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Case Report

Platelet-Rich Plasma as an Adjunctive Therapy for the Management of a Severe Chronic Distal Limb Wound in a Foal

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ABSTRACT

Distal limb wounds are frequent in horses after traumatic events. The use of platelet-rich plasma (PRP) represents a simple method of treating wounds in equines. A case of a chronic severely contaminated distal limb wound in an 8-month-old foal is presented. The patient was managed with the combination of standard wound therapy (debridement and bandages), surgery, and PRP obtained by a manual tube protocol. No complications were observed with the PRP treatment, and the foal was fully recovered 2 months later. The results from this case report indicate that PRP and its by-products (platelet-poor plasma) could be used as an adjunctive treatment in severe distal limb wounds in horses. A clinical controlled study should be performed to test this hypothesis.

1. Introduction

Distal limb wounds are frequent in horses after traumatic events. Approximately, 25% of these wounds should be managed for secondary closure due to substantial loss of soft tissues and for exaggerated wound retraction [1]. Furthermore, damage of the periosteum and opportunistic microbial infection [1,2] are complementary factors that hamper wound healing and increase both the recovery time and the costs associated with the treatment, such as, hospitalization period, bandages, and medicaments [3].

The standard management of distal limb wounds in horses includes an adequate debridement and a selection and application of a proper bandage during several weeks and even months [3]. In some cases, the recovery time is pivotal for owners, and practitioners are pushed to give additional wound care to improve wound healing and diminish the cicatrization time. On the other hand, the presence of severe microbial infections, bone sequestrum formation, and proliferative bone exostosis also demands a more specialized wound treatment, including surgery [1,2,4].

There are several natural substances (e.g., honey and elk velvet antler extract), synthetic (silicon) and biologic dressings (e.g., allogeneic skin, allogeneic peritoneum, and xenogenic porcine small intestinal submucosa) and physical procedures (e.g., low-level laser therapy, hyperbaric oxygen therapy, and shock-wave therapy) intended for the management of complicated distal limb wounds in horses [3,5,6]. The choice of these treatments depends on the experience of the practitioner and, of course, the budget of the owner. However, there is no standard treatment, and the treatment response may vary between patients.

The use of platelet-rich plasma (PRP) represents a simple method of treating wounds in horses [7,8]. Platelet-rich plasma releases transforming growth factor β 1 (TGF-β1) and platelet-derived growth factor isoform BB (PDGF-BB)

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and other proteins [9,10] that have anti-inflammatory, anabolic, and angiogenic effects [7] when injected into affected tissues. Activated platelets from PRP also release proteins with microbicidal properties, such as platelet factor 4 (PF-4). In addition, PRP contains mononuclear leukocytes and plasma complement [11]. The combination of all these components in PRP produces a substance with microbiostatic effects.

A case of a chronic severely contaminated distal limb wound in a foal is presented in this article. This case was successfully managed with the combination of standard wound therapy, surgery, and autologous PRP.

2. Case History

An 8-month-old weaned foal was presented with a history of a 2-month distal left hind limb wound possibly produced by a kick of his dam. On admission, the foal was quiet and alert, had a body condition score of 5 of 9 (where 1 is a horse with a poor body condition [extremely emaciated] and 9 is a horse extremely fat [12]), with a rectal temperature of 38°C, heart rate of 56 beats/min, and respiratory rate of 24 breaths/min. Mucous membranes were normal and had a capillary refill time of 2 seconds. Gastrointestinal sounds were normal. The main problem of the patient was a severe wound in the cannon of the left hind limb. The wound covered the proximal and central part of the cannon affecting nearly 60% of the cannon circumference. The wound was severely contaminated and had a bad smell (Fig. 1A). No samples were taken for microbiologic isolation. The foal was sedated with an IV bolus of 13 μg/kg of detomidine (Dormosedan; Zoetis, Exton, PA) and 26 μg/kg of butorphanol (Torbugesic; Fort Dodge Animal Health, East Riverside Drive, IA) for cleaning the wound and performing ultrasonographic and radiographic evaluation of the affected limb. Three days before surgery, the wound was covered with a moist dressing and a Robert-Jones bandage. At that moment, the patient presented a swollen zone with exaggerated granulation tissue and an osseous sequestrum exposition (Fig. 1B).

