Hoof abscess in the horse

The nutritional connection

Treatment

Definition A hoof abscess is the localized accumulation of liquid inflammation product (pus) between two podal layers (dermis and epidermis) or inwards from the hoof wall. A hoof abscess is usually the result of tissue damage localized in the hoof or elsewhere in the body. The process of inflammation could be non-infectious (without the involvement of pathological microorganisms) or infectious. *In other words: a hoof abscess could originate from an inflammatory process located in the hoof or elsewhere in the body (usually the digestive tract but not only). The pus could carry infectious bacteria or it could be completely aseptic, carrying only the cells of inflammation: white blood cells, activated mast cells, platelets.*

Causes There are a few known causes of hoof abscess in the horse. Some hoof abscesses have a septic origin – microorganisms entering the hoof from outside (e.g. through foreign bodies like nails or sharp stones, white line separation - WLD - in cases of low grade, acute or chronic laminitis) or originating from the body (e.g. hindgut bacteria, its exotoxins or bacteria migrating from a different pathological process in the body, that enter the bloodstream and reach the hoof).

In some cases the cause for a hoof abscess is the toxic effect of medication such as antibiotics and anti-inflammatory drugs (NSAIDs like Bute; steroids); dewormers; vaccines but also through certain pathological conditions such as hindgut dysbiosis (e.g. the abnormal population of gut microbes as seen in Hindgut acidosis).

Hoof abscess can also be caused by trauma to the sole by stepping on sharp stones or simply by the presence of a horseshoe. In cases where the cause for a hoof abscess is solely traumatic, there is often an existing weakness of the sole and therefore any impact on the sole on hard or uneven surface can result in the formation of a bruise. The inflammation at the site of the bruise easily produces pus and an abscess is formed.

Mechanism of hoof abscess formation Like with inflammation elsewhere in the body, the formation of a hoof abscess is accompanied by all or most of the following clinical signs: edema of the affected distal extremity (usually around the moment when the abscess is ready to ascend to the surface), localized heat and pain, increased digital pulse strength

due to increased blood flow to the affected area. The zone of inflammation is infiltrated by white blood cells (predominantly macrophages and neutrophils), which eliminate dystrophic tissue, byproducts of inflammation and potentially microbes. The edema of the inflamed podal dermis is limited by the inelastic hoof capsule, which in turn restricts the blood flow to the affected area. Without a way out, the toxic byproducts of inflammation can cause further damage to the inflamed corium. The restricted blood flow also decreases the amount of nutrients transported to the area in question, aggravating the condition.

Clinical signs During an **acute** hoof abscess formation, the horse is suddenly lame. To avoid putting pressure on the hoof, the horse might result to a jumping gait or another unusual gait that allows lower grade weight bearing on the painful limb. The local temperature of the hoof and coronary band is usually tangibly higher than that of the other hooves. In some cases swelling of the coronary band or, more rarely, of the whole distal limb is present. The digital pulse is stronger than normal. If the cause for the sudden onset of pain is a foreign body penetrating the hoof, the immediate attention of the veterinary surgeon is required, as the danger of infection of the sensitive inner structures of the hoof and a generalized sepsis (blood poisoning) are highly likely.

Alternatively, a hoof abscess with a **chronic** course of development is usually present at the solar corium (at the sole) and therefore causes slightly different symptoms. The horse demonstrates sole sensitivity when walking over hard surfaces. Upon examination and trimming of the hoof, necrotic and foul-smelling tissues of the sole are revealed.

Treatment The treatment of a hoof abscess involves removing the causing factor (see *causes*), free choice movement and natural hoof care.

