

Laminitis

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Abstract

Laminitis, commonly called founder (founder is when actual rotation occurs due to the inflammation), is inflammation of the lamina. But to understand what that definition means for you and your horse, it's important to appreciate hoof anatomy. The wedge-shaped bone that sits within the hoof, called the coffin bone, is suspended from the hoof wall by finger-like projections known as the laminae. Inflammation and disruption of blood flow to the hooves damage the laminae, causing the bonds between the finger-like projections to break down. As a result, the coffin bone loses its attachment to the hoof wall, enabling the bone and the wall to separate. In chronic cases, this separation allows the coffin bone to "sink" or "rotate" therefore affecting the structures within the foot.

Clinical Signs

Laminitis can affect all four feet but most commonly is seen in the forelimbs. Laminitic horses may stand in a sawhorse posture to alleviate pressure on their feet or lie down more frequently to avoid bearing any weight. They most often are lame on tight circles, walk with a stilted gait or be reluctant to lift up their feet when asked. Often, the hooves are warm and bounding digital pulses are present. Digital pulses are the pulses that can be felt along the sides of the sesamoid bones on palpation.

Diagnosis

Diagnosis is usually based on x-rays where measurements are taken to determine whether the coffin bone has rotated or sunk within the foot. You can also determine if there is increased gas opacity along the laminar line indicating active inflammation present. Unfortunately, changes on x-rays lag behind what is actually going on in the foot and damage can occur without evidence of rotation or sinking. Therefore, treatment is usually initiated as soon as laminitis is suspected.

Etiology

Often, the inflammation and disruption of blood flow to the feet result from a problem elsewhere in the horse's body. Several causes of laminitis include excess grain or lush green grass, severe fever or illness such as colic or Potomac Horse Fever, retained placenta after foaling, endocrine conditions such as Cushing's or Equine Metabolic Syndrome, or excessive weight-bearing on one limb (contralateral limb laminitis). The exact link between these conditions and laminar damage is still unknown. It is generally agreed upon that the laminar damage results from decreased blood flow to the feet. But how does a disease in one part of the body cause decreased blood flow in another?

One thought is called the circulation theory. This states that inflammation in another part of the body causes constriction of the blood vessels in the foot, decreasing blood flow in the smallest blood vessels in the lamina. As a result, the cells making up the lamina die. The finger-like projections disintegrate as

the cells die and nothing is left to suspend the coffin bone. In addition, because the smallest vessels are constricted, blood is rerouted through the larger vessels, which produces the bounding digital pulses seen in acute laminitis. Another theory focuses on primary destruction of the lamina. One of the ways the body repairs itself is by producing enzymes called matrix metalloproteinases (MMPs). MMPs are involved in breaking down tissue at the molecular level to promote the growth of new tissue. In the normal environment, tissue repair is a delicate balance between breakdown by MMPs and restoration by other enzymes and cells. In this theory, severe systemic inflammation causes excessive release of MMPs, which in turn destroy cellular components of the lamina and enables the coffin bone to shift.

Treatment

Despite disagreement about the exact mechanism of laminitis, treatment is generally the same regardless of cause. If laminitis is a consequence of a systemic disease, first and foremost is to treat the disease. Restriction of grains and lush hay, corrective shoeing, anti-inflammatory medications such as phenylbutazone (Bute), banamine or equioxx, soft bedding, and keeping the feet cool with ice baths or ice boots are mainstays of treatment. More debated therapies include the use of vasodilators such as acepromazine or isoxsuprine and rheological agents such as pentoxifylline to improve blood flow to the feet. Rheological agents cause the membrane of red blood cells to be more flexible, reportedly enabling them to better sneak through the constricted capillaries.

Prognosis

Prognosis depends on cause, whether the laminitis is acute or chronic, severity of rotation or sinking of the coffin bone, and how quickly steps are taken to reduce the continued destruction of the lamina. Managing a laminitic horse will require good communication between you, your veterinarian, and your farrier. If you suspect your horse is developing laminitis, it is important to contact your veterinarian as soon as possible.

References

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