Hypo- and hyperthyroidism: Causes of hepatic dysfunctions

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Aims: Between the liver and the endocrine glands, there are many multifactorial relationships and feedback mechanisms. The malfunction of one can result in the alteration of the other. Hypo- and hyperthyroidism, as well as the drugs used for these disorders may induce hepatic dysfunctions of various degrees. The aim of this study is to analyze the serum markers of liver function and the morphological hepatic changes (by ultrasound) in hypo- and hyperthyroidism.

Material

- group of patients with hypothyroidism: 59
  - subclinical:14
    - TSH ≥ 4.21μUI/ml
    - FT_4 = 12-22 pmol/l (normal)
  - clinically manifest: 45
    - $FT_{4 <}$ 12 pmol/l
- group of patients with hyperthyroidism: 30
  - TSH< 0.27 μUI/ml
  - FT_4 > 22 pmol/l
- control group: 30 subjects with the same age and sex parameters

The following were excluded from the study:
- patients with chronic viral hepatitis
- consumers of more than 20 g/day alcohol
- patients with systemic diseases that might affect the liver and the thyroid
- users of hepatotoxic drugs (other than for thyroid disease)

Method

- Serum liver function tests were performed: alanine aminotransferase (ALT), aspartate aminotransferase (AST), total bilirubin (Bt), γ-glutamyl transpeptidase (GGTP), alkaline phosphatase (SAP)
- The liver was monitored by ultrasound
- The results were compared to those of the control group

Results

HYPOTHYROIDISM

- the mean age of the patients was 51.5±12.1 years; 68.2% were women
- high ALT levels were detected in 35.60% of the patients
- an ultrasonographic appearance of fatty liver disease was found in 37.30% of the patients
-between FT_4 vs. ALT (r = -0.50; p<0.004) (Fig. 1), and between FT_4 vs. AST (r = -0.40; p<0.02) (Fig. 2), there was a highly statistically significant inverse linear correlation

Fig. 1. Diagram of the correlation between the dependent variable "ALT" and the independent variable "FT_4" for patients with hypothyroidism

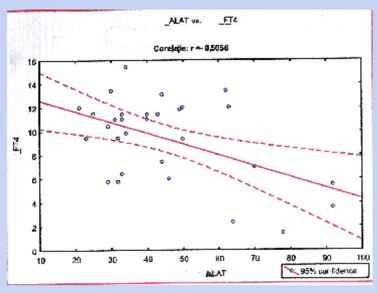
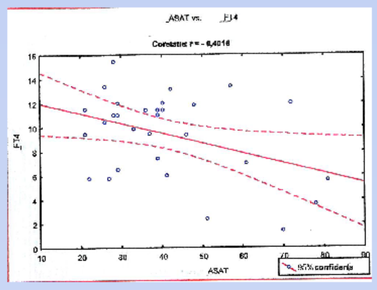
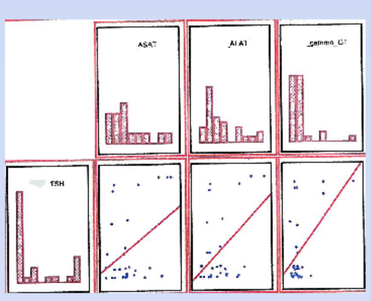


Fig. 2. Diagram of the correlation between the dependent variable "AST" and the independent variable "FT_4" for patients with hypothyroidism



Between TSH vs. ALT; TSH vs. AST; and TSH vs. GGTP, there is a direct correlation (p≤0.05) (Fig. 3)

Fig. 3. Diagram of the linear correlation between the independent variable "TSH" vs. AST, ALT, GGTP for patients with hypothyroidism



HYPERTHYROIDISM

- the mean age of the patients was 48.3 ± 18.2 years; 72.3% were women
- the prevalence of changes in liver function tests in the patients was: 23.3% ALT and AST; 36.6% Bt; 36.6% GGTP; 53.3% SAP
- fatty liver disease was found in 33.3% of the patients
- the linear regression model evidences a direct correlation between FT_4 and liver parameters with a significance for Bt, SAP, GGTP

Table 1: FT_4, TSH and biochemical liver parameters in patients with hyperthyroidism

	No. of cases	Mean	Confidence interval		Minimum	Maximum	Standard deviation
			Lower limit	Upper limit			
FT4	30	66.90	55.210	78.589	31	110	24.9776
TSH	30	0.048	0.024	0.072	0.002	0.16	0.0508
AST	30	44.150	33.738	54.561	23	89	22.2457
ALT	30	44.300	35.350	53.249	26	96	19.1231
Bt	30	1.172	1.015	1.329	0.7	1.90	0.3346
SAP	30	268.500	243.118	293.881	190	420	54.2329
GGT	30	52.950	47.726	58.173	41	81	11.1613

Conclusions:

It is recommended to monitor the liver function of all patients with thyroid dysfunctions at the time of diagnosis (pre-therapy) and during the evolution of the disease under therapy.

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