

T- and B-Lymphocytes levels in children with Type 1 Diabetes in association with Candida infection



Stanimira Elkina, Svetla Blajeva¹, Irina Halvadhyan, Venetziya Botzova, Chayka Petrova

Department of Pediatrics, Medical University of Plevna, Bulgaria

¹Department of clinical laboratory, immunology and allergology, Medical University of Plevna, Bulgaria



Introduction: Although type 1 diabetes (T1D) is most common autoimmune chronic metabolic disease in childhood, data about the role of T-Lymphocytes (T-Ly) and B-Lymphocytes (B-Ly) in children after the diabetes onset are still controversial. The impaired immune response in T1D is considered as a risk factor for candidal infections. Disorders of cell-mediated immunity in patients with T1D were already reported, but most of the studies are conducted in laboratory models and few are repeated in humans.

The **aim** of the study was to evaluate the serum levels of T- and B-Ly in children with T1D as a predisposing factor for genital candidiasis (GC)

Material:

We studied 71 children with T1D at the age of 6 to 18 years, divided into two groups – with and without GC and 30 age-matched healthy controls.

Methods:

A **flow-cytometry immunophenotyping** of T-Ly (CD3+), Ts (CD8+), Th (CD4+) and B-Ly (CD19+) was performed.

Microbiological culture of genital discharge by the patients with T1D for diagnostic of GC was made.

Glycated hemoglobin (HbA1c) for assessment of metabolic control of T1D was measured. HbA1c $\leq 7.5\%$ was considered as a sign of good metabolic control.

Statistical analysis with Statgraph and SPSS software was performed and as statistical significant a P-value < 0.05 was defined.

Results:

Positive cultures for candidal infection of genitalia had 24 (33,8%) of 71 studied diabetic patients. (**Fig.1**)

Poor long term metabolic control in all researched T1D patients was found: HbA1c - $10,09 \pm 2,28\%$, significantly higher in the group with GC - $11,09 \pm 2,26\%$ than those without infection - $9,39 \pm 2,18\%$ ($p=0,0002$).

(Fig. 2)

Serum levels of CD3+, CD4+ and CD8+ in all patients with T1D were found within the lower part of the normal reference range. No statistical significance with the healthy children was established ($p>0,05$). (**Tabl.1**)

Serum levels of B-Ly 11,02% in all diabetic children were significantly lower than those in healthy controls 14,52%. ($p=0,001$) (**Fig. 3**)

We found no significant differences between the researched T- and B-Ly levels in diabetic children with and without Candida. (**Tabl. 2**)

No significant correlation between the immunological parameters and metabolic control (HbA1c) was found.

Tabl. 2 T- and B-Ly in diabetic children with and without Candida, presented as % and absolute count

Ly	Candida ⁻ /N=47/			Candida ⁺ /N=24/			p
	Median	P ₂₅	P ₇₅	Median	P ₂₅	P ₇₅	
T-Ly (CD3+)							
%	67,43	65,16	75,36	69,09	65,6	75,39	0,8
Abs. count	1656	1284,5	2036,5	1737,3	1300,1	2096,6	0,74
T-helpers (CD4+)							
%	35,6	30,54	42,03	34,5	31,37	39,48	0,43
Abs. count	839,7	592,9	1080,8	864,5	674,8	1094,5	0,63
T-suppressors (CD8+)							
%	30,7	25,22	35,84	30,5	25,29	34,49	0,72
Abs. count	743,6	480,9	941,6	742,9	581,3	1011,2	0,5
CD4+: CD8+ Ratio							
	1,27	0,9	1,5	1,14	0,94	1,45	0,55
B-Ly (CD19₊)							
%	11,29%	9,13	13,85	10,62	8,52	13,42	0,39
Abs. count	243,65	167,8	429,2	268,65	188,5	322,95	0,99

