

Chronic equine proliferative pododermatitis: case report

Pododermatite proliferativa crônica equina: relato de caso

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ABSTRACT

Chronic equine proliferative pododermatitis (canker) is a chronic hypertrophic disease of the hoof, denoted by an excessive proliferation of the horn-producing tissues, which results from a dyskeratosis of the keratinocytes. It occurs mainly at the frog and sulci regions, but can sometimes also affect the heels, sole, bulbs or hoof wall. The etiology still remains unclear. Infectious agents such as anaerobic bacteria, viruses, spirochetes and fungi have been isolated from diseased tissues, but, moreover, an immune cause has been suggested, possibly related to a genetic predisposition. This report shows a case of a Brazilian Sport Horse, 10 years old, that had been affected on the right hindlimb for more than two years without a concise diagnosis. Success was achieved with the treatment consisting of oral prednisolone and topical *Purple Mush*[®].

Keywords: Canker. Immune. Prednisolone. Purple mush. Equine.

RESUMO

Pododermatite proliferativa crônica equina (cancro) é uma doença hipertrófica dos cascos, caracterizada por uma proliferação excessiva dos tecidos produtores de túbulos, o que resulta de uma disqueratose dos queratinócitos. Concentra-se principalmente na região da rasilha e seus sulcos, mas algumas vezes pode afetar também talões, bulbos, sola e parede do casco. A etiologia ainda não foi confirmada. Agentes infecciosos como bactérias anaeróbias, vírus, espiroquetas e fungos já foram isolados de tecidos afetados, mas cada vez mais uma hipótese imune vem sendo discutida, possivelmente relacionada a uma predisposição genética. Este relato traz o caso de um Brasileiro de Hipismo, 10 anos, afetado no membro pélvico direito há mais de dois anos sem um diagnóstico conciso. O êxito foi obtido com o tratamento consistindo em Prednisolona oral e *Purple Mush*[®] tópico.

Palavras-chave: Cancro. Imune. Prednisolona. Purple mush. Equino.

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Received: July 24, 2019

Approved: August 24, 2019

How to cite: Azzolini EFOT, Bastos SF, Barros RM. Chronic equine proliferative pododermatitis: case report. *Braz J Vet Res Anim Sci.* 2019;56(4):e160249. <https://doi.org/10.11606/issn.1678-4456.bjvras.2019.160249>

Chronic equine proliferative pododermatitis is a hypertrophic disease that alters the keratinocytes' cornification process, resulting in dyskeratosis (hyperkeratosis and

parakeratosis), that leads to an exuberant proliferation of a horn with inferior quality (Jongbloets et al., 2005; Baxter, 2011; Oosterlinck, 2015; Apprich et al., 2017). It affects hooves initially at the frog and associated sulci region, but will become diffuse to the bars, sole, heels, bulbs and even the hoof wall if left untreated (O'Grady & Madison, 2004; Redding & O'Grady, 2012; Oosterlinck, 2015).

Canker is reported to have a higher prevalence in draught horses, but it can affect thoroughbreds, warmbloods or any breed as well. Also, it is reported to occur mostly in the hindlimbs, although it can happen in all four feet (Oosterlinck et al., 2011).

The etiology remains elusive, anaerobic bacteria such as *Fusobacterium necrophorum*, fungi, spirochetes and virus (bovine papilloma virus types 1 and 2) (Brandt et al., 2011) have been isolated from diseased tissue; however, there is no proof of any relationship between these infectious

agents and the onset of canker. Chronic proliferative pododermatitis is not considered to be a true neoplasm, but rather a chronic inflammatory reaction (Oosterlinck, 2015). An immunologic hypothesis is moreover getting stronger. Jongbloets et al. (2005) have reported a case of a mare affected in all four feet. Cultures were obtained and were found negative to the pathogens tested and no papillomavirus was found. These results and the clinical signs presented led to this (auto-) immune hypothesis.

