Clinical value of thyroid-stimulating immunoglobulin in paediatric autoimmune thyroid diseases

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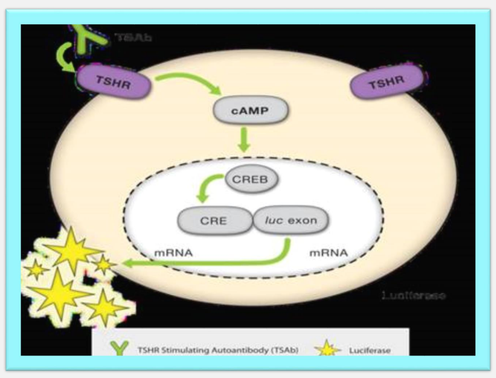
OBJECTIVE

In Autoimmune Thyroid Diseases (**AITD**) two types of TSH receptor antibodies (**TSHR-Ab**) may be distinguished: thyroid- stimulating immunoglobulin (**TSI**) that promotes the production of thyroid hormones and thyroid- blocking immunoglobulin (**TBI**) inhibiting the activity of TSH what leads contrarily to hypothyroidism.
The aim of this study was to compare mean TSI and TBI levels in large paediatric cohort with AITD and control.

METHODS

TSHR-Abs imitate the receptor's ligand by elevating (TSI) cAMP level in thyroid cells or act as an antagonists (TBI) inhibiting cAMP production. It is utilized in novel, cell-based tests (bioassays), which measure luciferase activity induced by cAMP . Chinese hamster ovary cells, stably express a chimeric human TSH- receptor. Available bioassays can differentiate whether TSHR-Abs have stimulatory or blocking properties.
Results relevant to TSI are presented as percentage of specimen-to reference ratio (SRR%, cutoff **140%**). TBIs are reported as percentage of inhibition –cutoff **40%**.

Fig.1 Model of TSH-R bioassay



TSHR-Ab from tested sample binds to the TSH receptor and triggers the cAMP signaling cascade, what finally results in the light emission.

RESULTS

A total of 240 serum samples were obtained from 206 paediatric patients with autoimmune diseases: 33 with Graves' disease (**GD**, 29 female, mean age SD 13.18 4.22 years), 69 with Hashimoto's thyroiditis (**HT**, 58 female, 13.33 2.98 yrs), 66 with type 1 diabetes (**Dt1**, 32 female, 13.43 3.17 yrs), 5 with juvenile arthritis (**JA**, 2 female, 13.8 3.27yrs) and 33 healthy controls (**C**, 11 female, 11.85 4.56 yrs).

Fig.2 Laboratory features of all study groups

	GD	HT	Dt1	JIA	C
n	53	83	66	5	33
TSH (uIU/ml)	1.12±2.13* (p=0.01**) (p<0.01***)	8.16±19.79 (n.s.****)	2.46±1.13	2.3±1.45	2.3±1.02
fT4 (ng/ml)	2.56±1.61 (p<0.0001**) (p<0.01***)	1.27±0.34 (n.s.****)	-	-	1.3±0.19
fT3 (pg/ml)	6.39±4.82 (p=0.001**) (p=0.05***)	3,27±1.08 (n.s.****)	-	-	3.84±0.95
Treatment	Metizol	L-thyroxin			

*mean ± SD
**p: statistical significance between GD and HT
***p: statistical significance between GD and C
**** statistical significance between HT and C

