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Laminitis in a Spanish pure-bred mare in Tabasco, Mexico: Case report

Laminitis en una yegua Pura Raza Española en Tabasco, México: Reporte de caso

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ABSTRACT

Laminitis is a serious, highly prevalent disease, recognized as one of the most important clinical syndromes in equines. The present study describes the case of a five-year-old Spanish pure-bred mare diagnosed with bilateral laminitis at approximately three months of age. The animal refused to walk, lying down all the time. The degree of claudication, according to the Obel scale, was degreed as 5; it also had an altered palmar digital pulse. It was prescribed 30 days of anti-inflammatory therapy with 1.1mg/kg intravenous (IV) of meglumine flunixin every 24 h, accompanied by omeprazole 2 mg/kg orally (O.V.). Additionally, hoof trimming and corrective shoeing were recommended. After eight months of treatment, the mare showed a remarkable improvement and gain in body condition, and a gestation was achieved. The anti-inflammatory treatment, hoof trimming and corrective shoeing favored the growth and hardness of the hoof, being successful in the treatment of laminitis.
Keywords: corrective shoeing, laminitis, Pure-bred Spanish Horse.

RESUMEN

La laminitis es una enfermedad grave, de alta prevalencia, reconocida como uno de los síndromes clínicos más importantes en equinos. En el presente estudio se describe el caso de una yegua Pura Raza Española de cinco años de edad, con diagnóstico de laminitis bilateral de aproximadamente tres meses. El animal se reusaba a caminar, manteniéndose echado todo el tiempo. El grado de claudicación, según la escala de Obel, se calificó de 5; asimismo, presentaba pulso palmar digital alterado. Se receto terapia de 30 días con antinflamatorios 1.1mg/kg intra venosa (IV) de flunixin de meglumine cada 24 h, acompañado de omeprazol 2 mg/kg vía oral (VO). Adicionalmente, se recomendó recorte de casco y herrajes correctivos. Después de los ocho meses de tratamiento, la yegua presentó una notable mejoría y ganancia de condición corporal, además, se logró una gestación. El tratamiento antiinflamatorio, recorte de casco y herrajes correctivos, favorecieron el crecimiento y dureza del casco, teniendo éxito en el tratamiento de laminitis.
Palabras clave: herraje correctivo, laminitis, Raza Pura Española.

INTRODUCTION

Laminitis or infosura is a serious disease, of high prevalence, recognized as one of the most important clinical syndromes in equines (Paula *et al*., 2020). The term laminitis is used to describe a systemic pathology, which compromises the general animal condition. It is an inflammation of the sensitive hoof laminae causing degeneration, separation and necrosis of the laminar corium (Londoño-Sossa *et al*., 2011; Mitchell *et al*., 2015).

Laminitis causes acute pain to animals and it is potentially fatal, primarily affecting adult horses and ponies of any breed (Mitchell *et al*., 2015).

Laminitis is commonly associated with the ingestion of nonstructural carbohydrates from pasture; however, it is not only related to diet, but also to some systemic diseases (Londoño-Sossa *et al*., 2011; Mitchell *et al*., 2015; Paula *et al*., 2020). The clinical alterations that predispose laminitis are acute abdominal syndrome, enteritis, retention of fetal membranes, metritis, pleuropneumonia, and other pathologies. It can also occur due to improper handling of the animal, such as excessive ingestion of cold water after work or the administration of high corticosteroid levels, which decrease protein synthesis, potentiate digital vasoconstriction and induce micro-thrombosis (Londoño-Sossa *et al*., 2011; Mitchell *et al*., 2015; Paula *et al*., 2020). Other risk factors associated with laminitis are horse breed being more prone to draft breeds, overweight in the animal, high nutritional level and older horses with Cushing's disease (AAEP, 2020).

Laminitis can present in one or more limbs with characteristic signs, such as lameness, increased hoof temperature and increased digital pulse in the limb, pain when pressure is applied, hesitant gait, stance with forelegs extended forward to relieve pressure, in chronic cases; widening of hoof wall rings may be observed as they follow from toe to heel, bruised soles, widened white line, with appearance of seromas and/or abscesses, drooping soles, thick callus as well as concave hooves with "Aladdin's shoes" appearance (AAEP, 2020).

