Dynamic Thiol/Disulfide Homeostasis In Patients With Autoimmune Subclinical Hypothyroidism

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Objectives:
Abnormal thiol/disulphide homeostasis has been shown to be responsible for a number of diseases in which chronic inflammation is predominant. However, the role of thiol/disulphide homeostasis in the pathogenesis of Hashimoto thyroiditis, which is also a chronic inflammatory disorder, is not known. In this study, we aimed to investigate dynamic thiol/disulphide homeostasis in patients with subclinical hypothyroidism using the new and automatic method developed by Erel & Neseholgu.

Methods:
Forty eight patients with newly diagnosed subclinical hypothyroidism due to Hashimoto thyroiditis and not yet on any treatment and 48 healthy subjects without any known disease were enrolled. Thiol/disulphide homeostasis [native thiol(-SH) –disulphide(-S-S-) exchanges] was measured in both groups with new method developed by Erel and Neseholgu. The half of the difference between total thiol (-SH + -S-S-) and -SH concentrations gave the -S-S- bond amount.

Table 1. Levels of thiol/disulphide homeostasis parameters between groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Control (n=48)</th>
<th>Subclinical Hypothyroidism (n=48)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>-SH (μmol/L)</td>
<td>398±49.8</td>
<td>375.1±38.7</td>
<td>0.014*</td>
</tr>
<tr>
<td>-SH + -S-S- (μmol/L)</td>
<td>432.4±51.3</td>
<td>416.7±40.9</td>
<td>0.101</td>
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<tr>
<td>-S-S- (μmol/L)</td>
<td>17.2±6</td>
<td>20.8±6</td>
<td>0.004*</td>
</tr>
<tr>
<td>-S-S- (-SH + -S-S-) (%)</td>
<td>4.4±1.7</td>
<td>5.6±1.7</td>
<td>0.001*</td>
</tr>
<tr>
<td>-S-S- (-SH + -S-S-) (%)</td>
<td>4±1.4</td>
<td>5±1.4</td>
<td>0.001*</td>
</tr>
<tr>
<td>-SH (-S-S-) (%)</td>
<td>92±28.8</td>
<td>90±27.8</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

Parameters were expressed as mean±SD and median [interquartile range]. *p<0.05 was considered significant for statistical analyses.

Results:
In patients with subclinical hypothyroidism, -SH level and -SH/(-SH+ -S-S-) ratio was found to be lower than that of the control group. -S-S- level (p=0.004), -S-S-/-SH (p=0.001) and -S-S-/(−SH + -S-S-) (p=0.001) ratio was higher in patients with subclinical hypothyroidism as compared to that of the control group. A positive correlation was found between anti-TPO and anti-Tg levels and -S-S-/-SH vs -S-S-/(−SH + -S-S-) levels while a negative correlation was found with -SH/(−SH + -S-S-) level.

Conclusions:
Thiol/disulfide homeostasis was found to have a tendency towards -S-S- formation in patients with subclinical hypothyroidism and thyroid autoantibodies were correlated positively with thiol oxidation. Abnormal thiol/disulfide homeostasis in patients with Hashimoto thyroiditis, is whether a cause or a consequence, may be illustrated by using thiol-containing drugs and following autoantibody levels. The efficacy, dose and duration of thiol drugs may be monitored easily, effectively, quickly and cheaply by the method developed by Erel and Neseholgu.

References: