Benha University
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PhD Summary

Evaluation of Platelets Rich Plasma (PRP) on Superficial Digital Flexor Tendon Injuries in Equine (An Experimental Study)

Thesis presented
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SUMMARY

The present investigation was carried out on 31 clinically normal adult donkeys (Equus Asinus) of both sexes. The mean age was 5.9 ± 0.38 years and the mean weight was 135.45 ± 2.2 kg. All animals were subjected to surgical induction of core lesion at mid SDFT. Intralesional injection of placebo in 7 animals (group I, control group); freshly prepared PRP in 12 donkeys (Group II) and DMSO 10% in 12 donkeys (Group III) were performed at 5^{th}, 15^{th} and 30^{th} days post induction of the core lesion for treatment. The relationship between the ultrasonographic and crossponding histopathological examination was evaluated. Clinical, ultrasonographic, gross pathological and histopathological evaluation of the core lesion was conducted before and during 5^{th}; 15^{th}; 30^{th}; 45^{th}; 60^{th} and 90^{th} days post induction of the core lesion.

Clinical assessment of the DMSO treated group revealed, significant ($p \leq 0.05$) improvement of all clinical parameter during the study. Complete disappearance of clinical signs was observed during 60^{th} and 90^{th} day for local heat and during 90^{th} day for local pain and lameness.

Clinical assessment of the PRP treated group revealed, significant ($p \leq 0.05$) improvement of all clinical parameter during study. Complete disappearance of clinical signs was observed during 60^{th} and 90^{th} day for local heat and during 90^{th} day for local pain and lameness.

In the present study, comparison between PRP and DMSO treated group proved that, although the recorded values were lower in PRP treated group than DMSO treated group, there was no significant difference

between both groups in respect to local heat, pain, lameness and swelling except that, the mid metacarpal circumference in the PRP treated group were significant ($p \leq 0.05$) lower than that of DMSO treated group at 45th, 60th and 90 days post induction.

Ultrasonographic examination of DMSO treated group showed significant ($p \leq 0.05$) decrease of SDFT CSA, SDFT width, core lesion CSA, core lesion width, core lesion length, FES and FAS during the study. At the end of the study and the core lesion CSA represented 28.13 % of the tendon CSA.

Ultrasonographic examination of PRP treated group showed significant ($p \leq 0.05$) improvement in the mean SDFT CSA, SDFT width, core lesion CSA, core lesion width and core lesion length, FES and FAS during the study. At the end of the study and the core lesion CSA represented 7.53 % of the tendon CSA.

Quantitative ultrasonographic finding of the DMSO treated group showed gradual infiltration with multiple hypoechogenic and less echogenic dotes till the end of the study. Histopathological examination showed variable degrees of hemorrhage, inflammatory cells and fibroblast infiltration. At the end of the study, the predominant collagen was thin semi parallel aligned.

Quantitative ultrasonographic findings of PRP treated group showed gradual infiltration with multiple hypoechogenic and echogenic dots. At the end of the study the characteristic pin point appearance of normal tendon was restored and the mean gray value reached 126.77 ± 1.3 Histopathological examinations, displayed regeneration of the normal

tendon architecture and the tendon appeared highly organized with thick reoriented collagen bundles at the end of the study.

The present investigations displayed that, the PRP treated group showed early healing process during 15th day in form of early extensive fibrovascular callus formation and during the end of the study (90th day) the healed tendon showed thick reoriented parallel and mature collagen bundles similar to the normal tendon. In addition, the gray scale histogram analysis revealed extensive hypoechogenic and echogenic dots. The mean gray value was 34.16 ± 0.81 during the 15th day and 126.77 ± 1.3 (nearly normal) at the end of the study. On the other hand, DMSO treated group showed less extensive fibrovascular callus formation at the end of the study, and the gray scale histogram was ranged from27.63+0.36 during 15th day and 82.37+0.61 during the end of the study.

Platelets Rich Plasma in this study provides promising results in the treatment of equine tendopathy. It offers rapid healing with regenerative effect represented by significant improvement of all clinical parameters. In addition the produced core filling tissue showed higher level of organization and resembling to the normal tendenious tissue ultrasonographically and histopathologically.

CONCLUSION

1. The surgical procedure for induction of tendopathy used in this study mimic to natural injury with the same clinical signs, ultrasonographic features and histopathological findings. In addition it was successfully used form monitoring different modalities for diagnosis and treatment.

2. The obtained clinical findings, ultrasonography and histopathological examination revealed encouraging results in the diagnosis of equine tendinitis, follow up the healing process and assessment of the quality of tissue fill the core defect.

3. Establishment consistent relationship between ultrasonographic and the correlated histopathological findings during different time points provides a mirror of histological alterations through the non-invasive technique of ultrasonography.

4. Quantitative and qualitative ultrasonographic evaluations by histogram gray scale analysis of the core lesion offer an accurate tool for ultrasonography of normal and injured tendon at different stages of healing.

5. Platelets Rich Plasma in this study provides promising results in the treatment of equine tendopathy. It offers rapid healing with regenerative effect represented by significant improvement of all clinical parameters. In addition the produced core filling tissue

showed higher level of organization and resembling to the normal tendenious tissue ultrasonographically and histopathologically.

6. The obtained ultrasonographical and histopathological results illustrated the superior significant effect of PRP over DMSO in the treatment of tendopathy in equines.

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