

The presence of anti-granulocyte antibodies in children with granulocytopenia during the first year of life

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Background

The analysis of anti-neutrophil antibodies (anti-HNA) for determination of the causes of granulocytopenia (<1 G/L of granulocytes) is becoming more available, i.e. due to implementation of commercial tests in the xMAP/Luminex technology.

Young children are a special group of granulocytopenia patients as they may suffer from the chronic condition. In some cases, the pathology results from the maternal-fetal incompatibility related to HNA antigens, known to cause neonatal alloimmune neutropenia (NAIN).

The severe course of the condition may last even several months. The NAIN diagnosis is based on the presence of anti-HNA antibodies in the serum of the mother and/or the child. The next step is demonstration that the mother has no HNA antigen targeted by these antibodies, while the child does have such antigen.

Aim

Determination of the presence of anti-HNA antibodies in children with granulocytopenia within the first year of life as well as assessment whether the detected anti-HNA antibodies may result from neonatal alloimmune neutropenia

Material

From Jan 2018 to Dec 2020, 352 granulocytopenia, children aged up to 1 year, were tested for the presence of anti-granulocyte antibodies in serum. In 13 cases, additional tests for NAIN were performed.

Methods

Detection of anti-HNA and/or anti-HLA antibodies was performed using: LABScreen MULTI (One Lambda) and MAIGA, GIFT, GAT tests. Genotyping was performed using PCR-SSP (HNA-1,3,4,5: HNA-Ready Gene, Inno-Train or HNA Genotyping Tray, One Lambda) and/or RT-PCR (HNA-3, HNA-5, HNA-2).

Results

Anti-neutrophil antibodies were detected in 94/352 (26.7%) children with granulocytopenia: 86.2% (81/94) had anti-HNA; 4.2% (4/94) anti-HNA+anti-HLA, 9.6% (9/94) antibodies of undetermined specificity. In the serum of 17/352 (4.83%) children, only anti-HLA antibodies were detected. The anti-HNA antibodies had the following specificities: anti-HNA-1a (51.8%), anti-HNA-1 (30.6%), anti-HNA-1b (14%), anti-HNA-2 (1.2%), anti-HNA-3b (1.2%), anti-HNA-4a (1.2%).

NAIN was confirmed in 2/13 (15%) of the studied cases, in which HNA-1b or HNA-2 antigens were detected; in the remaining 11 cases the presence of autoantibodies was confirmed.

Conclusions

- 1) In the first year of life of children with granulocytopenia, anti-granulocyte antibodies are mainly autoantibodies.
- 2) Detection of specific anti-HNA antibodies in a child with granulocytopenia justifies extending tests towards NAIN (search for anti-HNA antibodies in serum of the mother and genotyping of the HNA antigens of both mother and child).

