

Insulin resistance and impaired glucose tolerance in overweight/obese adolescents attending an obesity clinic in Belgium

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BACKGROUND

Obesity is a global epidemic and major health concern. Studies on glucose abnormalities in European overweight/obese adolescents are rare. Cut-off levels for defining insulin resistance are not well defined.

AIM

To study prevalence of insulin resistance, impaired glucose tolerance and type 2 diabetes mellitus in a cohort of overweight/obese adolescents. To determine correlations between patient characteristics and biochemical parameters of glucose homeostasis.

METHOD

From november 2014 until november 2018 we performed Oral Glucose Tolerance Tests (OGTT) in 156 overweight/obese patients. Patient characteristics are summarised in Table 1 and Figure 1.

Patient characteristics	N = 156
Sex (girls/boys)	82/74
Age mean (range)	14 years (12-17)
BMI mean (SD)	28.9 (5.6)
Acanthosis nigricans	19%
Familial history of type 2 diabetes mellitus	58 %

Table 1

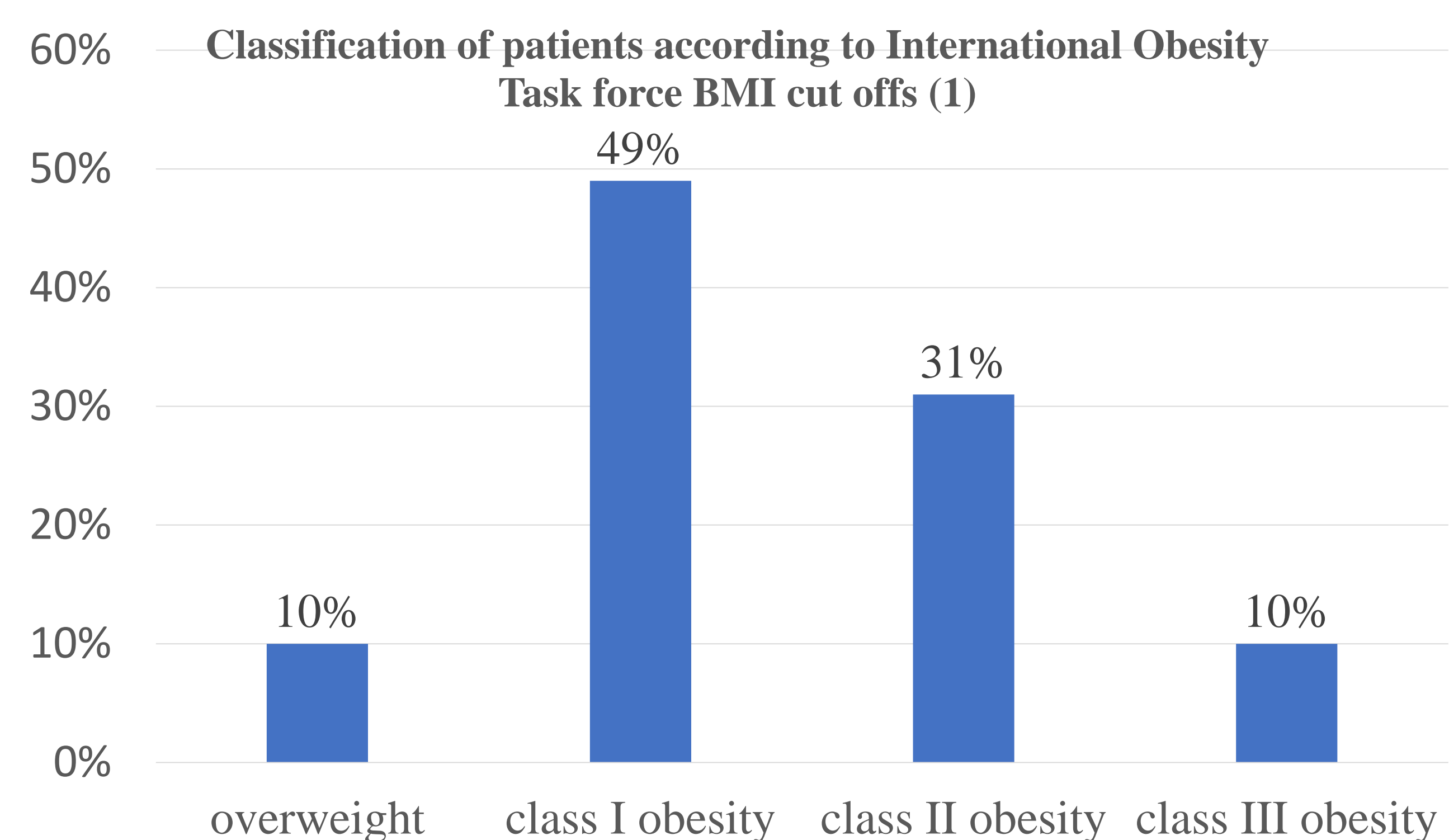


Figure 1

RESULTS part I

Biochemical results of glucose homeostasis are summarised in Table 2. The percentage of patients with insulin resistance (IR) according to HOMA-IR > 3.16, prediabetes (impaired glucose tolerance (IGT, blood glucose > 140 mg/dL 2 hours after ingestion of glucose in OGTT), impaired fasting glucose (IFG, fasting blood glucose > 99 mg/dL)) and type 2 diabetes mellitus are summarised in Table 3 (2).

biochemical results	Mean (SD)
fasting glucose (mg/dL)	91.1 (7.3)
fasting insulinemia (pmol/L)	186 (100)
HOMA-IR	6.9 (3.8)
peak insulinemia (pmol/L)	1752 (1488)
Blood glucose OGTT 120' (mg/dL)	120 (22)

Table 2

Abnormal results	number (percentage)
IR	136 (87%)
IFG	19 (12%)
IGT	21 (13%)
Prediabetes (IFG or IGT)	36 (23%)
Type 2 diabetes mellitus	1 (0.6%)

Table 3

RESULTS part II

Significant correlations were found between BMI (kg/m²) and fasting insulinemia (r= 0.335, p< 0.001), BMI and age (r= 0.2, p= 0.013), BMI and familial diabetes mellitus (r= 0.18, p= 0.024), and furthermore between fasting insulinemia and peak insulinemia during OGTT (r= 0.547, p< 0.001) and between peak insulinemia and blood glucose level 120 minutes after ingestion of glucose (r= 0.407, p< 0.001).

CONCLUSION

Although a very high percentage of overweight/obese adolescents has insulin resistance, only a minority of them has glucose intolerance or impaired fasting glucose. Type 2 diabetes mellitus is rarely seen in our patients. Further studies are necessary to explore this.

REFERENCES

- (1) Bervoets L and Massa G. Defining morbid obesity in children based on BMI 40 at age 18 using the extended international (IOTF) cut-offs. *Pediatr Obes.* 2014 Oct;9(5):e94-8
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