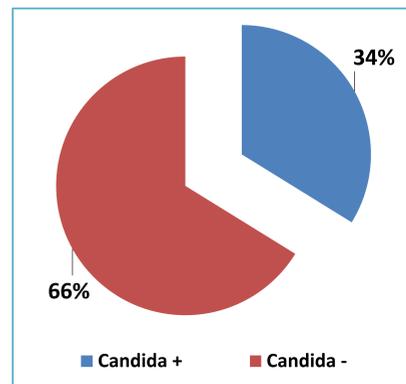


Fig. 1 Children with T1D and Candida infection

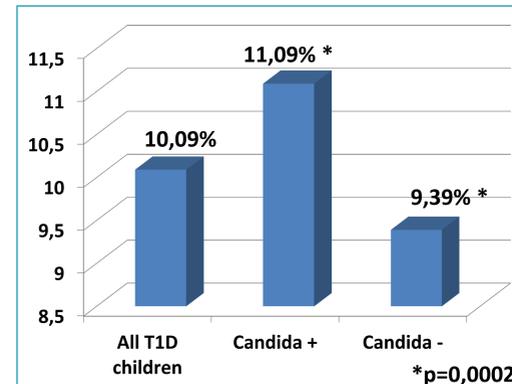


Fig.2 Mean level of HbA1c in Candida+ and Candida- diabetic children

Tabl. 1 T-Ly in children with T1D and control group, presented as % and absolute count

Ly	Children with T1D /N=71/			Control group /N=30/			p
	Median	P ₂₅	P ₇₅	Median	P ₂₅	P ₇₅	
T-Ly (CD3+)							
%	69,43	65,17	75,36	68,54	64,3	70,1	0,07
Abs. count	1672	1284,5	2036,6	1544	1203,6	1662	0,1
T-helpers (CD4+)							
%	35,1	31,1	41,1	36,6	34,89	39,01	0,29
Abs. count	839,7	656,7	1080,8	829,2	693,1	963,2	0,6
T-suppressors (CD8+)							
%	30,3	25,2	35,1	29,3	26,5	31,2	0,1
Abs. count	743,6	512	974,9	653,3	526,7	792,2	0,07
CD4+: CD8+ Ratio							
	1,23	0,9	1,5	1,24	1,16	1,42	0,3

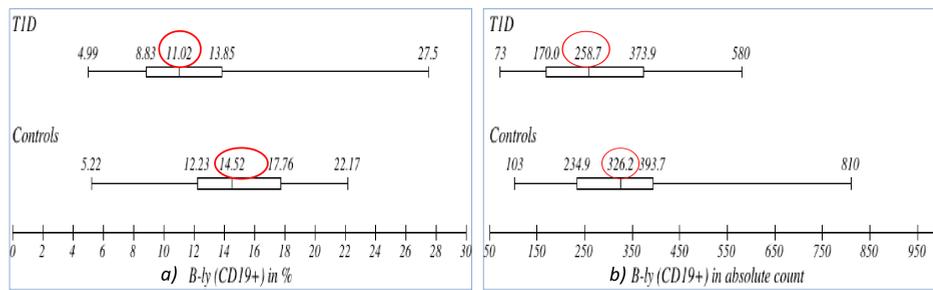


Fig. 3 B-Ly in children with T1D and control group, presented as a) % and b) absolute count ($p=0,0001$)

Discussion:

Our results consider poor long term metabolic control as a risk factor for genital candidiasis in children with T1D, which is consistent with literature data.

There are controversial data in the literature behalf of the cell-mediated immunological parameters in diabetic patients. The mean levels of the evaluated T-Ly in our patients were distributed within the lower part of the normal limits. Serum levels of B-Ly in all diabetic children were significantly lower than those in healthy controls

Although non significant, our results consider a trend of mild depression of T- and B-lymphocytes levels in the diabetic children with candidal infection. This trend requires confirmation by further larger researches.

Conclusion: In the children with T1D with poor long term metabolic control T-Ly levels were distributed at the lower reference range and B-Ly were decreased. No significant differences in association with Candida infection was found.

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