Diagnosis is made upon the history and gross macroscopic findings as the lesion has a pathognomonic appearance (Oosterlinck, 2015). The proliferative frog is characterized by numerous filamentous or cauliflower-like epithelial proliferations and the epidermal tissue of the frog is covered with a caseous exudate that resembles cottage cheese. It is frequently, but not always, accompanied by a putrid odor and bleeds easily when abraded (O'Grady & Madison, 2004; O'Grady, 2011; Redding & O'Grady, 2012; Oosterlinck, 2015).

In the early stages, it can be easily mistaken as thrush, since both conditions are associated with structural degradation (Oosterlinck, 2015). However, while canker is a proliferative disease of tissues, thrush is characterized by a loss of the frog tissue (Redding & O'Grady, 2012). Biopsy in moderate to severe stages is unnecessary and culture is unrewarding because of the mixed population of microorganisms that are often found on the epidermis of the hoof (Baxter, 2011; Oosterlinck, 2015).

Because of the unknown etiology, many treatment protocols have been tested, none of which have proven effective (Baxter, 2011; Oosterlinck et al., 2011). Treatment generally involves surgical debridement of the diseased tissue, topical application of antibiotics, topical application of caustic substances or topical cisplatin chemotherapy. A mix of 10% benzoyl peroxide in acetone and metronidazole powder is frequently applied with some success reported (Jongbloets et al., 2005; Oosterlinck et al., 2011; Apprich & Licka, 2013; Oosterlinck, 2015).

Jongbloets et al. (2005) raised this (auto-) immune hypothesis with the treatment and cure obtained in a mare that had all four feet affected together with the clinical findings that contributed to this immune reaction hypothesis. The treatment adopted consisted of surgical debridement and administration of prednisolone (1mg/kg sid per os). The horse was completely healed within 8 weeks and had no recurrence within the next year by the time of the paper's publication.

This report shows a case of a 10-year-old Brazilian Sport Horse gelding that had been affected on its right hindlimb

for more than two years without a concise diagnosis or treatment. The aim of this paper is to describe the success achieved with the treatment consisting of oral prednisolone and topical *Purple Mush*[®].

At the time of diagnosis, the horse was lame on that limb and minimally weight bearing even when at rest (Grade 5/5 following the AAEP Lameness Scale). All the affected areas were extremely painful indicating a severe stage of canker. The frog region had the pathognomonic appearance of caseous exudate ("cottage cheese") with the adjacent sole, bars, central sulcus, bulbs and medial heel already damaged (Figure 1).

On the first protocol attempted, surgical debridement was performed with the horse standing, excision off all the affected tissue (of the frog, sulci, sole and bulbs) followed by daily antiseptic lavage with chlorhexidine and, on alternating days, with povidone-iodine. The appliance of a topical 10% benzoyl peroxide in acetone and metronidazole powder was covered by bandaging the hoof with duct tape. Other standing debridements were performed as needed because of the continuous growth of still affected keratinocytes. No substantial improvement was found after two months of this treatment.



Figure 1 – Appearance of the hoof at the moment of diagnosis.

After many other protocols had been unsuccessfully attempted, such as twice daily lavage with topical caustic agents for 16 days, potassium permanganate washing for 15 days, topical sulfur powder for 10 days and seven days of oral prednisolone (1mg/kg), it was decided to import and try the *Purple Mush*[®], a hoof packing, natural product (*Croton lechleri*, *Gentiana quinquefolia*, *Mahonia aquafolium*, *Tabebuia impetiginosa*, *Scutellaria lateriflora*, *Hydrastis canadensis*, Ethanol) that has proven to be successful in the treatment of cankers worldwide with a zero recurrence rate of 80%, according to the manufacturer.

The horse became less lame after these initial treatments (Grade 3/5 – AAEP Lameness Scale) and was shod and returned to light hand walks or trail rides while waiting for the *Purple Mush*[®] to arrive. Despite that, the frog region was still soft, painful and covered with the caseous exudate. Meantime, other debridements were performed by a farrier, together with the trimming and shoeing of the other hooves. Before initiating the treatment with this new product, the hoof was left for two weeks without any kind of treatment.

