IMMUNOHISTOCHEMICAL STAINING OF OSTEOCLAST-SPECIFIC MARKER, NFATc1, IN STAGE III GIANT CELL TUMOR OF THE BONE

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INTRODUCTION:

Osteoclastic bone resorption and osteolysis with tendency for local recurrence and pulmonary metastases are a common complication of stage III Campanacci giant cell tumour of the bone (GCTB). Studies have shown receptor activator of nuclear factor κB ligand (RANKL) highly stimulates osteoclastogenesis through nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 1 (NFATc1) which is involved in the regulation of a number of osteoclast-specific genes. Osteoclastogenesis is retarded in NFATc1 suppression and knocked-out embryonic stem cells *in vitro*. To our knowledge, the regulation of NFATc1 in osteoclastic resorption in GCTB has not been studied especially in stage III GCTB. We analyzed NFATc1 expression by immunohistochemistry technique in 31 consecutive cases of stage III GCTB to understand the clinico-pathological correlation.

METHODS:

This study involved 31 consecutive cases of stage III Campanacci giant cell tumour of bone (GCTB) operated and treated at Hospital Universiti Sains Malaysia from January 2004 to December 2017. Expression of NFATc1 was assessed using immuno-histochemical staining method in all representative archive tumour sections. Serial sections of 5μm was cutand stained by immuno-histochemical techniques. NFATc1 expression over nuclear area of tumor cells were examined and evaluated in three random microscopic fields using a standard light microscope at 40 x 100 magnification by two-blinded independent observers. Positivity for NFATc1 expression was assessed according to percentage of 1000 background cells using an image analysis software (Olympus – U-RFL-T Cell F). The highest score from three selected fields was taken for statistical analysis using SPSS version 25.0. Statistical analysis was carried out using independent *t*-test for different groups and considered statistically significant when *p*-values were less than 0.05.

RESULTS:

The mean value of NFATc1 expression obtained as a percentage of 1000 background cells was 0.81 with standard deviation of 1.48. The range was between 0.0 to 6.33 with a median of 0.07. Comparison of NFATc1 expression showed higher percentage in recurrence group with a mean of 1.01 (SD 0.68) compared to non-recurrence group with the a mean of 0.79 (SD 1.55). The mean difference was 0.22 (-1.06, 1.51). This difference was statistically not. A comparison of NFATc1 expression showed higher mean value in lung metastases group which was 2.01 (SD 2.49) compared to 0.58 (SD 1.13) in non-lung metastases group. The mean difference between the two groups was 1.43 (-1.63, 4.49) which was also statistically not significant.

DISCUSSIONS:

This study shows all 31 cases with aggressive stage III GCTB were not positively stained with NFATc1 antibody with the possibility osteoclast may have not been the main cells responsible in the bone destruction in GCTB condition.

CONCLUSION:

Further research may evaluate whether NFATc1may or may not be useful to predict the risk of pulmonary metastases or recurrence disease in Stage III GCTB.

REFERENCES:

1. Ghani SA et al. Indian J Orthop, 2018. 52:31- 4.
2. Faisham WI, et al. Singapore Med J. 2006. 47(8):679-83.
3. Zawawi MS, et al. J Biomed Mater Res A. 2015. 103(11):3572-9.
4. Zawawi MSF, et al. Biochem Biophysical Research Communication. 2012. 427(2):404-9.