

Local and Systemic Effects of a Commercial Preparation of Chondroitin sulfate, Hyaluronic Acid and N-Acetyl-D-Glucosamine when Administered Intra-articularly or Intramuscularly to Healthy Dogs

CM MacPhail, M Brewer, JR. Hawley, J Veir, MR Lappin.

Colorado State University, Fort Collins, Colorado.

Products containing glycosaminoglycans (GAG) are frequently administered by various routes to dogs to aid in the management of osteoarthritis (OA). However, little information is available concerning effects of these products when administered to dogs, particularly regarding biomarkers of OA. The purpose of this study was to determine local and systemic effects of a single intra-articular (IA) administration or repeated intramuscular (IM) administrations of a formulation of chondroitin sulfate, hyaluronic acid, and N-acetyl-D glucosamine in healthy dogs.

Eight healthy, young adult, mixed sex beagles were used in this study. Using procedures approved by the Institutional Animal Care and Use Committee, blood, serum, and synovial fluid (both stifle joints) were collected on Days -7, 0, 7, 14, 35, 42, 49, 56, and 63.

After arthrocentesis on Day 0, 1.5 mL of Polyglycan® (ArthroDynamic Technologies, Inc., Lexington, KY) was injected into the right stifle joint. Days 14 to 35 were designed as a washout period. After sample collection on Day 35, Polyglycan® was administered IM (0.1 mL / lb) to each beagle with repeated IM injections on Days 42, 49, and 56.

Complete blood cell counts (CBC) and serum biochemical profiles were performed on Days -7, 0, 35 and 63. Aggrecan synthesis (epitope CS846), GAG, and prostaglandin E2 (PGE2) concentrations were determined using previously validated assays in serum and synovial fluid (right stifle joint unless the volume was insufficient) collected on Days -7, 0, 7, 14, 35, 42, 49, 56, and 63. The dogs were observed daily for changes in appetite, attitude, ambulation, and body temperature.

Other than evidence of transient lameness (< 24 hours) following synovial fluid sampling, no other clinical side-effects were noted. There were no significant changes in CBC or biochemical results over time. There were no significant changes in serum or synovial fluid concentrations of CS846 or GAG over time. While there were no significant changes over time in serum concentrations of PGE2, synovial fluid concentrations of PGE2 were significantly lower on Day 56 ($p = 0.03$) and Day 63 ($p = 0.02$) when compared to Day 35 concentrations.

The results indicate administration of Polyglycan® using these routes of administration and dose schedules had no measurable side-effects. Repeated arthrocentesis in the presence of these Polyglycan® protocols had no measurable effect on serum concentrations of aggrecan synthesis, GAG, and or PGE2 or synovial fluid concentrations of aggrecan synthesis or GAG. However repeated IM injection resulted in a significant decrease in synovial fluid PGE2 concentrations, which may reflect a positive influence on synovial inflammation.