Mesenchymal stem cell effects on microbiological and histopathological alterations in spondylitis tuberculosis rabbit's healing process

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INTRODUCTION: Mesenchymal Stem Cell (MSC) has the potency to modulate immune response and to repair tissues. The existence of MSC in Mycobacterium tuberculosis microscopical environment is hoped to reduce its proliferating activity. This research aims to observe the direct MSC transplantation effect on the vertebral body defect in spondylitis tuberculosis rabbit on microbiological and histopathological aspects of bone healing in vivo.

METHODS: Fourteen spondylitis tuberculosis rabbits were divided into two groups which are the treatment (n=7) and the control group (n=7). The treatment group underwent total treatment Subroto Sapardan alternative 6 (TTSSA6) intervention procedure, scaffold and MSC transplantation and anti tuberculosis drugs administration, meanwhile control group underwent the same procedure as treatment group without MSC transplantation. Th1 and Th2 along with microbiological and histopathological examination on the tissue lesion from both group were analysed from blood after 6 weeks of incubation. The results were tested statistically and the healing score was calculated.

RESULT: Six weeks after MSC transplantation, Th1 was increased from 4.79% (SD= 2.35) into 30.90% (SD = 30.23) and Th2 was decreased from 42.74% (SD = 10.23) into 29.26% (SD = 34.95). Th1/Th2 population was increased from 0.12 (SD = 0.08) into 5.84 (SD = 7.80). Microbiological examination showed healing of 3 out of 7 treatment rabbits group (3/7, 42.9%) and 4 out of 7 control rabbits group (4/7, 57.1%); (p = 0.500). Histopathological examination showed healing of 2 from 7 treatment rabbits and also 2 from 7 control rabbits group (2/7, 28.6%); (p = 0.720). Hence the healing score of both the treatment group (n=7; mean score 268.57; SD = 15.74) and the control group (n=5; mean score 264.00; SD = 16.73) were all above 105 (healed) (p = 0.595).

DISCUSSION AND CONCLUSION: Microbiological and histopathological examination on tissues lesion shows a good healing process from both treatment and control group which show that there is no effect of MSC transplantation to the immune response system on the infection of Mycobacterium tuberculosis which is shown on the alteration of positive into negative results from 2 out of 7 rabbits on both groups. MSC transplantation does not have significant effect on ST rabbit's healing process microbiologically and histopathologically shown by the same total healing score.