Influences of *mycobacterium tuberculosis* exposures in the bony bridge formation of mesenchymal stem cell transplantation to rabbit with spondylitis tuberculosis

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**INTRODUCTION:** Fusion is defined by the incorporation of bone-to-bone or between the parts of bones. Mesenchymal stem cell (MSC) differentiation into osteoblast is not disturbed in relation to Mycobacterium tuberculosis's debris exposure in the microscopic environment in vitro. This research aims to observe the influences of live *Mycobacterium tuberculosis* on bony bridge formation on Spondylitis Tuberculosis rabbit's defect which is transplanted with MSC.

**METHODS:** Six spondylitis tuberculosis rabbits were divided into two groups which were culture (C), PCR (P), and histopathologic (H) positive as the exposed group (n=3) and PCR and histopathologic (PH) positive as the control group (n=3). Both groups underwent total treatment Subroto Sapardan alternative 6 (TTSSA6) treatment, anti tuberculosis drugs administration, scaffold and MSC transplantation. Clinical examination was carried after 6 weeks incubation time and bony bridge through the manual palpation (MP) method was examined. Bone intra defect area percentage (BIDAP) was calculated, bone area per field view (BAFV), and lateral bone defect area (LBDA) were measured based on microscopic examination from histopathology preparation while antero-posterior projection callus area (APPCA) and lateral projection callus area (LPCA) were measured based on x-ray image using Image J software. The results were tested statistically and used to determine the fusion score.

**RESULT:** MP from both control and exposed group showed 1 positive MP rabbit. Mean BIDAP score for exposed group 30.00% (SD = 14.00) and control group 40.67% (SD = 12.50), mean BAFV score for exposed group 0.05 mm² (SD = 0.02) and control group 0.07 mm² (SD = 0.02), mean LBDA score for exposed group 0.155 mm² (SD = 0.067) and control group 0.230 mm² (SD = 0.07). Mean APPCA score for exposed group 34.30 mm² (SD = 5.61) and control group 25.77 mm² (SD = 9.79), mean LPCA score for exposed group 25.87 mm² (SD = 5.61) and control group 23.71 mm² (SD = 8.34). Mean fusion score for exposed group 77.67 and 120.6 for control group. These results showed that there were 2 of 3 rabbits (2/3) in the exposed group had fusion disturbances and 1 out of 3 rabbit (1/3) had better fusion; while in the control group there was 1 of 3 rabbits (1/3) had delayed fusion, 1 of 3 (1/3) had normal fusion and 1 of 3 (1/3) had better fusion.

**DISCUSSION AND CONCLUSION:** *Mycobacterium tuberculosis* existence does not affect bone rigidity manually. This result differs from the result obtained based on the three histopathologic aspects showing the impression of *Mycobacterium tuberculosis*’s existence that suppresses formation of new bone intra-defect proven by the smaller bone area formed in the exposed group compared with the control group. Fusion disturbance by *Mycobacterium tuberculosis* exposure was also stated in several literatures emphasizing the suppressing effects of *Mycobacterium tuberculosis* to osteoblast's activity which inhibit the formation of new bone necessary in the bony bridge formation hence, fusion. The presence of *Mycobacterium tuberculosis* bacteria histopathologically and radiologically interfere with the formation of new bone in the infection defect of spondylitis tuberculosis rabbit, but manually palpation of the relationship between bone shows that it is still in the fusion.