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Case Report

Analgesia Promoted by the Perineural Infiltration of Ethanolic Solution 49.75% in Horses: Report of 8 Cases

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Abstract

The neurolytic solutions are widely used in equine medicine, in order to temporarily block nerve transmission to treat chronic degenerative diseases and relieve pain. Ethanol is the neuroleptic agent that has the longest duration of action, but causes higher rates of local inflammatory reaction, depending on concentration and site of infiltration. The present article aims to cite the use of 49.75% Ethanol Solution in eight cases. Three cases with infiltrations in the digital palmar nerves (DPN): two cases of ossification of alar cartilage and one fracture of the lateral wing in the third phalange; and five cases in the palmar nerves (PN): two chronic laminitis and three proximal interphalangeal bone proliferations (ring bone). Five of the eight cases presented local inflammatory reaction, representing 62.5%. All animals decreased the degree of claudication from 3 to 20 days. The animals were clinically followed-up for 120 days, with no return to the original degree of claudication. Lastly concluded that the 49.75% ethanolic solution was effective in the production of analgesia in horses with chronic digital affections, but it should be contraindicated in this concentration for PN block, because of presents local inflammatory reaction and esthetic damages due to fibrosis in several animals. Further studies with ethanol in neurolytic solutions for equines are necessary, trying to make possible a concentration that has a lasting effect, without exteriorization of inflammatory and / or fibrosis reactions..

Keywords: Horse; Chronic Pain; Neurolytic; Ethanolic Solution

Abbreviations: ACA: Painful Ossification of Alar Cartilages; DPN: Digital Palmar Nerve; LAM: Chronic Laminitis; PWF: Fracture of the Distal phalange Lateral Wing without joint involvement; PN: Palmar Nerve; RB: Proximal Interphalangeal Osteoproliferation with joint involvement (ring bone)

Introduction

Although all scientific and technological advances, pain, in its various forms of manifestation, continues to be one of the greatest challenges of equine medicine. Several methods of analgesia are researched and used in equine practice, aiming at temporarily or definitively abolishing patients' pain. The main goals of analgesia therapy are: keeping the animals in the sports career or function performed, conducting examinations or clinical-surgical procedures, improving the prognosis for a particular condition and promote better quality of life and welfare [1]. For pain control, there are several therapeutic options, among them: corticosteroids, non-steroidal anti-inflammatory drugs (A.I.N.E.), α-2 agonists and opioid agents. However, these treatments are usually effective in acute pain, that is, pain presented as a clinical sign of any disease. Chronic pain becomes the disease itself, due to the prolonged time of painful stimulation, the use of these therapies is restricted, since their continuous use may cause adverse effects on the species (such as gastritis and renal failure). In these cases, the pain is called neuropathic [1-4]. The principal known cause of chronic pain in horses is the result of degenerative processes at the extremities of the limbs, especially in the phalanges and interphalangeal joints, being one of the problems most commonly faced by clinicians. More than a third of all chronic claudication on the horse originate from lesions in the palmar region of the limb, which respond positive albeit temporary, to the block of the Digital Palmar Nerve [3,4]. Among the podal diseases that comprise this group are: podosesamoiditis or distal sesamoid (navicular) disease, navicular fracture, ossification of collateral cartilages of the distal phalanges, angular fracture or of the palmar process of the distal phalanges and podal osteitis [1,5-7]. In cases of chronic degenerative syndromes in the palmar hull region, responsive to Nerve Digital Palmar anesthetic block, palmar digital neurectomy or chemical neurolysis through neurolytic agents are indicated [5,6]. The use of neurolytic agents has been introduced in equine medicine as a palliative treatment of low back pain and degenerative limb processes and is often used on animals

with prolonged disease process [1,8]. Thereby has becoming increasingly common to use these agents in the clinical-surgical routine, aiming at the "irreversible" or reversible prolonged blockade of nerve conduction in the chronically affected region [1].

Theoretically, most of the neurolytic agents used in humans can be administered to horses, but there are proportionately few controlled studies on this subject in veterinary medicine, which in most cases lead to doubts and misconduct in the use of these drugs. Several drugs are cited with neurolytic action, among them phenols, alcohols and ammonium chloride, the latter being the most used by equine clinicians in South America, using Ammonium Chloride in concentrations of 1 to 2%. Alcohols have a longer lasting action than the others, but cause a greater local inflammatory reaction or transient cellulitis [1,4,9].

