CELLTROVET
MEDICINA VETERINÁRIA REGENERATIVA

THERAPEUTIC USE OF MESENCHYMAL STEM CELLS IN THE TREATMENT OF MEDULLAR APLASIA SECONDARY TO CHRONIC KIDNEY DISEASE IN THE CAT

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INTRODUCTION

The renal cortex is responsible for approximately 90% of erythropoietin production in the body. In advanced stages of kidney disease animals have reduced ability to synthesize erythropoietin, consequently, there is a deficiency of erythropoietin, resulting in erythroid hypoplastic anemia. In such cases the animals are being treated with synthetic erythropoietin. Prolonged treatment with synthetic erythropoietin results in the development of resistance leading to the medullar aplasia. We studied a female cat (indeterminate breed), 4 years old, presenting the stage 2 of chronic kidney disease. After 2 years of conventional treatment the animal developed aplastic anemia responsive to symptomatic treatment with blood transfusions. The cat made 5 blood transfusions in the period and no improvement was observed.

OBJECTIVE

We investigate the effect of the applications of alogenic adipose stem cells (ADSCs) in a cat affected by aplastic anemia as a consequence of kidney disease.

METHODS AND RESULTS

The adipose tissue collected was isolated (Fig. 1) and evaluate the proliferative potential of the stem cells. It was also assessed their ability to differentiate into osteogenic, chondrogenic or adipogenic. The cat was treated with three applications of 4 x 106 ADSCs through the cephalic vein and one intramedullary (Fig. 1 and Tab. 1). The applications of ADSCs resulted in stability of the bone marrow response and increased percentage of hematocrit (45%) (Fig. 2).