The Americans Association of Equine Practitioners (AAEP, 2020) established the following equine lameness scale:
Degree 1: Lameness that is difficult to observe in any situation.
Degree 2: Lameness that is difficult to observe at a walk or trot but appears in certain circumstances.
Degree 3: Permanent lameness at trot at all times.
Degree 4: Lameness is evident by nodding the head or taking a short stride.
Degree 5: Lameness is very evident and permanent with minimal weight bearing and manifests itself at rest and even more so when moving.

The knowledge and understanding of the pathophysiology of laminitis is somewhat unknown, a situation that limits efforts for its prevention and treatment. Therefore, timely diagnosis and subsequent medical treatment, supported by biomechanical methods, are of utmost importance to minimize the effects of this disease (Mitchell *et al.,* 2015).

The objective of this study is to describe the diagnosis and treatment of a case of bilateral laminitis in a five-year-old Spanish pure-bred mare, which was treated with anti-inflammatory therapy, hoof trimming and corrective horseshoeing.

CLINICAL CASE DESCRIPTION

It is presented the case of a five-year-old Spanish pure-bred mare (Figure 1), that began with discomfort when walking and lying down most of the day. This problem had been present for about three months. The degree of claudication, considering the scale of EEAP (2020), it was rated from degree 5; she also presented increased digital palmar pulse. The mare was rested in a stall with a rubber floor and a bed of shavings with a thickness of approximately 70 cm to make her as comfortable as possible. Its feed was based on fresh Taiwan grass (*Pennisetum purpureum*) chopped at free access without additional concentrate.

Figure 1. Clinical process of laminitis in a Spanish Breed mare. a) Aspect of the laminitic hoof, b) Physical examination of the hoof clearly shows necrosis of the dermal laminae and cell death, c) MAD latero-medial image with evident 5° rotation about to perforate the solar part, d) therapeutic fitting of the hoof based on a glued aluminum horseshoe and impression material to support the palmar part of the hoof, e) radiographic aspect of the MAD after 12 months of treatment and f) aspect of the MAD hoof after 12 months of treatment.

First, a physical examination of the hoof (Figure 1a,b) of the right/left forelimb was performed using palpation forceps. Subsequently, radiographs were taken using a latero-medial projection to determine the degree of rotation of both limbs (Figure 1c). Once the radiographs were obtained, it was established that the rotation angle of the third phalanx (p3) was greater than 5º. Trimming was performed to stabilize and improve the position of P3 within the corneal case, so that the therapeutic hardware would perform its function

of trimming the step. The hardware used in the treatment was a libero model (Mustad, Norway) with a rokert toe modification (Figure 1e).
Thirty-day therapy was prescribed with anti-inflammatory drugs 1.1mg/kg intravenous meglumine flunixin every 24 h, accompanied by omeprazole 2 mg/kg orally to prevent possible gastric ulceration and prolong the use of anti-inflammatory drugs.

After 12 months of treatment with therapeutic shoeing (Figure 1f), the mare presented a considerable improvement and gain in body condition, achieving a pregnancy.

Figure 2 shows the radiographic images of laminitis at the beginning as well as its evolution at six and 12 months after treatment.

Figure 2. Radiographic images of bilateral laminitis, a) MAI with rotation of 5 to the point of perforating the sole; b) MAI at 6 months after de-rotation and tenotomy of the common flexor tendon and c) MAD after 12 months of treatment.

DISCUSSION

Timely prognosis given by ethical clinicians is very important in the treatment of equine conditions such as laminitis. The most recommended parameters to estimate the prognosis in equines with laminitis are: claudication degree and the intensity of third phalanx rotation measured as the angle formed by the dorsal aspect of the podal bone and the hoof wall (Londoño-Sossa *et al*., 2011). The degree of claudication is commonly determined based on the classification defined by Obel (1948), but recently some authors (Meier *et al*., 2019) have made modifications to that scale and proposed a five-criteria, three-stage method that employs a severity scale of 0-12; however, this method is very limited given that many of the signs on which the criteria are based may not be present in the preclinical phase (with the exception of the digital pulse).

