Distinct immunophenotyping profiles of EBV-induced infectious mononucleosis and HIV-infection

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BACKGROUND AND OBJECTIVES

- Flow cytometry analyzes the number and ratio of specific cell subpopulations and recognizes the pathological changes of cellular immunity, which presents immunophenotyping profile
- Immunophenotyping of peripheral blood cells can help distinguish between different infectious diseases
- Infectious mononucleosis caused by the Epstein-Barr virus (EBV) is a self-limiting infection in most immunocompetent hosts while infection with the human immunodeficiency virus (HIV) is associated with progressive deficiency of the immune system
- Both viruses establish a lifelong infection after acute phase, latent in EBV and chronic in HIV. This study included subjects with a clinical diagnosis of infectious mononucleosis caused by EBV and newly-diagnosed HIV-positive individuals
- The aim of this study was to determine and compare immunophenotyping profile of patients with a clinical diagnosis of infectious mononucleosis and newly-diagnosed HIV patients using flow cytometry
- Percentages of certain lymphocyte subpopulations of peripheral blood; T lymphocytes, B lymphocytes, NK cells, CD4+ T lymphocytes, CD8+ T lymphocytes, activated CD8+CD38+ and HLA-DR T lymphocytes were determined for all patients in this study and then compared with reference values for healthy individuals

METHODS

- 136 patients with infectious mononucleosis and 473 newly-diagnosed HIV-patients who entered clinical care at University hospital for infectious diseases “Dr. Fran Mihaljević” from January 2012 to the end of December 2016 were analysed for their lymphocyte subsets using flow cytometry
- Lymphocyte subsets were determined using CYTO-STAT tetraCHROME CD45-FITC/CD4-RD-1/CD8-ECD/CD-3PC-5, CYTO-STAT tetraCHROME CD45-FITC/CD56-RD-1/CD19-ECD/CD3-PC-5, HLA-DR-PC-7 and CD38-PC-7 (Beckman Coulter, Inc., Brea, CA, USA)
- CD4+ lymphocyte absolute count was determined with Flow-Count™ Fluorospheres
- To examine the differences between two groups Mann-Whitney test was used

RESULTS

- Lymphocyte subset values are shown in table 1.
- Statistically significant differences between two populations were noted for B lymphocytes, HLA-DR activated T lymphocytes, CD8+CD38+ lymphocytes, and CD4+ absolute count ($p<0.00001$)
- There was no statistically significant difference for T lymphocytes ($p=0.271$), CD4+ lymphocytes ($p=0.575$), CD8+ lymphocytes ($p=0.596$) and NK cells ($p=0.535$)

Table 1. Lymphocyte subsets values in HIV-positive patients and patients with EBV induced infectious mononucleosis

	HIV-positive patients	EBV-induced infectious mononucleosis patients
T-lymphocytes % med (min-max)	79,9 (28,0-96,8)	87,9 (71,2-98,1)
B-lymphocytes % med (min-max)	8,6 (0,5-52,1)	2,4 (0,1-9,5)
CD4+ lymphocytes % med (min-max)	19,8 (0,4-55,5)	16,7 (5,8-39,1)
CD8+ lymphocytes % med (min-max)	52,7 (5,2-88,6)	66,1 (39,3-85,4)
NK cells % med (min-max)	9,3 (1,3-47,0)	9,1 (0,1-25,7)
Activated T-lymphocytes (HLA-DR) % med (min-max)	12,3 (1,2-77,5)	53,5 (7,8-82,6)
CD38+ lymphocytes % med (min-max)	26,0 (3,0-82,0)	61,0 (21,0-81,0)
CD4+ lymphocytes absolute count (cells/µl) med (min-max)	327 (1-1871)	918 (223-2094)

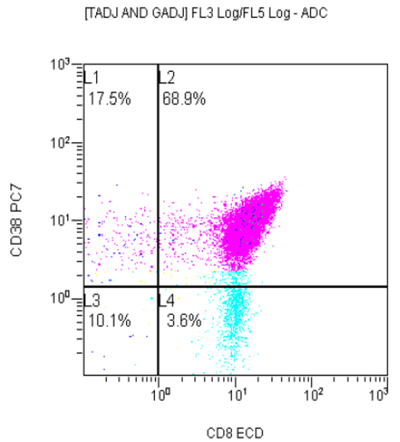

Figure 1. CD8+CD38+ T-lymphocytes in patient with EBV induced infectious mononucleosis

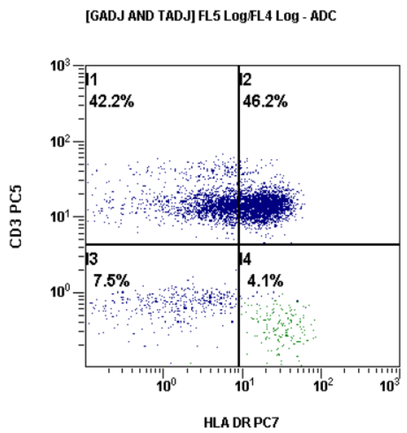

Figure 2. HLA-DR activated T-lymphocytes in patient with EBV induced infectious mononucleosis

CONCLUSIONS

Immunophenotyping profiles of EBV-induced infectious mononucleosis and HIV infection of newly diagnosed patients show statistically significant difference in three lymphocyte subsets, as well as CD4+ absolute count.
Activation markers CD38 and HLA-DR are especially significant in distinguishing the two infections using flow cytometry.

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