Following the standard protocol recommended by the instructions of the product (*Purple Mush*[®]), the hoof was cleaned and scrubbed with a non-caustic antibacterial (neutral soap), dried and the product stuffed into all the crevices. We were careful to remember that the frog was still very painful to touch even with the horse not grossly lame (1/5 - AAEP Lameness Scale). The hoof was properly bandaged with a plastic wrap, cotton and duct tape. This bandage was kept for 5 days and then repeated every 5 days for 3 weeks, allowing a day between the wrappings to vent and dry the hoof. Prednisolone was also given orally along with the hoof packing treatment and continued for 10 weeks. For the first two weeks, the horse was given the initial dose of 1.3mg/kg (600mg), per day every day. During weeks 3, 4 and 5, it received 300mg/day daily, and for weeks 6 through 10, 200mg/day every other day.

After performing the standard number of packings, we decided to continue for a few more weeks. The hoof was starting to show some improvement, no caseous exudate was present and the spread of the affected area through the bulbs was being controlled. The packing was stopped at the 6th week of treatment when the frog was entirely within the normal consistency, neither soft nor with exudate. The tubules of the hoof were macroscopically observed to be in the correct pattern. The horse was sound, no longer painful to touch and bearing weight normally on that limb. He was returned to his normal training schedule later that week.

At the 9th week of treatment (Figure 2), the horse was absolutely normal, not painful, and the frog completely canker free with normal consistency and without any exudate. The bulbs were also observed to be free of disease with no exudate and returned to the expected consistency and growing normally. The lateral aspect had already fully grown to the normal length while the medial aspect was at approximately 1cm above the desired length. As of the writing of this paper, there is one week remaining on prednisolone. The horse is now fully recovered, completely sound (0/5 AAEP Lameness Scale) with a healthy hoof and there is no expectation of a recurrence of the disease. The horse has returned to his normal training program and preparing for the next show jumping championships.

Due to the unknown etiology of the chronic equine proliferative pododermatitis, many treatment protocols are not effective. As observed on the animal of this report, surgical debridement followed by daily antiseptic cleaning did not present satisfactory results. The alternative therapeutic treatment of *Purple Mush*[®] associated with prednisolone displaying efficient results strongly reinforces the hypothesis of an immune origin; with the *Purple Mush*[®] being responsible for controlling the “outer” inflammation of the epidermal tissues of the hoof. Its main ingredient, *Croton lechleri*



Figure 2 – Sole and frog region returned to the regular appearance and solidity expected of a healthy hoof. The horse is now sound at the 9th week of treatment.

(Sangre de Drago), a tree from the Peruvian Amazon, has proven strong anti-inflammatory and wound-healing properties (Jones, 2003). The “inner” inflammatory chain, possibly originating by the autoimmune reaction against the keratinocytes, was being controlled by the anti-inflammatory steroid prednisolone suppressing the immune system of the horse and hindering the damage to the body’s own cells.

Despite that, considering the arguments presented and the research carried out, it is understood that the literature pertinent to satisfactory canker therapy is scarce and more studies about its real etiology are needed. Due to the aforementioned facts, the awareness of owners/handlers about a condition of hull integrity as a relevant factor for the equine welfare is also essential.

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Conflict of Interest

No potential conflict of interest was reported by the authors.

Ethics Statement

All authors have been personally and actively involved in the manuscript, and are jointly and individually responsible for their content.

Acknowledgements

We are grateful to Mr. Coco Fernandez for his many courtesies sharing his wisdom with us during the course of this treatment. We also would like to thank Mr. Robert McMinn for reading the manuscript.

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Financial Support: None.

Authors Contributions: Essayra Fortes Oliveira Tregnago Azzolini and Samuel Freitas Bastos contributed to treatment execution. Essayra Fortes Oliveira Tregnago Azzolini wrote the manuscript with support from Rafaela Magalhães Barros and Samuel Freitas Bastos. Rafaela Magalhães Barros contributed to preparation and design of the manuscript. Essayra Fortes Oliveira Tregnago Azzolini conceived the original diagnosis and treatment projects with supervision from Samuel Freitas Bastos.