Removing the causative factor Laminitis and hoof abscesses in horses have a lot in common, but most importantly they are closely connected to nutrition. A diet, that is mostly balanced and as natural as possible allows not only for the formation of strong and withstanding hooves, but also helps the function of the immune system. A strong immune response to infection insures that the hoof remains a stable impenetrable structure to microorganisms that are found everywhere where the hooves of the horse might take it. In turn a weaker structure is far more susceptible to infection. The environmental conditions (e.g. mud, constant rain) play a role in softening the outer epidermal layers of the hoof, but a horse in good general health usually has hooves that can defy tough weather conditions. Therefore when addressing a hoof abscess diet plays a very important role (unless the cause for the abscess is a foreign body – contact your veterinary surgeon for advice and treatment). As is with laminitis, carbohydrate overload is a very common cause for abscess formation. Overload of non-structural carbohydrates (fructan, glucose, starch) causes a condition in the hindgut of the horse known as dysbiosis. During dysbiosis a population of certain specie or species of microorganisms grows in number while other species die. As the micro fauna in the hindgut changes, some or most of the NSC entering the hindgut go

through a process of fermentation instead of undergoing microbial digestion. Fermentation of NSC leads to production of lactic acid, which could be absorbed and used as an energy source by the horse at limited amounts. The rest can cause damage to the hindgut wall (a condition known as hindgut acidosis as lactic acid production leads to low hindgut pH). It is also believed that Streptococcus ssp., which take a huge part in carbohydrate overload in the hindgut of horses, release exotoxins, which reach the hoof and cause laminitis. What does this have to do with hoof abscesses? Although more research is needed on the matter, it is highly likely that the same forces at work during a laminitic attack act during hoof abscess formation. The endotoxins originating from the hindgut undoubtedly cause pathological changes to the connection between the dermis and epidermis of the hoof. As inflammation kicks in, pus forms and an abscess is taking shape. ***What to do: reduce or completely take out (depending on your horse's weight and health status) grazing, grains (esp. maize), fruit, sugary treats, over the shelf feeds with total sugar content higher than 10%. If your horse is underweight consider a change in diet. No matter what your horse's weight is, allow hay access 24/7.***

But an unbalanced diet affects hoof health in more than one way. Insufficient quantities of certain minerals that are believed to (more research with horses is presently needed) directly affect hoof quality (e.g. copper and zink). Such a major imbalance that manifests itself clinically as poor hoof quality (which leads to hooves that are more easily affected by the environmental conditions and terrain) suggests that it is fairly likely that the horse suffers under other deficiency related conditions elsewhere in its body. ***What to do: consider bringing in more variety in your horse's diet. Look for different types of hay and mix them in proportions according to their nutritional qualities and your horse's needs. Add small amounts of different herbs and allow your horse to choose between them. If your horse is eating grains or seeds, introduce different types according to its needs (avoid maize as a general rule).***

Free choice movement Knowing the way an abscess forms, we can conclude that a horse needs to move in order to expel it. Movement builds up pressure inside the hoof capsule – a process which has already begun with inflammation. However painful, movement is the only way for the puss to be pushed out of the rigid hoof capsule. Stall confinement might prove less painful for the horse, but it increases the period of recovery as pressure is built more slowly if the horse is mostly standing still. But mechanical pressure is not the only reason why movement is the recommended way of action in cases of hoof abscess. With each step the horse takes, pressure buildup inside the hoof capsule promotes blood flow and the eradication of the toxins, produced during the inflammation process. ***What to do: allow your horse to move freely in a paddock with soft surface. Wrapping and poulticing the hoof with a warming and drawing solution can help expel the abscess sooner, but also helps reduce the pain of movement (if the cause for the abscess is a foreign body penetrating the sole, contact your veterinary surgeon for further advisement).***

Natural hoof care Natural hoof care supports the hoof's natural function. ***What to do: avoid putting shoes or take the shoes off if your horse has an abscess. Shoes will take away the pressure from the sole and mitigate healing. In some cases the shoes themselves can be the cause of abscess formation. No digging or carving the sole, bars or toe in search for the abscess in the hoof is needed. This only weakens the external structures of the hoof and exposes the internal structures for further infection from outside. Although the pressure and pain of the inflamed tissue might resolve quicker, it will take the hoof much longer to heal from such an unnatural intervention. In some cases the surgical intervention itself causes more abscesses to appear. Most abscesses resolve within a few days given that all the above conditions are in place.***

Ralitsa Grancharova, DVM, MRCVS

For further information contact me on:

http://holisticvirtualvet.weebly.com/

holisticvirtualvet@abv.bg