In the present clinical case, since the patient remained lying down and without any attempt to get up, a degree 5 was assigned, which is assigned when the animal refuses to move unless forced; which according to EEAP (2020), is the most severe degree. In this regard, Mitchell *et al.* (2015) describe that it is common for severely affected horses to take a specific posture to shift their weight onto their hind legs, due to intense pain that is often accompanied by anxiety and muscle twitching. It is vitally important to avoid prolonged periods of recumbency in animals due to the potential for pressure ulcers (Mitchell *et al.,* 2015).

Lack of adequate pain control is a common reason why horses affected by laminitis are eventually euthanized (Bamford, 2019). Nonsteroidal anti-inflammatory drugs (NSAIDs) such as flunixin meglumine (1.1 mg/kg orally (OV) or intravenously (IV) and phenylbutazone (2-6 mg /kg OV), in low doses, are commonly used as a form of analgesia and to treat laminitis-induced inflammatory responses. For the chronic stage of laminitis cyclooxygenase type 2 (COX-2) inhibitor NSAIDs, such as firocoxib, provide safe and effective pain relief. Non-selective COX inhibitors may be better in the acute and developmental stages of laminitis, as vascular function is still present (Orsini, Wrigley, & Riley, 2010). A vasodilator such as acepromazine (0.002-0.0066 mg/kg VO or IV or intramuscular (IM), may be helpful in counteracting vascular dysfunction in the phalanx (Parks, 2009). Accepromacin increases digital and laminar blood flow in normal horses. The calming effects of aceppromazine may stimulate the horse to lie down, which may be beneficial. More recently, interest has developed in the use of other analgesic agents such as lidocaine and ketamine, administered as an intravenous infusion, or narcotics, either as a continuous, epidural or intravenous infusion (Parks, 2009).

On the other hand, many factors must be taken into account, especially if there is rotation of the third phalanx, an event that determines a poor prognosis in the vast majority of cases (Londoño-Sossa *et al*., 2011). Some authors consider that an angle greater than 11 is of poor prognosis for the return to athletic function (Londoño-Sossa *et al*., 2011). Radiographic studies to evaluate the degree of palmar / plantar rotation of the distal phalanx showed that in the patient in the present study, this angle was 5º, which confirms the diagnosis of laminitis (Sherlock and Parks, 2013). Stick *et al*. (1982) suggest that horses with a rotation less than 5.5° have a better prognosis for return to sporting activities than horses with a rotation greater than 11.5°. However, Paula *et al*. (2020) reported that horses with a rotation between 10.5° and 11.02° returned to normal activities.

The use of therapeutic horseshoes for the treatment of laminitis are the wodem shoe, banana shoes with wedge insoles, aluminum shoes with glued-on bench insoles, represent the first option in the treatment of chronic laminitis (Estrada, 2011). Tenotomy of the deep digital flexor tendon is another option in the treatment of laminitic horses, since it helps to improve biomechanics, decreasing the tension force that this tendon exerts on p3, allowing derotation, although the postoperative period and rehabilitation will require medication and time to restore the functionality of the limb (Carmona and López, 2011).

Radiographs are indicated in every suspected laminitic case because they provide valuable information about the presence, severity, relative chronicity and progressive nature of the disease (Sherlock and Parks, 2013). Interpretation of the horse with suspected laminitis is more complex than just identifying the presence or absence of dorsal rotation (Sherlock and Parks, 2013). A thorough evaluation of radiographs is essential as many abnormalities may be evident at the same time (Parks, 2007).

The most important factor in the long-term prognosis of the horse with laminitis is the extent of laminar pathology which influences the degree of instability between the distal phalanx and hoof wall however, this is very difficult to determine. Advanced diagnosis with

the use of radiological imaging along with clinical signs may help in future evaluations, but currently the evaluation of a horse with laminitis is based on paying close attention to the details of the simple radiographic series, clinical evaluation and occasionally venographic studies.

Fortunately, the patient was able to recover satisfactorily, a situation that represents a successful case, considering that approximately 75% of horses treated for laminitis do not return to their respective physical activity, and in many cases are ultimately slaughtered (Londoño-Sossa *et al*., 2011).

CONCLUSION

Treatment with anti-inflammatories, therapeutic shoeing, as well as teamwork between veterinarian, farrier, owner and equestrian, favored the growth and hardness of the hoof, with success in the treatment of laminitis.

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