2.1. Ultrasonographic and Radiographic Findings

The ultrasonographic evaluation showed no compromise (infection or rupture) of the plantar soft tissue structures (flexor tendons and suspensory ligament and their synovial sheath). A loss of continuity of the body of the digital common extensor tendon and a hyperechoic parallel structure to the proximo-dorsal region of the third metatarsal bone was also noted. In the radiographs, the affected region was mainly observed as proliferative exostosis in the proximo-dorsal region of the third metatarsal bone and small surrounding parallel fragments of demineralized bone (Fig. 1C). Ultrasonographic and radiographic findings demonstrated proliferative exostosis and osseous sequestration in the proximo-dorsal region of the third metatarsal bone.

2.2. Surgery and Intraoperatory Use of Platelet-Rich Plasma

On the day of the surgery, the foal was given preoperative medications (IV ceftiofur 2.2 mg/kg [Ceftiovet; Lab Kyrovet, Bogotá, Colombia] and flunixin meglumin at 1.1 mg/kg [Flumine; Lab California, Bogotá, Colombia]). The animal was sedated with an IV bolus of 13 μg/kg of detomidine and 26 μg/kg of butorphanol, and anesthesia was induced with an IV bolus of 2.2 mg/kg of ketamine (Imalgene 1000; Merial, France) and 0.05 mg/kg of diazepam (Valium; Roche Pharma, Madrid, Spain) and maintained

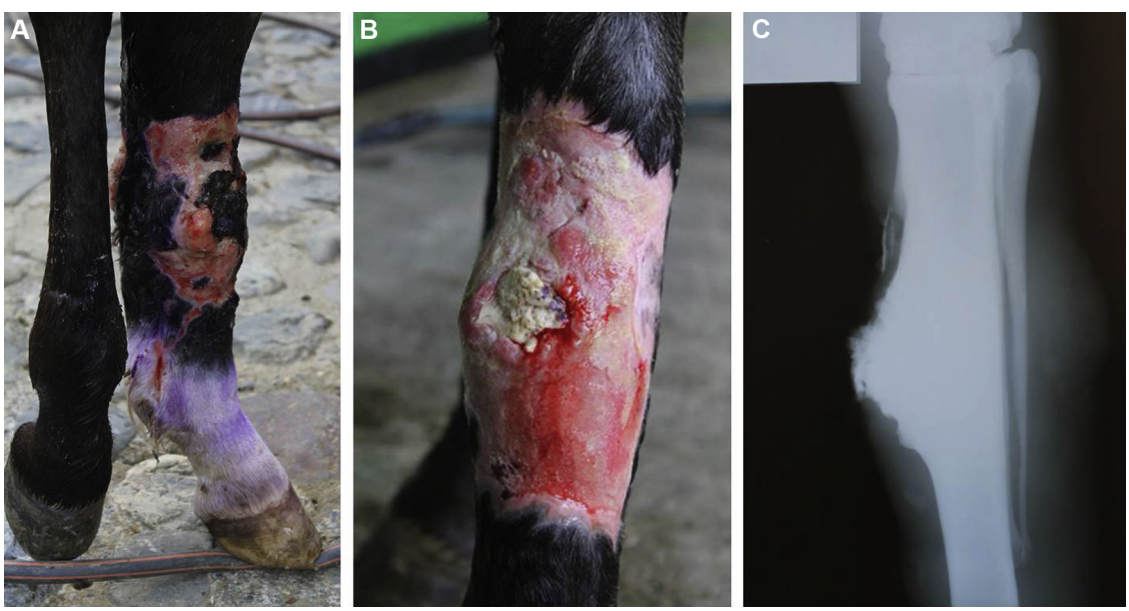

Fig. 1. (A) The wound was severely contaminated and presented a bad smell. (B) Swollen zone with exaggerated granulation tissue and an osseous sequestrum exposition. (C) Lateral radiograph image demonstrating proliferative exostosis and fragments of demineralized bone.