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 ≥ 4.21 mU/l
    - FT4 = 12-22 pmol/l (normal)
  - clinically manifest: 45
    - FT4 ≥ 12 pmol/l
- group of patients with hyperthyroidism: 30
  - TSH < 0.27 μU/ml
  - FT3 > 22 pmol/l
- control group: 50 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 ultrasoundographic appearance of fatty liver disease was found in 37.30% of the patients
- between FT4 vs. ALT (r = -0.50; p<0.004) (Fig. 1), and between FT4 vs. AST (r = -0.40; p<0.02) (Fig. 2), there was a highly statistically significant inverse linear correlation

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 FT4 and liver parameters with a significance for Bt, SAP, GGTP

Table 1: FT4, TSH and biochemical liver parameters in patients with hyperthyroidism

<table>
<thead>
<tr>
<th>Parameter</th>
<th>No. of cases</th>
<th>Mean</th>
<th>Confidence Interval</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT4</td>
<td>30</td>
<td>66.90</td>
<td>55.210 - 78.589</td>
<td>31</td>
<td>110</td>
<td>24.9776</td>
</tr>
<tr>
<td>TSH</td>
<td>30</td>
<td>0.048</td>
<td>0.024 - 0.072</td>
<td>0.002</td>
<td>0.16</td>
<td>0.0008</td>
</tr>
<tr>
<td>AST</td>
<td>30</td>
<td>44.150</td>
<td>33.738 - 54.561</td>
<td>23</td>
<td>89</td>
<td>22.2457</td>
</tr>
<tr>
<td>ALT</td>
<td>30</td>
<td>44.300</td>
<td>35.350 - 53.249</td>
<td>26</td>
<td>96</td>
<td>19.1231</td>
</tr>
<tr>
<td>Bt</td>
<td>30</td>
<td>1.172</td>
<td>1.015 - 1.329</td>
<td>0.7</td>
<td>1.90</td>
<td>0.3346</td>
</tr>
<tr>
<td>SAP</td>
<td>30</td>
<td>268.500</td>
<td>243.118 - 293.881</td>
<td>190</td>
<td>420</td>
<td>54.2329</td>
</tr>
<tr>
<td>GGTP</td>
<td>30</td>
<td>52.950</td>
<td>47.726 - 58.173</td>
<td>41</td>
<td>81</td>
<td>11.1613</td>
</tr>
</tbody>
</table>

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.