Type 1 Diabetes and Cholesterol

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Introduction

Recently it has been suggested that previous guidelines using total cholesterol as an indication of dyslipidaemia in children with Type 1 diabetes mellitus (T1DM) are insensitive and that Non-HDL is a better marker of cardiovascular risk[1].

Non-HDL is total cholesterol minus HDL and therefore incorporates LDL and non-fasted triglycerides. Recommended non-HDL should be <3.1mmol/l, levels 3.1-3.6mmol/l require lifestyle modification and over 3.6mmol/l lifestyle modification and statins.

Analysis was done of T1DM patients at UHS who had an annual review in the first 6 months of 2016 and the data was compared to the existing study[1].

Objectives

1. To demonstrate non-HDL is a more sensitive marker of dyslipideamia in children with T1DM rather than total cholesterol.
2. To see if there is any correlation between non-HDL, BMI, HbA1c and gender.
3. To demonstrate that dyslipideamia is becoming an increasing problem
4. To assess the impact of lifestyle advice and whether statins should be started if it is persistently above 3.6mmol/l

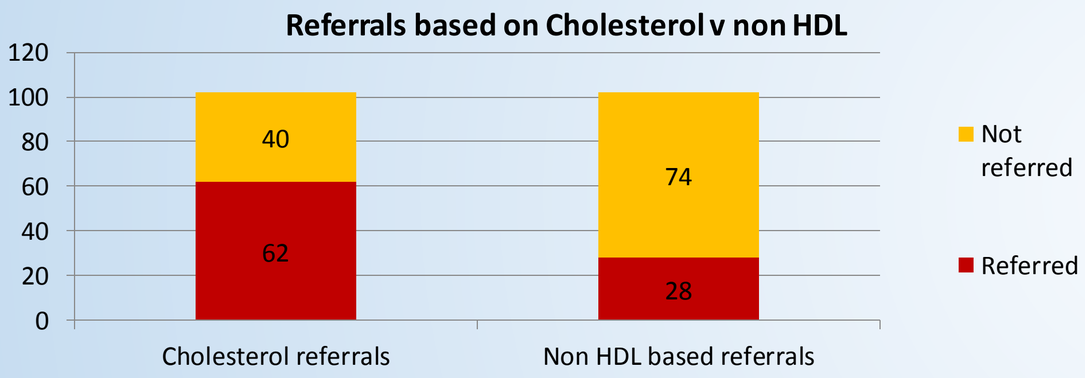
Method

Data was gathered on all paediatric patients with a diagnosis of T1DM treated under the diabetic team at University Hospital Southampton who had an annual review between January and June 2016. There were 102 patients in total, 60 males and 40 females (mean non-HDL 2.84mmol/l ±0.78, mean HbA1c 69.83mmol/l ±14.6). Patients who had any other form of diabetes were excluded (n=3). Each patient had their non-fasted bloods analysed and their HbA1c, cholesterol, BMI, age, gender and any referral to dieticians recorded. Of these, 72 had been patients since 2014 and their non-HDL for each year recorded.

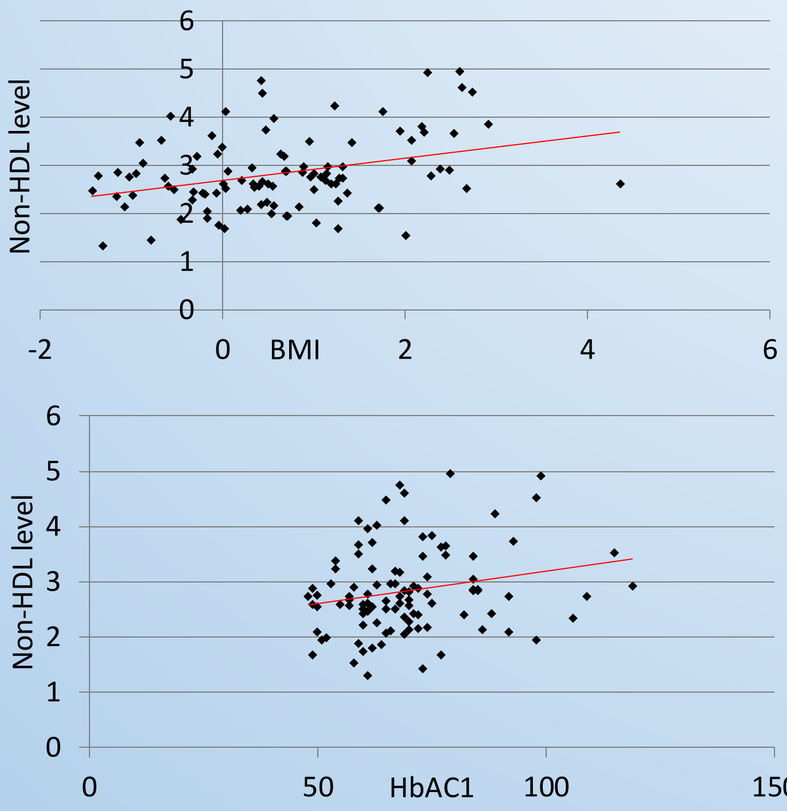
Results

(Using all 102 patients)

1. In 2016, 62 patients should have been referred to the dieticians for further lifestyle advice as their total cholesterol was over 4.1mmol/l. In comparison, using the same cohort of 102 patients, only 28 would have been referred using non-HDL.



