Fetuin A Serum Levels in Children with Nonalcoholic Fatty Liver Disease (NAFLD)

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Background

Fetuin A is a hepatokine known as a natural inhibitor of the insulin receptor tyrosine kinase and is associated with insulin resistance and NAFLD. Studies on adults provided conflicting results regarding the link between fetuin A and the severity of liver damage in NAFLD. Data on children are limited. Objective: Our aim was to investigate the relationship between fetuin A, metabolic parameters and NAFLD in obese children.

Methods

118 obese subjects (48F/70M), aged 9.3 ± 2.4 yrs, were studied. Anthropometry, OGTT, biochemical measurements and fetuin A serum levels were assessed. In 19 children the presence of NAFLD was investigated by ultrasonography (US). 7/19 children had a normal liver US (group 1), whereas 12/19 were diagnosed as NAFLD (group 2). Ninety-nine children underwent liver biopsy to assess the presence of NASH: 14 were diagnosed as “NASH” (group 3) and 85 as “not NASH” (group 4). Differences between groups were assessed by Mann-Whitney U-test.

Results

Fetuin A levels were related to age (r=0.25, P<0.01), waist circumference (WC) (r=0.2, P<0.05) systolic blood pressure (r=0.2, P<0.05), apolipoprotein B (r=0.275, P<0.01), fasting plasma glucose (r=0.2, P<0.05) and insulin levels (r=0.3, P<0.005), OGTT mean insulin (r=0.26, P<0.05), 2h postload insulin (r=0.26, P<0.01), HOMA-IR (r=0.3, P<0.01) and ISI (r=0.3, P<0.01). Stepwise regression analysis revealed that among age, BMI SDS and WC, fetuin A was the major predictors of 2h postload insulin levels (adj R2=0.105).

Group 2 tended to have significantly higher levels of fetuin A (723.2 ± 102.6 μg/mL) than group 1 (641.1 ± 81.4 μg/mL) (p=0.056). No significant differences between groups were found in age and BMI (Table 1).

Among children who underwent liver biopsy no significant difference between group 3 and 4 was found in fetuin A serum levels (Table 2).

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>P</th>
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</thead>
<tbody>
<tr>
<td>Nr</td>
<td>7</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Age (yrs)</td>
<td>11.9 ± 1.9</td>
<td>12.1 ± 2.6</td>
<td>ns</td>
</tr>
<tr>
<td>BMI (SDS)</td>
<td>2.9 ± 1.1</td>
<td>3.2 ± 1.3</td>
<td>ns</td>
</tr>
<tr>
<td>% Male</td>
<td>85.7</td>
<td>58.3</td>
<td>ns</td>
</tr>
<tr>
<td>Fetuin A (ng/mL)</td>
<td>641.1 ± 81.4</td>
<td>723.2 ± 102.6</td>
<td>0.056</td>
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</tbody>
</table>

Table 1. Comparison between patients with or without NAFLD diagnosed by US.

<table>
<thead>
<tr>
<th></th>
<th>Group 3</th>
<th>Group 4</th>
<th>P</th>
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<tbody>
<tr>
<td>Nr</td>
<td>14</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Age (yrs)</td>
<td>9.56 ± 2.02</td>
<td>8.58 ± 1.95</td>
<td>ns</td>
</tr>
<tr>
<td>BMI (SDS)</td>
<td>2.47 ± 1.12</td>
<td>2.69 ± 0.86</td>
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<tr>
<td>% Male</td>
<td>50</td>
<td>58.8</td>
<td>ns</td>
</tr>
<tr>
<td>Fetuin A (ng/mL)</td>
<td>606.53 ± 156.37</td>
<td>631.87 ± 193.79</td>
<td>ns</td>
</tr>
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</table>

Table 2. Comparison between patients with different degrees of NAFLD (NASH/not NASH) diagnosed by liver biopsy.

Conclusions

Fetuin A may represent a biomarker of NAFLD in obese children, though not related to the severity of the disease.