Pengaruh Vaksinasi BCG dalam Meningkatkan respons T Helper 1 (TH1) dan respons tumor terhadap radiasi pada karsinoma nasofaring

Abstrak:

The general purpose of this study was to reveal mechanism of BCG vaccination in increasing immune response especially T helper 1 (Thl) response in high and low responses of nasopharyngeal carcinoma (NPC) based on the concept of stress immunocompetent cell, and its influence on NPC response towards radiation. This was an experimental study using randomized pretest-posttest control group design. Proposed hypotheses were: 1) BCG vaccination increases (cellular) Thl at response in high and low responses of NPC; and 2) BCG vaccination given in combination with radiotherapy for NPC increases response of NPC towards radiation. This study involved two groups: 1) Group with radiotherapy and placebo as control group, consisted of 38 patients, and 2) Group with combination of radiotherapy and BCG vaccination as treatment group, consisted of 39 patients. Random allocation used permutation block technique. Dependent variables examined were immune response components in nasopharyngeal tissue, i.e, macrophage, NK cell, CD4 T cell, CD8 T cell, IL-2 presenting T cell, IL-4 presenting T cell, IL-10 presenting T cell, IFN-gamma presenting T cell, IgA presenting plasma cell, IgG presenting plasma cell, and active plasma cell. Staining used was immunohistochemistry with peroxydase antiperoxydase method.

The result of this study showed that radiotherapy caused decrease of macrophages and NK cells (Thl response), increase of IgG presenting plasma cells (Th2 response). While BCG vaccination in combination with radiotherapy caused increase of macrophages and NK cells (Thl response), decrease of IgG presenting plasma cells (Th2 response). BCG vaccination caused increase of Thl response through activated macrophages. Mechanisms of the increase of Thl response in high and low responses of NPC were as follows:

1) BCG vaccination in high response of NPC caused macrophages to increase very highly, followed by, the slight increase of IL-2 presenting T cells, a very high increase of interferon-gamma presenting T-cells, and a high increase of CD8 T cells.

2) BCG vaccination in Low response of NPC caused macrophages to increase moderately high, followed by the very few increase of IL-2 presenting T cells, a slight increase of interferon-gamma presenting T-cells, and a very few increase of CD8 T cells.
BCG vaccination increased nasopharyngeal tumor eradication so that its volume reduced. Therefore, BCG vaccination in combination with radiotherapy increased response of NPC towards radiation. The conclusion of this study is that the BCG vaccination is an effective way to prevent the decrease of Thl response due to impact of radiation therapy, of NPC. Radiotherapy and BCG vaccination are a rational combination (supporting each other) and advantageous. This is because nasopharyngeal cancer cell can be simultaneously killed through two pathways, i.e., 1) exogenous pathway by radiotherapy and 2) endogenous pathway by immunological effector cells. BCG vaccination in combination with radiotherapy is an effective way to response of NPC towards radiation. Side effects of BCG vaccination using modified multiple scarification technique in combination with radiotherapy of NPC are clinically mild.

Keyword:
radiotherapy of nasopharyngeal carcinoma, Thl response, BCG vaccination, stress immunocompetent cell