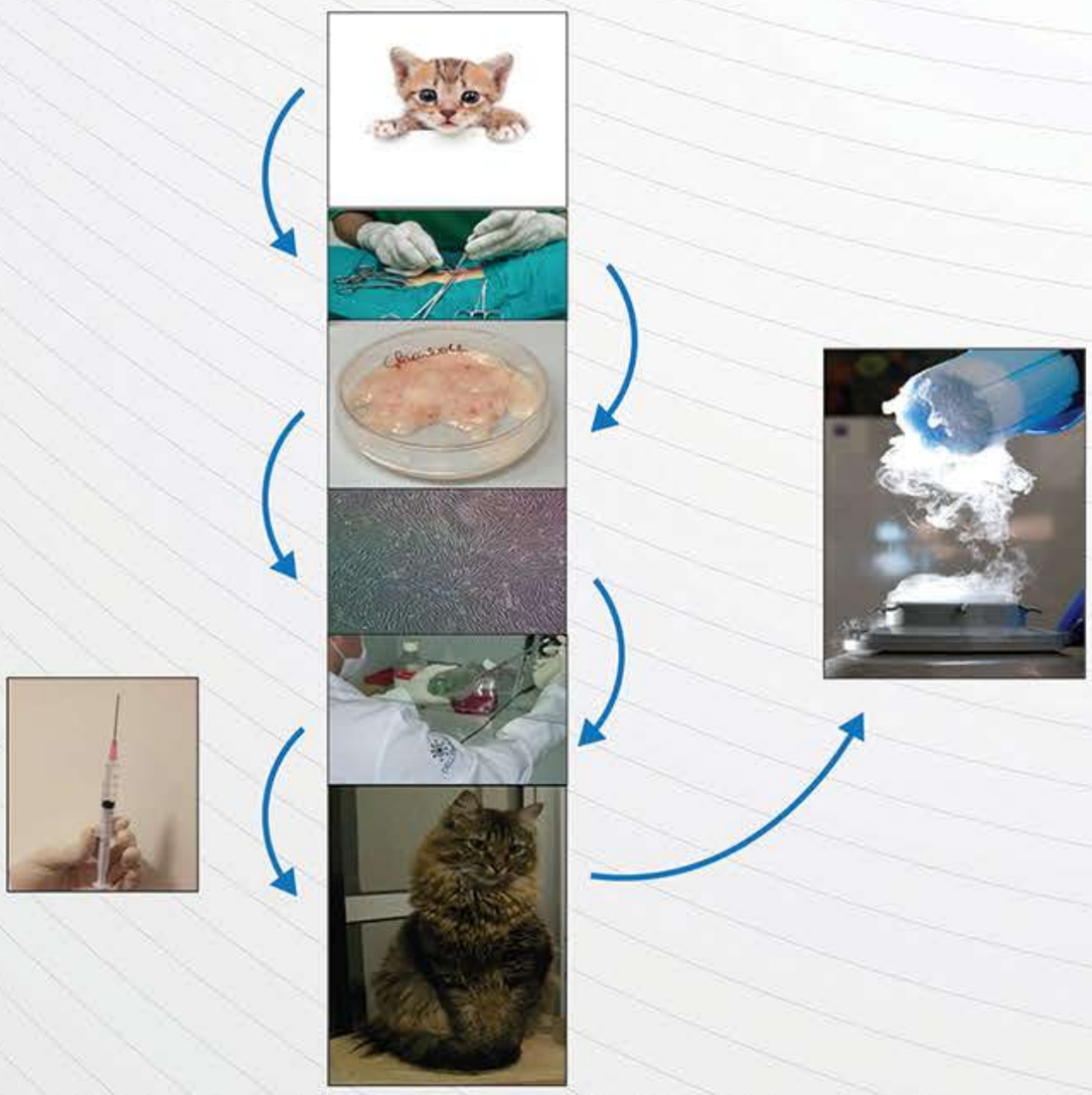

Figure 1. Experimental procedures involving the preparation of stem cells.The adipose tissue collected was isolated and evaluated its proliferative and differentiative potential. The adipose stem cells were stored frozen with liquid nitrogen.

Date of Application	Local Application	Hematocrit %
March 12	Cephalic Vein	13
April 14	Intramedullary Route	21
May 25	Cephalic Vein	26

Table 1. Details of applications of alogenic feline adipose stem cells (4 x 106 adipose stem cells) and hematocrit values obtained after treatment in the cat. The first application was conducted via the cephalic vein, the second via intramedullary route and the last via the cephalic vein.

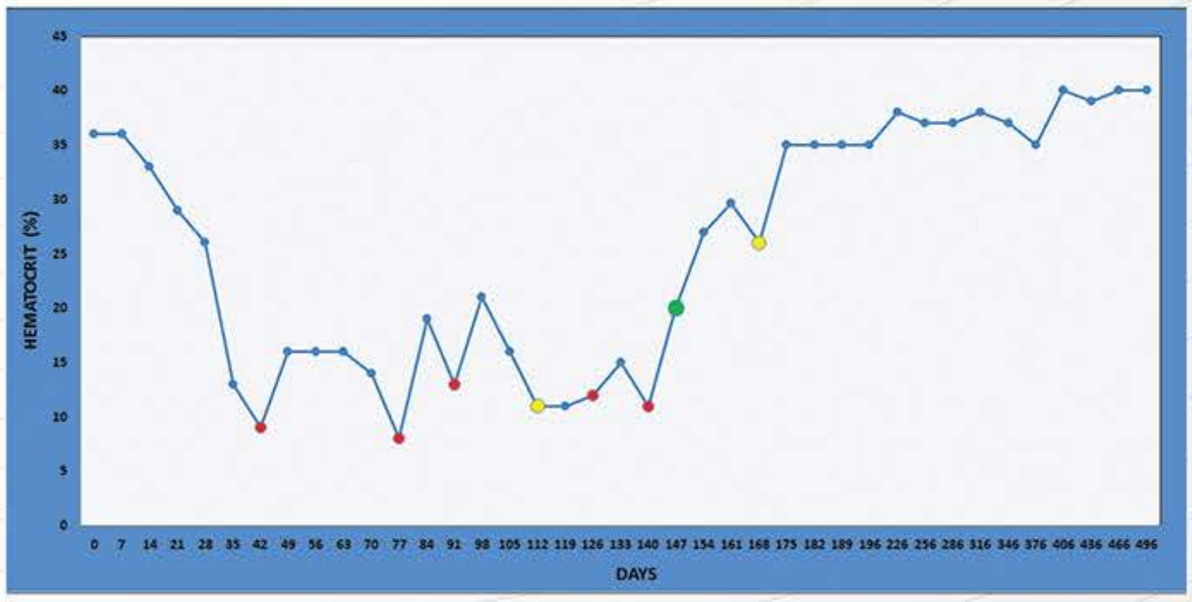

Figure 2. Representative graphic showing the variation in hematocrit levels after the beginning of therapy with stem cells. The hematocrit was measured weekly. There were three applications of stem cells being two systemic (●), one intramedullary (●) and five blood transfusions (●).

CONCLUSION

This study demonstrated that, in the case of medullar aplasia/chronic kidney disease, stem cell therapy combined with conventional treatment can improve the cat's condition, as well as, increase her life expectancy. Currently, the female cat is not subjected to any treatment and remains stable in her vital functions.

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