Cardiovascular Risk and Long Term Follow-up of Turkish Children with Type 2 Diabetes: Single Center Experience

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Background: Type 2 Diabetes (T2DM) increases in parallel with obesity in childhood. T2DM can be associated with cardiovascular risk (CVR) even childhood.

Objective: to investigate the presence of CVR criterions in children with T2DM and to detect CVR as the earliest age as possible.

Method: This study enrolled 84 (58 Girls) children with T2DM. OGTT was performed in 47 children. Biochemical and hormonal analyses were performed in fasting state. The presence of hepatosteatosis, polycystic ovaries and microvascular complications were investigated. At admission, atherogenic index of plasma (AIP) and atherosclerosis-index (AI) were calculated as:
AIP=log (Triglyceride/HDL) and AI= (T.Cholesterol-HDL) / HDL.

Results: Mean age was 13.4±2 years. Clinical features are given in Table 1. 55.1% of girls were obese and 80.7% of boys were obese. Paternal and maternal features are given in Table 2.

35 patients had been followed for 24 months. The youngest patient with high AIP (>0.21) was 8.9 year-old girl and the youngest patient with high AI (>3.1) was 10.6 year-old boy. AIP was high in 90% of patients and high AI was found in 38% of them. 81.5% of them had hepatosteatosis. Autoantibodies were detected in 15 of 60 patients. 65.4% of patients had ≥3 cardiovascular risk criterions.

Significant differences were found in BMI between at admission and at 3rd., at 6th. and at 12th months (p=0.001, p=0.024, p=0.049,respectively) (Figure 1). There was a difference in HbA1c between at admission and at 12th months (p=0.021) (Figure2). BMI-at admission was correlated with systolic-blood-pressure (SBP) (0.488), diastolic-BP (r:0.450), HOMA-IR (r:0.307), Quicki (r:-0.307), FGIR (r:-0.336), AST (r:0.268) and ALT (r:0.348). AIP was positively correlated with BMI-SD at-admission (r:0.231), SBP (r:0.259), ALT (r:0.380), AST(r:0.298) and microalbuminuria (r:0.315).

BMI and SBP at admission are the determining factor on AIP (p=0.02 and p=0.005, respectively). Also, HbA1c at admission is determining factor on AI (p=0.004).

Table 1: Clinical and laboratory features of study population

	TOTAL n:84	FEMALE n:58	MALE n:26
BMI SDS	2.3 (0.6)*	2.15(0.75)*	2.4±0.4
SBP, mmHg	121±16	119±15	127±16
DBP, mmHg	78±13	77±13	82±14
HbA1c-0, %	8.4±2.8	8.1±2.6	9.2±3
HOMA-IR	5.62 (15.5)	7.45(6.9)*	6.29(8.4)*
Quicki	0.28±0.03	0.28±0.03	0.28±0.03
FGIR	5.3 (7.41)*	7.2(14.2)*	16.4(19.5)*
AIP, log (Triglyceride/HDL)	0.58±0.33	0.59±0.25	0.57±0.46
AI, (LDL/HDL)	2.9±1	2.9±1	2.8±1.1
AST,IU/L	23.5(16.2)*	21.5(10.7)*	31(29.5)*
ALT,IU/L	24(29.2)*	20(20)*	38.5(40.5)
Microalbuminuria, mg/day	6.35 (14.66)*	6.8(14.65)*	6 (14.66)
Follow-up period, month	23.5±21	21±19	28±24

* Median (IQR)

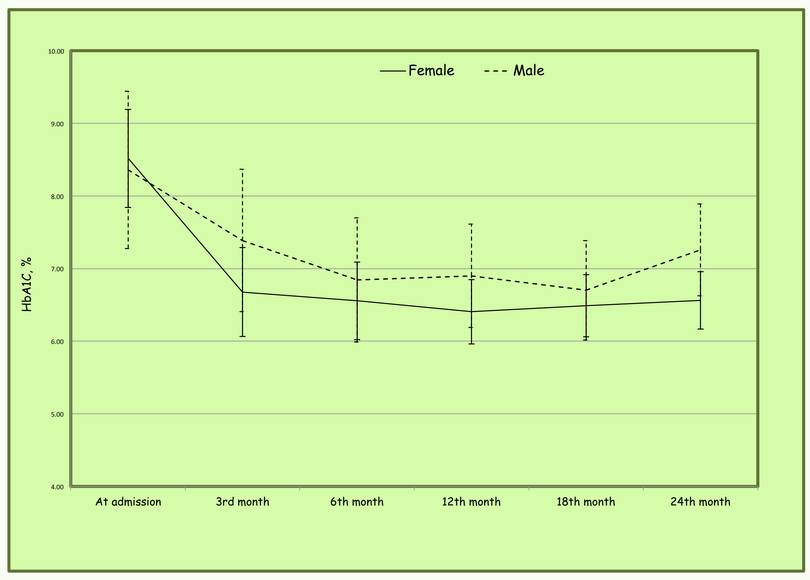

Figure 1: The HbA1c changes of the patients

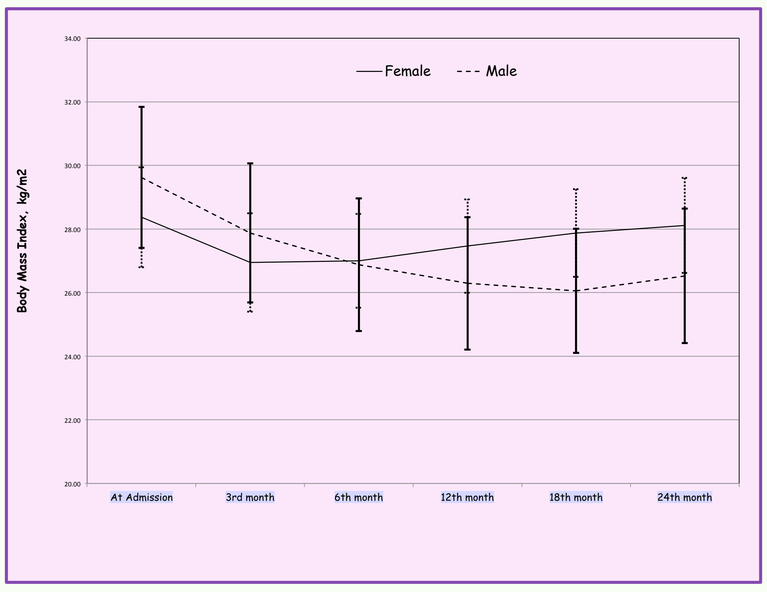

Figure 1: The BMI index changes of the patients in two years

Table 2: Family features of the patients

	FEMALE n: 58	MALE n:26
Maternal Type 2 DM	20	4
Maternal Type 1 DM	3	1
Maternal Obesity	30	16
Paternal Type 2 DM	14	7
Paternal Type 1 DM	1	1
Paternal Obesity	18	14
Type 2 DM in family member	37	15
Type 1 DM in family member	2	3

Conclusion:
Cardiovascular morbidity is high in T2DM. Children with T2DM have increased CVR even if younger than age of 10. BMI is the most important determining factor of CVR. AIP and AI might be useful for early diagnosis in clinical practice

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