

# Associations between lipid parameters and insulin resistance in obese adolescents



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## OBJECTIVES

According to the World Health Organization, one of the most serious public health challenges in the 21st century is obesity among children [1]. Obesity, which is accompanied by insulin resistance in combination with dyslipidemia, is one of the main factors in the development of atherosclerosis [2]. Meanwhile, there is not much has known about interrelation between this parameters in pediatric patients. Studying the dynamics of hyperlipidemia against the background of correction of insulin resistance may become a new criterion for the quality of treatment and prediction of potential risks in the future.

## METHOD

215 obese adolescents (mean age is 14,03±2,21 y.o) with no gender difference were examined. Lipids assessment included measurement of total cholesterol (TC), triglycerides (TG), low density lipoproteins (LDL), high density lipoproteins (HDL). Guideline on the management of high blood cholesterol (ACC, 2018) [3] was used for distributing lipid parameters by the groups: acceptable (Group 0), borderline(1) and abnormal (high)(2). Insulin resistance (IR) was analyzed by HbA1C level, fasting blood glucose (FG) and fasting insulin (FI) measurement followed by HOMA-IR calculation. Fasting status (at least 8 hours) was required. Standard statistics (SPSS soft) used for the data analysis.

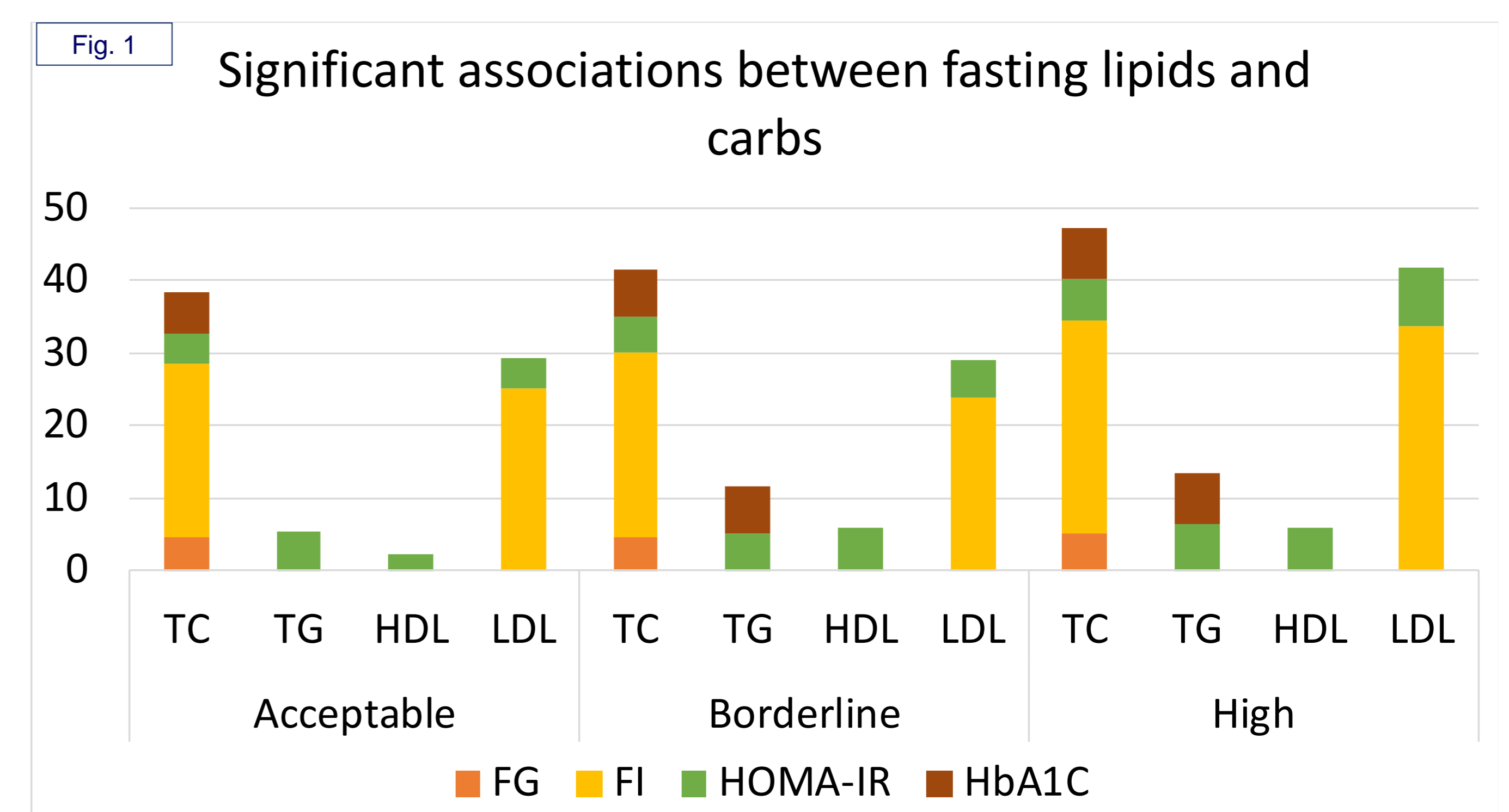
## RESULTS

- We have established that about half (46,51%) of obese adolescents have acceptable TC level, about one third (29,30%) - borderline and just quarter of them (24,19%) were hyperlipidemic.(Tab.1)
- TG are high in 48,15%, borderline in 40% and acceptable just in 11,85%. HDL are borderline low in 84,61%, acceptable in 3,07% and high in 12,32% (Tab.1).
- LDL are acceptable in vast majority of overweight (77,90%) with the equal distribution of borderline and high results (by 11,05%)(Tab.1).
- Increasing of TC is associated with FG (4,61; 4,74; 5,20, p=0,003), FI (24,06; 25,31; 29,28, p=0,02) and HOMA-IR (3,90; 4,94; 5,67, p=0,003), HbA1C( 6,23; 6,62; 7,13, p<0,05) (Fig.1)
- Increased TG are associated with HOMA-IR (5,46; 5,14; 6,46, p=0,02) and C-peptide (3,43; 2,99; 4,81, p<0,01), HbA1C (5,76; 6,53; 6,97, p< 0,05) (Fig.1)
- Increasing of LDL is associated with HOMA-IR (4,26; 5,13; 7,82, p<0,01), FI (25,07; 23,80; 33,83, p = 0,01) (Fig.1)
- Decreasing HDL is associated with HOMA-IR (2,26; 5,96; 5,86, p=0,003) (Fig.1)

Tab. 1 The distribution of lipid profile (% of examined)

Indicators	Group 0 acceptable	Group 1 borderline	Group 2 high
TC (%)	46,51	29,30	24,19
TG (%)	11,76	40,45	47,79
HDL (%)	2,59	87,02	10,39
LDL (%)	77,90	11,05	11,05

Associations between lipid parameters and parameters of glucose metabolism



## CONCLUSIONS

1. Just one fourth of obese children is hyperlipidemic, whereas dislipidemias with high TG and borderline HDL are common.
2. Fasting relationships between FG and FI (by HOMA-IR) are crucial for all lipid parameters shift in obese adolescents. Moreover, seems, insulin sensitivity drop down could be causative for the HDL decline. (Fig.2)
3. Hyperlipidemia and high TG are related to the diabetes mellitus

## References

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3. Grundy, S. M., Stone, N. J., Bailey, A. L., Beam, C., Birtcher, K. K., Blumenthal, R. S., ... Yeboah, J. (2019). 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/A SPC/NLA/PCNA Guideline on the Management of Blood Cholesterol. Journal of the American College of Cardiology.

