Not bone marrow-derived mesenchymal stem cells in the treatment of bone marrow disorder in dogs

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Abstract

This study aimed to assess the use of other sources of mesenchymal stem cells (MSC) rather than bone marrow-derived to treat bone marrow hypoplasia in dogs in order to offer an alternative therapy to animals undergoing weekly blood transfusions. 18 canine patients with bone marrow disorder (BMD), including 4 males and 11 females were randomly selected in a veterinarian hemotherapy center. Most of the animals were diagnosed with myelogram with erythrocytic hypoplasia; only three dogs were diagnosed with with pancytopenia hypoplasia. The causes of the BMD varied between immune-mediated and sequel of canine monocytic ehrlichiosis. Only MSC from dental pulp (DPSC) and adipose tissue (ATSC) were used, provided by a heterologous canine bank. The animals were divided into four groups according to the route of administration: intraosseous (IO) or intravenous (IV) and source of MSC: DPSC or ATSC. The protocol constituted of 4 MSC applications with a range of 30 days. Biweekly blood counts were performed and hematocrit value was compared between ratings. Surprisingly and contrary to previously reported, the animals that received IV MSC transplantation had their hematocrit increased earlier than animals from IO group. Eigth animals (44.4%) had their hematocrit normalized after the first or second transplant. Other five (27.7%) had decreased the interval between blood transfusions during the experiment and owners report improved overall health status. There was no significant difference between the sources of MSC used. With the data obtained so far we can conclude that the use of not bone marrow-derived MSC can contribute to the regeneration of bone marrow hypoplasia. Furthermore, IV MSC transplant has many advantages over IO, such as the easy administration and non requirement of anesthesia to be performed. Once again, the heterologous MSC transplantation was proven to be effective and with no contraindications for use. We hope our findings will contribute in the treatment of human bone marrow degenerative disorders.