Fig.3 Positive values of TSHR-Abs in all GD (n=53) and HT (n=83) samples

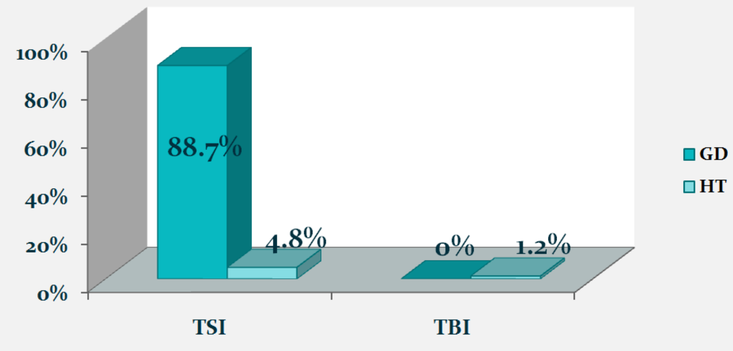


Fig.4 TSI levels in samples with GD vs. GO

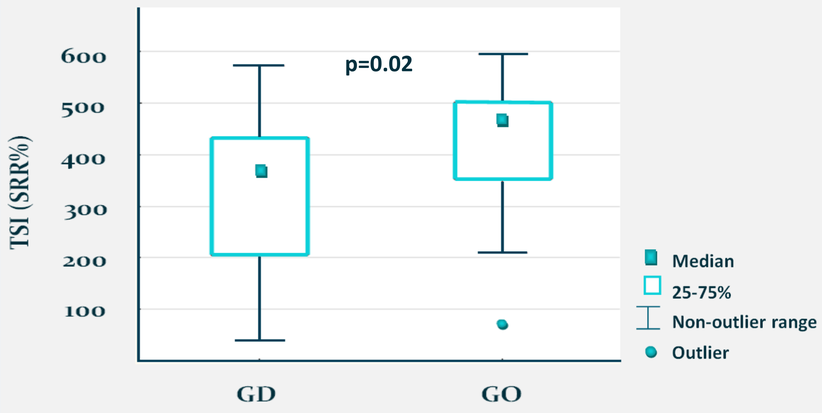
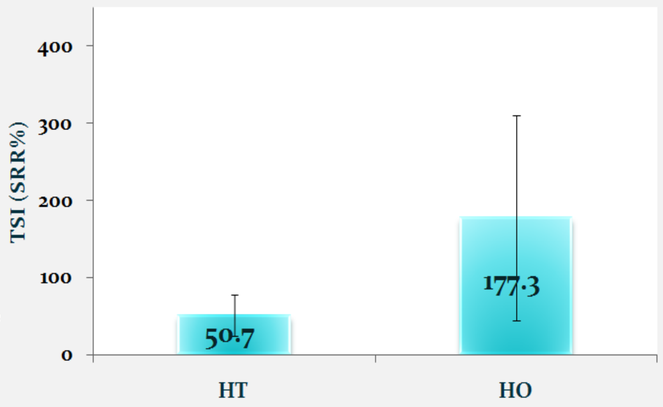


Fig.5 Mean TSI levels in HT and HO



CONCLUSION

1. These results indicate strong correlation between TSI and GD .
2. Occurrence of orbitopathy associates with TSI's presence both in GD and HT.
3. Higher TSI levels in group with vs. without TAO are observed.
4. TBI's utility seems to be uncertain.

Fig.6 Proportion between TSI's positive values in HT and HO

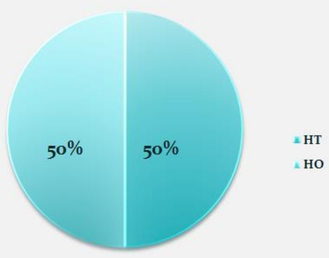
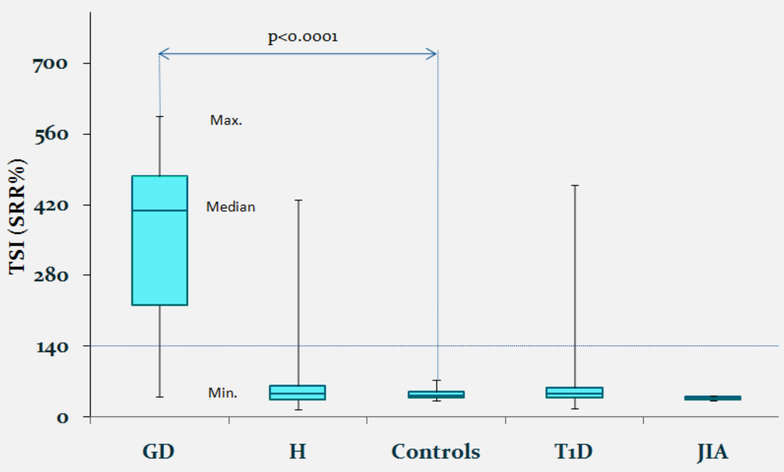


Fig.7 TSI levels in all study groups



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