **hepatic damage** that are cumulative and progressive. Treatment consists of supportive care for liver failure and prognosis is poor.

Question

Which of the following is not hepatotoxic to horses?

- Cantharidin
- Microcystis
- Anabaena
- Aphanizomenon

Explanation - The correct answer is cantharidin. Cantharidin toxicity (aka blister beetle toxicity) results in **endotoxic shock** and **renal failure**. Horses affected may be found dead, colicking, or in cardiovascular shock. **Vesicles may form in the mouth and tongue**, and if the animal lives long enough, you can expect to see watery feces. **Renal tubular damage** will be profound, and you will probably observe cardiac arrhythmias. The blister beetles may become processed with hay or pellets; the horses then eat the toxic part of the beetle by accident. Anabaena, Aphanizomenon, and microcystis are all blue-green algae that cause hepatotoxicity.

Question

While on a routine call for teeth floats, you notice that there is a significant amount of fiddleneck in the horse pasture. What are the histopathologic findings that are associated with consumption of this plant?

- Megalocytes, fibrosis, and biliary hypoplasia of the liver
- Megalocytes, hepatic lipidosis, and biliary hypoplasia of the liver
- Nigropallidal encephalomalacia of the brain
- Megalocytosis, fibrosis, and biliary hyperplasia of the liver

Explanation - The correct answer is **megalocytosis, fibrosis, and biliary hyperplasia of the liver**. Fiddleneck (*Amsinckia intermedia*) is a **pyrrolizidine alkaloid**. Nigropallidal encephalomalacia is seen as a result of consuming yellow star thistle.
