Non-HDL cholesterol in diabetic children: Treatment recommendations based on glycemic control, BMI, age, sex, and generally accepted cut points

Reference levels derived from the German-Austrian Diabetes Documentation and Quality Management System (DPV)

Schwab KO1, Doerfer JT, Dost A2, Rohrer TR3, Hungerle A1, Scheuing N2, Krebs A1, Hofer SE1 and Holl RW4 for the German/Austrian Diabetes Documentation and Quality Management System (DPV)
1Department of Pediatrics and Adolescent Medicine, University Medical Center, Jena; 2Department of General Pediatrics and Neonatology, Saarland University Medical Center, Homburg; 3Institute of Epidemiology and Medical Biometry, University of Ulm, Ulm, Germany; 4University Children’s Hospital, Innsbruck, Austria

Introduction
Most of the guidelines recommend in a first step lifestyle changes to improve diabetes control and in a second step lipid lowering medication (1). To improve the low frequency of lipid lowering treatment (2), a diagnostic algorithm of LDL-, non-HDL- and HDL-C has been established for diabetic adolescents and healthy peers (3). Here, we would like to give treatment recommendations for the pediatric diabetologist by using accepted cut points of non-HDL-C levels (4).

Conclusions:
• Patient groups like obese over 10 year old females with type 1 diabetes frequently will not reach acceptable non-HDL levels despite marked improvement of their diabetes control.
• Therefore, both lipid lowering medication and simultaneously changes of lifestyle are recommended in these patient groups in order to reach acceptable non-HDL-C levels.

Methods
Percentile-based distribution of non-HDL-C levels of diabetic adolescents (DPV, n=26,147) were calculated related to HbA1c elevations from 6% to >9% in normal weight and overweight female, and male children with type 1 diabetes.

Table 1: Characterisation of children and adolescents with type 1 diabetes

<table>
<thead>
<tr>
<th>Number of patients</th>
<th>Age, years</th>
<th>Age range, years</th>
<th>Male sex, %</th>
<th>BMI, kg/m²</th>
<th>BMI SDS</th>
<th>HbA1c, %</th>
<th>Non-HDL-cholesterol, mg/dl</th>
<th>HDL-cholesterol, mg/dl</th>
</tr>
</thead>
<tbody>
<tr>
<td>26,147</td>
<td>13.7 ± 3.9</td>
<td>1 - 17.9</td>
<td>53</td>
<td>21.3</td>
<td>0.3 ± 0.86</td>
<td>8.3 ± 1.7</td>
<td>117 ± 36</td>
<td>60 ± 16</td>
</tr>
</tbody>
</table>

Table 2: Distribution of non-HDL cholesterol related to worsening glycemic control related to HbA1c elevations from 6% to >9% in normal weight (BMI <90th percentile), overweight (BMI ≥90th percentile), female, and male children with type 1 diabetes aged 210 years

Table 3: Distribution of non-HDL cholesterol related to worsening glycemic control related to HbA1c elevations from 6% to >9% in normal weight (BMI <90th percentile), overweight (BMI ≥90th percentile), female, and male children with type 1 diabetes aged 210 years

References:

Results:
• Information about the scope of increased non-HDL-C levels due to worsening HbA1c, increasing age, sex differences, and overweight are shown in Table 2 and 3.
• To achieve the non-HDL-C goal of <120 mg/dL, both lipid-lowering medication and healthy lifestyle are strongly recommended for non-HDL-C levels ≥140 mg/dL concerning 10% of all patients and 25% of overweight adolescent girls with T1D.