Ethanol is the neuroleptic agent that has the longest duration of action, but causes high rates of local inflammatory reaction, depending on its concentration and site of infiltration [1]. In the literature, authors cite perineural infiltration of ethanolic solutions over a wide concentration range(4 a 99,5%), aiming at neurolysis (by dehydrating action and precipitation of proteins) and consequent analgesia. The pain will be absent until restoration of the nerve fibers and normal transmission of impulses, depending on the ethanolic concentration, that can cause from neuropraxia to neurotmesis, determining the time of neurolytic or analgesic action [1,5,9].

Nicoletti et al. [5] in a comparative study of the infiltration of Sarapin® (Group A) and Ethanol Solution 99.5% (Group B), in the Palmar Nerve of horses, noticed latency time between 7 and 30 days, and with 150 days the sensitivity had returned in group A and with 180 days was absent in Group B. However, all animals in Group B had a local inflammatory reaction at the site of application, with a painful reaction for 3 to 4 weeks, and aesthetic impairment in the middle third of the metacarpus (cinnamon region). In this way the authors proved the long-lasting action of ethanol, but with the undesirable and restrictive inflammatory reaction and local esthetics.

This retrospective study aimed to evaluate the action of 49,75% ethanolic solution perineural infiltration in palmar and palmar digital nerves in horses with chronic distal degenerative syndromes, to evaluate time of latency and action, local inflammatory reactions and decrease in the degree claudication.

Cases Presentation

This paper reports the case of eight animals, aged between 4 and 12 years, weighing between 380 and 526kg, attended the Ambulatory of the Research and Extension Group on Equines of the Federal University of Alagoas and the Hospital of Equines Vetpolo, in the city of Indaiatuba-SP, respectively in the Northeast and Southeast regions of Brazil. The animals presented with pain of more than 30 days, with clinical and radiological diagnosis of the following affections: Fracture of the Distal phalange Lateral Wing without joint involvement-PWF (1 animal), Painful Ossification of Alar Cartilages – ACA (2 animals), Chronic Laminitis–LAM(2animals), Proximal Interphalangeal Osteoproliferation with joint involvement (ring bone)- RB (3 animals). All of the animals had already been treated with non-steroidal anti-inflammatory drugs, in most cases phenylbutazone for 5 days, and corrective shoeing, being: horseshoe closed with side door holsters for PWF, Egg Bar Shoe for ACA, Hearth bar Shoe for Laminitis and braking with buffer insole for animals bearing ring bone. In the cases of PWF and ACA, 5ml of the solution in the Digital Palmar Nerve (DPN) lateral and 5 ml in the medial DPN were used. In the cases of LAM and RB, the nerve used was the Palmar Nerve (PN) in the middle third of the metacarpus (cinnamon), with 5ml infiltrated in each nerve (lateral and medial).

The localization of the nerves was done according to the methods described by Moyer et al. [10]. The achievement of satisfactory results was evaluated through a decrease in minimum claudication of one degree, according to Stashak [11]. Animals without claudication were considered grade 0. From there, it was indicated the use of neurolytic, infiltrated from 48 hours to 7 days after the anesthetic block, avoiding excess local volume. The neurolytic blocks were performed with the same volume as the anesthetic block, with 49.75% ethanolic solution, diluting 2.5 ml of 99.5% absolute alcohol in 2.5ml NaCl solution 0.9% per nerve.

1. Mangalarga Marchador and Campolina are the Brazilian Walking horse's breeds.

2. Vaquejada is a western equestrian sport of cultural origin in the Brazilian Northeast.

Discussion

According to the data in Table 1, the latency time of the neurolytic varied from 3 to 20 days, being directly related to the local inflammatory reaction, that is, the animals that presented inflammatory reaction evidenced a longer latency period and consequent delay in the decrease of the degree of claudication comparing with animals without local inflammatory reaction. There was exacerbated sensitivity at the site of infiltration of patients who presented inflammation, raising doubts whether the neurolysis occurred prior to the time of decreased claudication and was masked by pain at the site of application. Also, in this clinical study, reactions were found in greater quantity than in the study by Nicoletti et al. [5] where only one in five horses showed a painful inflammatory reaction in the infiltrated region (PN). Consequently, even diluting the concentration cited by the author [5] by 50% gave 62.5% (5/8 animals) with reaction. This percentage increases considering only PN, where 80% (4/5) of the animals presented pain, redness, swelling and heat at the point of infiltration. In the analysis of Table 1, it is suggested that ethanol has a greater inflammatory reaction in perineural infiltrations in NP than in DPN.