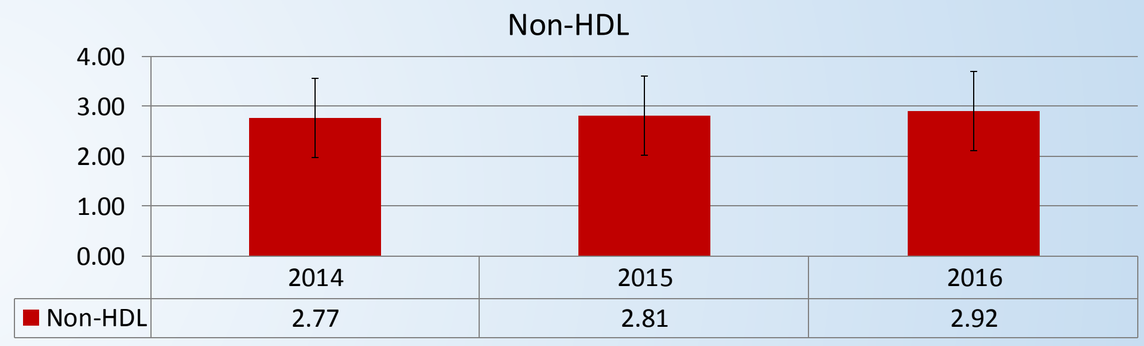
2. Unlike the German research we could find no significant correlation between non-HDL and gender (2.77±0.76 for male compared to 2.94±0.80 for females) but there was a correlation between non-HDL and BMI (p value 0.0006) and non-HDL and HbA1c (p value 0.028).



Results (continued)

(Using 72 patients with data from 2014-16)

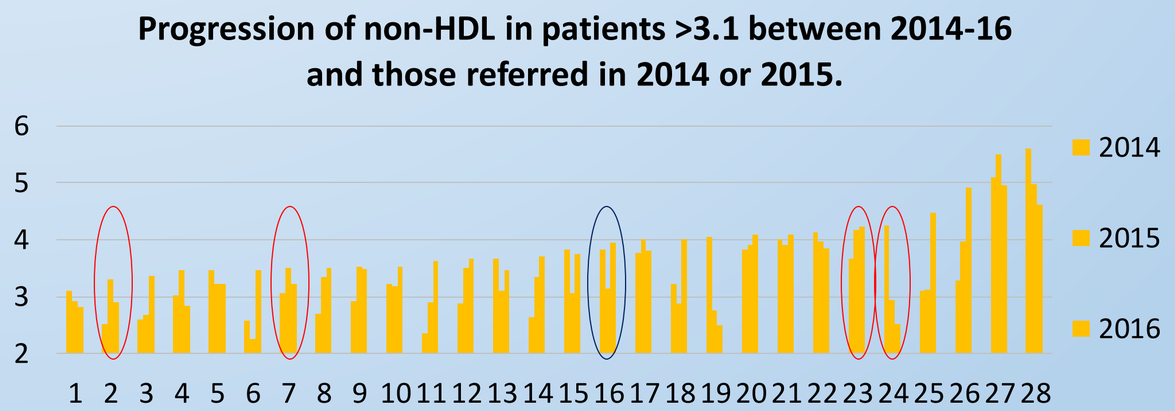
3. Data from 72 patients who had non-HDL levels measured from 2014-16 were analysed. The mean non-HDL increased from 2.77mmol/l ± 0.79 in 2014 to 2.92mmol/l ±0.79 in 2016 (p value 0.033).



There was also an increase in the number of cases that would have been referred using non-HDL.

Year	≥3.1	≥3.6
2014	25%	17%
2015	28%	11%
2016	32%	21%

4. Of the 72 patients that had a non-HDL>3.1 in any year between 2014-16 only 5 had been referred to the dieticians for further lifestyle advice in 2014 or 2015. These all showed an initial improvement in non-HDL the following year, except 1. Only one patient in this cohort was seen by dieticians in 2014 and they made an improvement in 2015 but the non-HDL was significantly worse in 2016.



References

1. K Otfried Schwab MD, Jurgen Doerfer MD, Andreas Hungele, et al. Non-High-Density Lipoprotein Cholesterol in Children with Diabetes: Proposed Treatment Recommendations Based on Glycemic Control, Body Mass Index, Age, Sex, and Generally Accepted Cut Points. *The Journal of Paediatrics* 2015; 167(6)

Discussion

It can be seen that there is a significant difference using non-HDL in comparison to total cholesterol measurements, both in relation to how we interpret the patients results and cardiovascular risk, and in how we recommend further treatment options. HbA1c and BMI remain significant contributors to adverse lipid profiles and cardiovascular risk in diabetes. Children with T1DM already have regular dietetic advice aiming to maximise diabetes control and healthy weight. We have not demonstrated a clear indication for statin treatment in addition to these measures in this cohort.