THYROID FUNCTION IN CHRONIC RENAL FAILURE, HAEMODIALYSIS, AND TRANSPLANT PATIENTS

M Frutos, S Casado, R Peces, J A Sánchez Martin, L Hernando

Universidad Autónoma de Madrid, Spain

Several groups [1,2,3] have described thyroid abnormalities in chronic renal insufficiency.

This study was conducted in order to evaluate the thyroid function of patients with chronic renal failure, before and during haemodialysis therapy, and after a successful renal transplant.

Patients and Methods

Seventy-four patients divided into three groups were studied:
(i) Twenty patients (9 men and 11 women, 15 to 59 yrs of age) with end-stage kidney disease, not yet on dialysis and with creatinine clearance below 10 ml/min (Pre-HD).
(ii) Thirty-three patients (19 men and 14 women) undergoing maintenance haemodialysis, three times weekly, 4 hr per dialysis, with UF-II, 14 or SP 1052 coil dialysers. The duration of dialysis was 6 to 60 months, with ages ranging from 16 to 65 yrs (HD).
(iii) Twenty-one patients (16 men and 5 women, - between 18 and 53 yrs of age) with a functioning kidney transplant over a six month period and creatinine clearance over 50 ml/min (RT).

Patients from pre-HD and HD groups were receiving a 80 g protein diet, aluminium hydroxide, multivitamins, folic acid and ferrous sulphate. Some of them needed antihypertensive drugs. The RT patients received prednisone and azathioprine, 20 mg every other day and 100 mg daily, respectively.

Fasting blood samples were taken between 8 and 9:30 a.m., 48 hrs after the last dialysis, and 48 hrs after the prednisone dose in the RT group.

Serum levels of thyroxine (T₄) and triiodothyronine (T₃) were determined by radioimmunoassay [4]. Thyroid stimulating hormone (TSH) was measured by competitive radioimmunoassay [5] with a kit provided by Abbott Laboratories. These values were compared with the values of 30 normal control subjects of matching ages.
Results

The results of the serum thyroid function tests are summarised in Table I.

<table>
<thead>
<tr>
<th></th>
<th>T₃ (ng/100 ml)</th>
<th>T₄ (µg/100 ml)</th>
<th>TSH (µU/ml)</th>
<th>T₄ / T₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>163 ± 6.2</td>
<td>8.38 ± 0.56</td>
<td>2.38 ± 0.30</td>
<td>51.4 ± 3.0</td>
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<tr>
<td></td>
<td>(30)</td>
<td>(30)</td>
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<td>(30)</td>
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<tr>
<td>pre-HD</td>
<td>97 ± 10.4</td>
<td>8.19 ± 0.51</td>
<td>4.65 ± 0.50</td>
<td>94.8 ± 8.74</td>
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<td></td>
<td>(20)</td>
<td>(20)</td>
<td>(20)</td>
<td>(20)</td>
</tr>
<tr>
<td>p*</td>
<td>&lt;0.0005</td>
<td>NS</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>HD</td>
<td>109 ± 7</td>
<td>7.26 ± 0.54</td>
<td>3.32 ± 0.29</td>
<td>70.8 ± 5.35</td>
</tr>
<tr>
<td></td>
<td>(33)</td>
<td>(33)</td>
<td>(33)</td>
<td>(33)</td>
</tr>
<tr>
<td>p*</td>
<td>&lt;0.0005</td>
<td>NS</td>
<td>&lt;0.01</td>
<td>&lt;0.0025</td>
</tr>
<tr>
<td>RT</td>
<td>219 ± 17.5</td>
<td>12.0 ± 0.92</td>
<td>2.58 ± 0.39</td>
<td>59.9 ± 6.49</td>
</tr>
<tr>
<td></td>
<td>(21)</td>
<td>(21)</td>
<td>(21)</td>
<td>(21)</td>
</tr>
<tr>
<td>p*</td>
<td>&lt;0.0025</td>
<td>&lt;0.005</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

Values are given as mean ± SEM. The number of patients is in brackets.

*The significance of the difference between the means of each patient group and the control, was tested using the unpaired t-test.

No symptomatic hypothyroidism (low T₃ and high TSH levels) was found in patients with chronic renal failure. Thyroid enlargement was noted in only two patients from the HD group.

Diminished serum T₃ levels were present in patients with chronic renal failure before and during chronic haemodialysis. Serum thyroxine concentrations were normal in both groups.

Regression analysis showed no significant relation between T₃, T₄, and haemodialysis duration.

High T₃ and T₄ levels were found in renal transplant patients, a finding not previously reported.

Serum cholesterol, total proteins, creatinine, and BUN did not correlate with serum thyroid function tests.

T₄/T₃ ratios were significantly elevated in the pre-HD and HD groups with respect to the normal and RT groups.

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References

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