Conversely all animals demonstrated a decrease in the degree of claudication form 120 days, 100% of the animals decreased the degree of claudication significantly, of those 25% (2/8) with a slight degree (not evidenced in step, only at trot) and 75% (6/8) without apparent lameness. The results show the effectiveness of neurolytic blockade promoting analgesia in patients with chronic

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degenerative syndromes. It is also of fundamental importance that the use of neurolytic be accompanied by the therapeutic care of protection and sanity of the hull, for that reason all the animals continued to shoeing and the therapeutic shoeing by affection, as already described.

Table 1: Discrimination of affections, infiltrated nerves, characteristics associated with the patients and results obtained from the perineural infiltration of ethanolic solution in palm digital nerves (PND) and palmar nerves (PN) of horses with chronic pain, with the following conditions: Fracture of the Distal phalange Lateral Wing without joint involvement (PWF), Alimentary Cartilage Ossification (ACA), Chronic Laminitis (LAM) and proximal Interphalangeal Dorsal Osteoproliferation with ring bone (RB).

Animal (N°) -Afection- Infiltrated Nerve	Activity- Race- Sex	Latency Time for Analgesia	Observation Local Inflammatory Reaction	Degree Claudication Initial	Claudication Degree Post Infiltration (After Latency)	Degree of Claudication With 120 Days	Observation of Aesthetic Impairment (Presence of Fibrosis)
1-PHF-DPN	Polo-Standardbreds-F	3 days	No	3	0	0	No
2-ACA-DPN	Polo-Standardbreds -M	3 days	No	2	0	0	No
3-ACA-DPN	Polo-Mixed race -F	10 days	yes	3	0	0	No
4-LAM-PN	Reproduction -Campolina[1]-F	7 days	No	4	2	1	No
5-LAM-PN	Marchador-M. Marchador1-F	20 days	yes	3	1	0	Yes
6-RB-PN	Vaquejada[2]-Quarter Horse-F	15 days	yes	3	1	1	Yes
7-RB-PN	Vaquejada-Quarter Horse-M	15 days	Yes	2	0	0	Yes
8-RB-PN	Vaquejada-Quarter Horse-F	20 days	Yes	3	1	0	Yes

Less satisfactory results relate to conditions of difficult-to-resolve multifactorial entomopathogens, such as chronic laminitis, with mortality rates above 50% [12] and proximal interphalangeal joint injuries, which usually require associated surgical or chemical arthrodesis [13]. In other conditions, the ethanolic solution ceased to claudication in all animals, being an important adjunct to traditional therapeutic techniques, provided that the necessary rest of the animal was respected. The results corroborate with the findings by other authors, since in prognosis is favorable in 91.7% of the cases (winged cartilage ossifications) in cases of wing fractures of the distal phalanges without joint involvement (PWF), where the results with neurolytic use are satisfactory and indicated [1].

The second major contraindication for the use of the ethanolic solution in this study was the fibrosis and volume increase in the cinnamon of the animals submitted to PN infiltration, which are not restricted only to the application site but extend throughout the lateral region and medial aspect of the metacarpal, significantly compromising local aesthetics. In the animals submitted to the neurological blockade of the DPN there were no aesthetic damages.

Conclusion

We concluded that the ethanolic solution 49.75% was effective in the production of analgesia in horses with chronic digital affections, but it should be contraindicated in this concentration for PN blockade, since it presents local inflammatory reaction and esthetic damages due to fibrosis in most animals. There is a need for further studies with ethanol in neurolytic solutions for equines, in order to identify the optimum formulation with long duration of action with minimal inflammation and fibrosis reactions. Furthermore, the study confirms the importance of neurolytic solutions in the palliative treatment of chronic degenerative cases and as adjuvants in the assisted control of pain in long-term clinical-surgical cases.

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Conflict of Interest

Declare if any financial interest or any conflict of interest exists.

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