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RETROSPECTIVE STUDY ON THE USE OF FAT DERIVED MESENCHIMAL STEM CELLS IN THE TREATMENT OF THE SUPERFICIAL DIGITAL FLEXOR TENDINITIS OF THE ATHLETIC HORSES

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Superficial Digital Flexor (SDF) tendinopathies are common pathological conditions affecting the musculoskeletal system of the horse. The competitive career of performance horses may be shortened as a consequence of tendon injuries for being the full recovery extremely difficult. The aim of this study was to assess the anatomical and clinical recovery of injured tendons after the injection of fat derived stem cells into the lesion. 15 horses for a total of 17 tendons were selected and treated with stem cells. Exactly 7 race horses (6 thoroughbreds and 1 trotter) and 8 saddle horses were included in a period of approximately one year between 2006 and 2007. The mesenchymal stem cells (MSC) were obtained from subcutaneous fat through a surgical excision laterally to the base of the tail. The cells were extracted, isolated and expanded in culture, as previously described (Barbaro K., 2008). The cells, diluted in homologous plasma at 500.000/ml concentration were injected into the lesion under ultrasonographic guidance. All horses were trained following a progressive exercise protocol for a period of 8 months. A set of 51 ultrasound images were collected in 3 different stages with the same ultrasound machine and same operator and exactly at time A (before the injection), at time B (approximately 60 days after injection) and at time C (approximately 120 days after injection). Afterwards, a single blind trial involving 4 experts (raters) was carried out to assess qualitatively and quantitatively the images using an evaluation system based on ordinal scales of ranked scores. Each expert evaluated 3 replicates of the 51 images in electronic format and every image was codified in the blind way from the experts. At every image was assigned a qualitative evaluation in relation to the echogenecity (completely anechoic, mostly anechoic, hypoechoic and isoechoic) and a quantitative evaluation in relation to the amount of fibers present at the site of the lesion (0-25%, 26-50%, 51-75% and 76-100%). For the final judgment the four categories were reduced to two classes: high/low echogenecity and high/low percentage of the fibers pattern present. The multirater agreement beyond chance was calculated using the Kappa statistic proposed by Randolph J. (2007) and a multivariate logistic regression analysis was performed in order to identify significant correlations between opinions from the experts and the stage of disease. The clinical results were evaluated through races data and direct information from the owners for the saddle horses regarding the recovery of their previous athletic activity and for race horses was considered as positive outcome the chance to have raced at least four times after treatment. The opinions expressed by the experts confirm more echogenecity and more amount of fibers pattern to the images obtained at time B and C (60 and 120 days post injection). The experts expressed concordant opinions on qualitative and quantitative analysis on the three repetitions of the same image (K of Randolph > 0.61) other than all experts have shown the reproducibility between their opinions on the same image (K of Randolph > 0.61). The multivariate logistic regression analysis has confirmed more probability to have a higher echogenecity and amount of the fibers pattern for the images at time B and C. More exactly the images at time C had a probability to be classified as “at high echogenecity” and “at high percentage of fibers pattern” 95 and 50 times respectively higher than those at time A. The clinical results have shown a recovery range of approximately 71% in the race horses group and 75% in the saddle horse group. The study has demonstrated an objectively valid method of analysis of echographic images for the assessment of the SDF tendonitis and confirms the preliminary results obtained in a larger retrospective
study where mesenchymal stem cells were used for, even so derived from bone marrow (Smith R.K.W. 2010). From a clinical point of view, our study wants only represent a preliminary report on a restricted number of SDF tendinitis with the intention to produce the results of the use of fat-derived MSC in the treatment of different tendo-desmic pathologic conditions in a large population of athletic horses.

Bibliography

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