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Safety and efficacy of plateletpheresis as a method to collect platelet concentrates from equine donors

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As part of their role in maintaining homeostasis, platelets are the primary source of growth factors, attachment factors, and enzymes found in serum. Due to these properties, platelet derivatives are appealing to enhance wound healing and as an alternative to fetal bovine serum, a xenogeneic serum in cell culture media. Plateletpheresis is commonly used to collect platelets in human medicine and has been used for dogs, but has not been validated for use in the standing horse. Plateletpheresis was performed on six female mix breed horses using commercially available equipment. This technique was tested to evaluate the feasibility of collecting large quantities of platelets from equine donors for the production of platelet lysate (PL). An apheresis machine and dual-needle collection kits were used with standing horses under chemical restraint and contained in stocks. Retrieval and return lines were connected to the horse via jugular catheters. Blood was collected for chemistry and coagulation panels before plateletpheresis, immediately after plateletpheresis, and at 8, 16, 24 and 48 hours following the procedure. Physical exams were conducted at the above time points and every 12 hours. PL was produced from the platelet concentrate following two freeze-thaw cycles and three centrifugation cycles. One liter of platelet concentrate was collected from each horse, with a mean platelet yield of 390 x 109/L. The procedure lasted on average 162.8 minutes and was well tolerated by donors. Pooled PL from all six horses contained 6.1ng/ml of transforming growth factor-β1, 3.5 ng/ml of platelet derived growth factor-BB, and 13.8 ng/ml of vascular endothelial growth factor-A. Plateletpheresis using a commercially available apheresis machine is a feasible option for collecting platelet concentrate from equine donors. PL produced from the platelet concentrate contained high levels of growth factors. This data supports the possibility of PL as an alternative to fetal bovine serum in cell culture media.