

Clinical Follow-Up of Horses Treated With Bone Marrow–Derived Mesenchymal Stem Cells for Musculoskeletal Lesions

Dora J. Ferris, DVM; David D. Frisbie, DVM, PhD, Diplomate ACVS;
 John D. Kisiday, PhD;
 C. Wayne McIlwraith, BVSc, PhD, DSc, FRCVS, Diplomate ACVS;
 Brent A. Hague, DVM, MS, Diplomate ACVS, ABVP;
 Michael D. Major, DVM, MS, Diplomate ACVS;
 Robert K. Schneider, DVM, MS, Diplomate ACVS;
 Chad J. Zubrod, DVM, MS, Diplomate ACVS;
 Jeffery J. Watkins, DVM, MS, Diplomate ACVS;
 Chris E. Kawcak, DVM, PhD, Diplomate ACVS; and
 Laurie R. Goodrich, DVM, PhD, Diplomate ACVS

In 70% of orthopedic (joint/collateral ligament) and 86% of soft tissue cases (suspensory ligament, superficial digital flexor tendon, and deep digital flexor tendon), treatment with bone marrow–derived mesenchymal stem cells (BMSCs) resulted in return to function when follow-up information was collected an average of 21 mo after BMSC treatment. Authors' addresses: Gail Holmes Equine Orthopaedic Research Center, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Fort Collins, Colorado 80523 (Ferris, Frisbie, Kisiday, McIlwraith, Kawcak, Goodrich); Oakridge Equine Hospital PC, 6675 East Waterloo Road, Edmond, Oklahoma 73034 (Hague, Major, Zubrod); Department of Veterinary Clinical Sciences, College of Veterinary Medicine, Washington State University, Pullman, Washington 99164 (Schneider); Veterinary Medical Teaching Hospital, Texas A&M University, College Station, Texas 77843 (Watkins); e-mail: dora.ferris@colostate.edu. © 2009 AAEP.

1. Introduction

Bone marrow–derived mesenchymal stem cells (BMSCs) have garnered increasing attention as a viable therapy for musculoskeletal lesions in horses, humans, and other animals. Clinical follow-up information has been limited mainly to case reports with low numbers. The goal of this

study was to provide follow-up information on a modest number of horses suffering musculoskeletal lesions treated with BMSCs.

2. Materials and Methods

Horses (n = 162) receiving BMSCs expanded at Colorado State University's Orthopaedic Research Laboratory (ORC), or Advanced Regenerative Therapies

Research Abstract

NOTES

(ART) were retrospectively followed based on medical record analysis and follow-up interview with the attending veterinarian/owner. Six separate centers participated.

3. Results

Follow-up information (mean = 21 mo post-treatment, range = 7–39 mo post-treatment) was obtained for 97 horses with 101 lesions treated. Minor adverse events were reported in three horses treated intra-articularly; all improved, and similar to other cases, they returned to work. Fifty-two/61 horses with soft tissue injuries (85%) and 29/40 horses with orthopedic injuries (73%) returned to work. Age, sex, breed, discipline, and

severity of lesion were not significantly associated with outcome.

4. Discussion

This study confirms anecdotal reports of good clinical outcomes post-BMSC treatment for musculoskeletal lesions. Results of this study support future controlled trials to be undertaken for the use of BMSCs in horses.

Drs. Gary Baxter, Kurt Harris, and Bob Racich contributed cases (≤ 5), and Sangeeta Rao and Francisco Oleo-Popelka provided statistical analysis. Drs. Frisbie, Kisiday, McIlwraith, Kawcak, Goodrich, Watkins, Hague, Major, and Schneider have stock in ART.