77° CONVEGNO SISVET

Stato: INVIATO - ID: 13403

Evaluation of the effect of autologous Leukocyte and Platelet Rich Fibrin membranes in the treatment of dairy calves after disbudding: preliminary results.

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In dairy industry, disbudding is a common practice that induces pain and discomfort to the treated calves and requires a long healing period [1]. The treated areas remain severely damaged for at least 3-4 weeks and complete healing takes 6-13 weeks. In addition, local disinfectants and antibiotics may be required to prevent further complications. Considering all the welfare aspects associated with hot-iron disbudding, a technique to enhance the healing process and shortens the re-epithelialization time must be considered as a clinical treatment option. Therefore, the use of the Leukocyte-Platelets Rich Fibrin (L-PRF) could fulfill this need. The L-PRF is a platelet-based autologous, hemostatic biological scaffold that has been used in other animal species for wound healing [2] and whose production protocol has recently been validated in dairy cows [3]. The aim of this randomized, controlled clinical trial is to investigate the efficacy of L-PRF on wound healing after disbudding in dairy calves. Seventeen Holstein-Friesian calves were randomly enrolled in the study and disbudded with a hot-iron within three weeks of birth. A whole blood sample of 20 ml was collected from each calf by jugular venipuncture and used for L-PRF production according to the procedures described [3]. All patients received bilateral procaine-based cornual nerve block (5 ml/side Procamidor duo®, IZO S.r.l.), followed by disbudding 15 minutes later. After disbudding, each calf received two L-PRF membranes on the right wound (treated side_TS) while the left one was left untreated (control side_CS). During follow-up, the healing process was assessed weekly by digital photographs and monitored until complete re-epithelialization of the wounds. The clinical procedure proved to be well tolerated by the animals and easy to perform. No side effects were observed. On average, the TS healed within 6 weeks, while the CS healed within 8 weeks ($p<0.05$). The digital analysis of revealed that wound on the TS, which healed faster, required 5 weeks and showed a percentage decrease in wound area of 80%, while the wound that took longer to heal required 9 weeks with a percentage decrease in wound area of 80%. In contrast, for the CS, the time interval for the same parameter ranged from 6 weeks to 10 weeks with a percentage decrease of 80%. Preliminary data show that L-PRF has an overall beneficial effect on the regeneration of wounds caused by hot-iron disbudding in dairy calves. Its use in dams might be hypothesized as support for a complete clinical calf management program to reduce the use of disinfectants and antibiotics while maintaining a high level of animal welfare. Nevertheless, further studies are needed to confirm the encouraging results observed.

[1]Adcock SJJ, Tucker CB. 2018. The effect of disbudding age on healing and pain sensitivity in dairy calves. J Dairy Sci.101:10361-10373 [2]Caterino C, G Della Valle, F Aragosa, S Cavalli, J Guccione, F Lamagna, G Fatone Clinical Application of Platelet Concentrates in Bovine Practice: A Systematic Review. Vet Sci. 2023 10:686 [3]Della Valle G, MC Alterisio, J Guccione, C Caterino, F Aragosa, G Ferrara, D De Biase, P Ciaramella, G Fatone. Leukocytes-Platelets Rich Fibrin preparation method: protocol standardization, macroscopic and histologic evaluations, and Growth Factors assessment, SISVET,978-88-909092-5-2, 2023.