THE CYTOTOXIC ABILITY OF NK CELLS IN CHILDREN WITH AUTOIMMUNE THYROIDITIS.

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INTRODUCTION

The perforin protein is responsible for target cells permeabilization, and is a constituent of lytic granules of cells with the ability to cytotoxic reaction. It plays an essential role in cytotoxicity of NK cells and CD8+ lymphocytes. Hashimoto disease belongs to the organ specific autoimmune diseases with a preponderance of cell’s mechanisms in auto-antigens destruction. Spontaneous cytotoxicity as well as phagocytosis and cytokines release seems to be very important for disease initiation and development. In autoimmune thyroiditis type Hashimoto the key role in Thyrocytes destruction plays the spontaneous cytotoxic activity of T cells, and antibodies dependent mechanisms are of a less value. A spontaneous cytotoxicity is associated with the number and degree of activity of NK cells. An important role in this process plays perforin contributed in permeabilization of target cells.

OBJECTIVE AND HYPOTHESES:

The aim of the study was to evaluate the number of NK cells, their cytotoxic ability and the perforin expression in peripheral CD56 cells in children with Hashimoto's thyroiditis.

METHOD:

10 children at the age 10-17 years diagnosed with Hashimoto's thyroiditis were enrolled and 9 healthy children as the control group. The studied group consisted of 10 children with autoimmune Hashimoto's thyroiditis aged 4-18 years including 8 females and 2 males. The patients were qualified to the studied group on the basis of hypoechogeneity of thyroid gland in ultrasound and detection of elevated levels of antithyroid antibodies (anti-TPO and/or anti-Tg antibodies) in the serum. Control group consisted of patients aged 4-18 years (median: 12, lower quartile: 6, upper quartile: 16), including 7 females and 2 males. Healthy children were referred to the Children's Hospital of Medical University of Warsaw and qualified for routine health screen or minor surgical procedures. Blood collection was performed at least three weeks after last episode of infection, vaccination and any medication and at least 3 months after last episode of viral disease as mononucleosis, smallpox. No cases of autoimmune thyroiditis or any other immune abnormalities were observed in this group.

Each individual was assessed clinically by a pediatrician or by a research physician for eligibility to take part in the study. For all analyses 3 ml of venous blood was taken from the patients to the tubes with heparin anticoagulant. In every child were evaluated: the number of NK cells (CD56+), cytometric test of cytotoxic ability of NK cells and perforin expression in CD56+cells.

RESULTS

In cytometric test of cytotoxicity with K 562 cells the values of spontaneous cytotoxicity of NK cells were significantly higher in children with Hashimoto's thyroiditis in comparison to healthy children (p=0.04) (Fig.3), whereas the percentage of circulating NK cells in both groups was comparable. Simultaneously in children with Hashimoto's thyroiditis the expression of perforin in CD56+ cells and CD8+ cells was significantly lower than that observed in healthy children (p=0.04) (Fig.3, 4). There was a strong positive correlation between the perforin expression in NK cells and CD8+ cells in children with Hashimoto's thyroiditis (r=0.74). (Fig.5)

CONCLUSION:

In children with Hashimoto's thyroiditis in comparison to healthy children a higher cytotoxic activity of T cells is observed with simultaneously decreased perforin expression in NK and CD8+ cells. Probably this apparently paradoxical effect might be a consequence of hyperactivity of this cells and results from exhausting secretion of perforin.

Authors have no conflict of interest.