# Dyslipidemia in Children with Diabetes

Lim Pei Kwee[1], Vasanwala Rashida[2], Cheng Tuck Seng[2], Hui Yuen Ching Angela[1], Lim Soo Ting Joyce[1], Lek Ngee[2], Yap Fabian[2]

[1]Division of Nursing, KK Women's & Children's Hospital, Singapore
[2] Endocrinology Services, KK Women's & Children's Hospital, Singapore

## Background

- Available data on prevalence and distribution of dyslipidemia in children with diabetes is limited
- Studies have shown that lipid abnormality tracks from childhood to adulthood and contributes to the atherosclerotic process, therefore initial assessment and follow up is essential[1]

## Aim

- To study the prevalence and comparison of dyslipidemia in children with type 1 diabetes (T1D) and type 2 diabetes (T2D) in a tertiary children's hospital

## Method

- A cross-sectional sample of diabetes patients, age 7-18 years on active follow-up between 1st January to 31st December 2014 were recruited
- Fasting blood samples were analysed for glycated haemoglobin (HbA1c), total cholesterol (TC), high density lipoprotein (HDL), triglycerides (TG) and low density lipoprotein (LDL)
- Measurements of TC, HDL and TG were performed on Abbott Architect c8000 platform and LDL was calculated with Friedwald's equation
- Dyslipidemia was defined as TC ≥5.2 mmol/L, HDL ≤1.0 mmol/L, TG ≥3.4 mmol/L or LDL ≥3.4 mmol/L[2]
- Children's demographic characteristics and biochemical data were compared between T1D and T2D using Fisher's exact test and independent sample t-test.
- Gender- and age-adjusted mean BMI of patients were computed using Analysis of Covariance (ANCOVA).

## Results

- Total 165 patients (T1D: n=115; 69.7%, T2D: n=50; 30.3%) were recruited
- T1D were diagnosed at younger age and average age was 7.75 ±3.39 as compared to 12.50 ±2.43 in T2D (p= <0.001) as shown in Table 1
- T2D had higher BMI (27.70 ±0.60 vs 19.81 ±0.40 kg/m$^2$; p=<0.001)
- The prevalence of any dyslipidemia in children with diabetes was 46.1% (n=76) and higher in T2D than T1D (68.0% vs 36.5%, p=<0.001)
- T2D had higher TG (1.60 ±0.90 vs 1.00 ±0.65 mmol/L; p=<0.001) but lower HDL (1.17 ±0.21 vs 1.51 ±0.36 mmol/L; p=<0.001) than T1D.
- There was no significant difference in LDL between T1D and T2D (3.01 ±1.06 vs 2.92 ±0.86 mmol/L; p=0.560)
- 16.5% (n=19) of T1D had LDL ≥ 3.4 mmol/L (Table 2)
- A large proportion of T1D (n=76, 66.1%) were found to have higher than acceptable LDL level (ISPAD and ADA recommended acceptable LDL levels of <2.6 mmol/L)

## Discussion

- In this study, 58 children with diabetes (35%) have TC ≥5.2mmol/l. This is consistent with 39%of children with diabetes and double that of school children without diabetes (17%) in a UK study[3]
- Higher than acceptable LDL level was highly prevalent in T1D (66.1%) whom had no family history of lipid disorder (83.5%) may suggest that T1D children are taking higher intake of food products containing saturated fatty acids and cholesterol as snacks or substitute to avoid higher carbohydrate intake
- Screening for fasting blood lipids may need to commence at diagnosis among T1D and annually for early interventions if abnormal

## Conclusions

- A significant proportion of children with T1D showed higher than acceptable LDL (2.6 – 3.3 mmol/L) but not frankly elevated LDL (≥3.4) level and no family history of lipid disorder. Further research on the reasons for this LDL pattern is recommended

### Table 1 : Children's Characteristics

| | Type 1 (n = 115) | Type 2 (n=50) | *p* value |
|---|---|---|---|
| Gender (n,%) | | | 0.613 |
| Male | 54 (47.0) | 26 (52.0) | |
| Female | 61 (53.0) | 24 (48.0) | |
| Ethnicity (n,%) | | | 0.036 |
| Chinese | 81 (70.4) | 30 (60.0) | |
| Malay | 12 (10.4) | 13 (26.0) | |
| Indian / Others | 22 (19.2) | 7 (14.0) | |
| Family history of lipid disorder (n,%) | 19 (16.5) | 10 (20.0) | 0.657 |
| Current Age (years) | 13.61±2.58 | 15.36 ±2.00 | <0.001 |
| Age at diagnosis (years) | 7.75 ±3.39 | 12.50±2.43 | <0.001 |
| Duration of diabetes (years) | 5.85 ±3.69 | 2.82 ±2.12 | <0.001 |
| Prevalence of dyslipidemia (n,%) | 42 (36.5) | 34 (68.0) | <0.001 |
| Mean HbA1c (%) | 8.98±1.96 | 7.90 ±2.27 | 0.095 |
| Mean BMI adjusted to gender & age (kg/m$^2$) | 19.81±0.40 | 27.70 ±0.60 | <0.001 |
| Mean TC (mmol/L) | 4.88 ±1.11 | 4.96 ±1.24 | 0.663 |
| Mean HDL (mmol/L) | 1.51 ±0.36 | 1.17 ±0.21 | <0.001 |
| Mean TG (mmol/L) | 1.00 ±0.65 | 1.60 ±0.90 | <0.001 |
| Mean LDL (mmol/L) | 2.92 ±0.86 | 3.01 ±1.06 | 0.560 |

### Table 2: Comparison of Dyslipidemia in Type 1 and Type 2

| | Type 1 (n, %) | Type 2 (n, %) | *p* value |
|---|---|---|---|
| TC ≥ 5.2 mmol/L | 35 (30.4) | 23 (46.0) | 0.075 |
| HDL ≤ 1.0 mmol/L | 5 (4.3) | 6 (12.0) | 0.091 |
| TG ≥ 3.4 mmol/L | 13 (11.3) | 21 (42.0) | <0.001 |
| LDL ≥ 3.4 mmol/L | 19 (16.5) | 19 (38.0) | 0.004 |

## References

1.Kwiterovich PO, Journal Clinical Endocrinology Metabolism, 2008, Nov; 93(11); 4200-4209; Recognition and management of dyslipidemia in children and adolescents
2. National Cholesterol Education Program (NCEP): Highlights of the report of the expert panel on blood cholesterol levels in children and adolescents, Paediatrics, 1992; 89;495-501
3.Azard K, Parkin JM, Court S, Laker MF, Alberti KGMM, Archives of Disease in Childhood 1994; 71: 108-113; Circulating lipids and glycaemic control in insulin dependent diabetic children

ESPE 2015

243--P2

Diabetes and Insulin

Pei Kwee Lim

DOI: 10.3252/pso.eu.54espe.2015

Poster presented at: ESPE2015BARCELONA European Society for Paediatric Endocrinology

PosterSessionOnline.com