

# Prevalence and characterization of retinal alterations in a cohort of overweight and obese children

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## Background

Increasing incidence of pediatric obesity has been observed worldwide. Metabolic syndrome, characterized by visceral obesity, dyslipidemia, hypertension and impaired glucose metabolism, is associated with obesity.

## Objectives

To evaluate **early ocular signs of hypertension** by retinography in a cohort of overweight (BMI>85<sup>th</sup>) or obese (BMI > 95<sup>th</sup>) children, in order to:

- 1) define the **prevalence of retinal alterations**;
- 2) **characterize the patients**.

## Methods

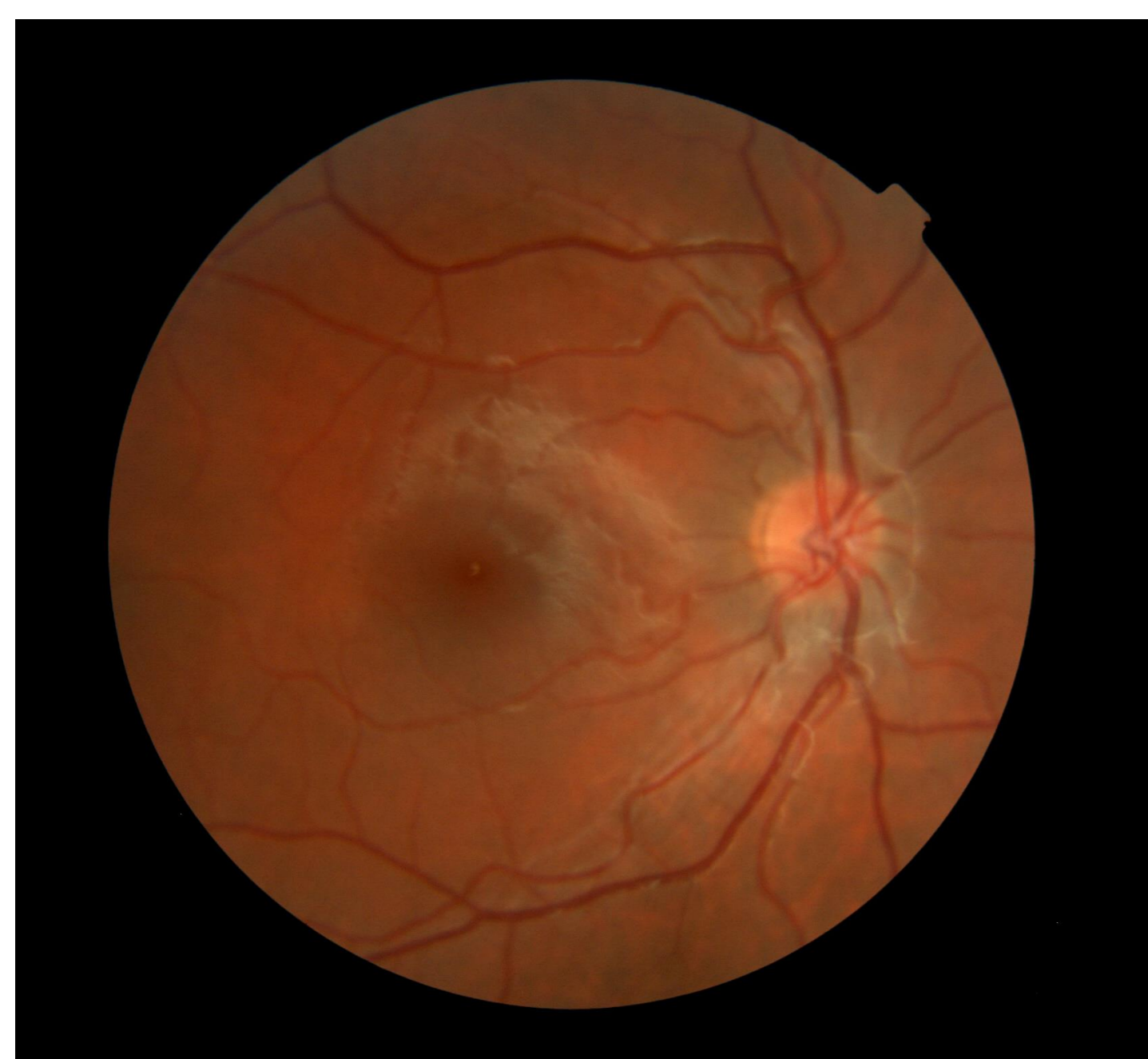
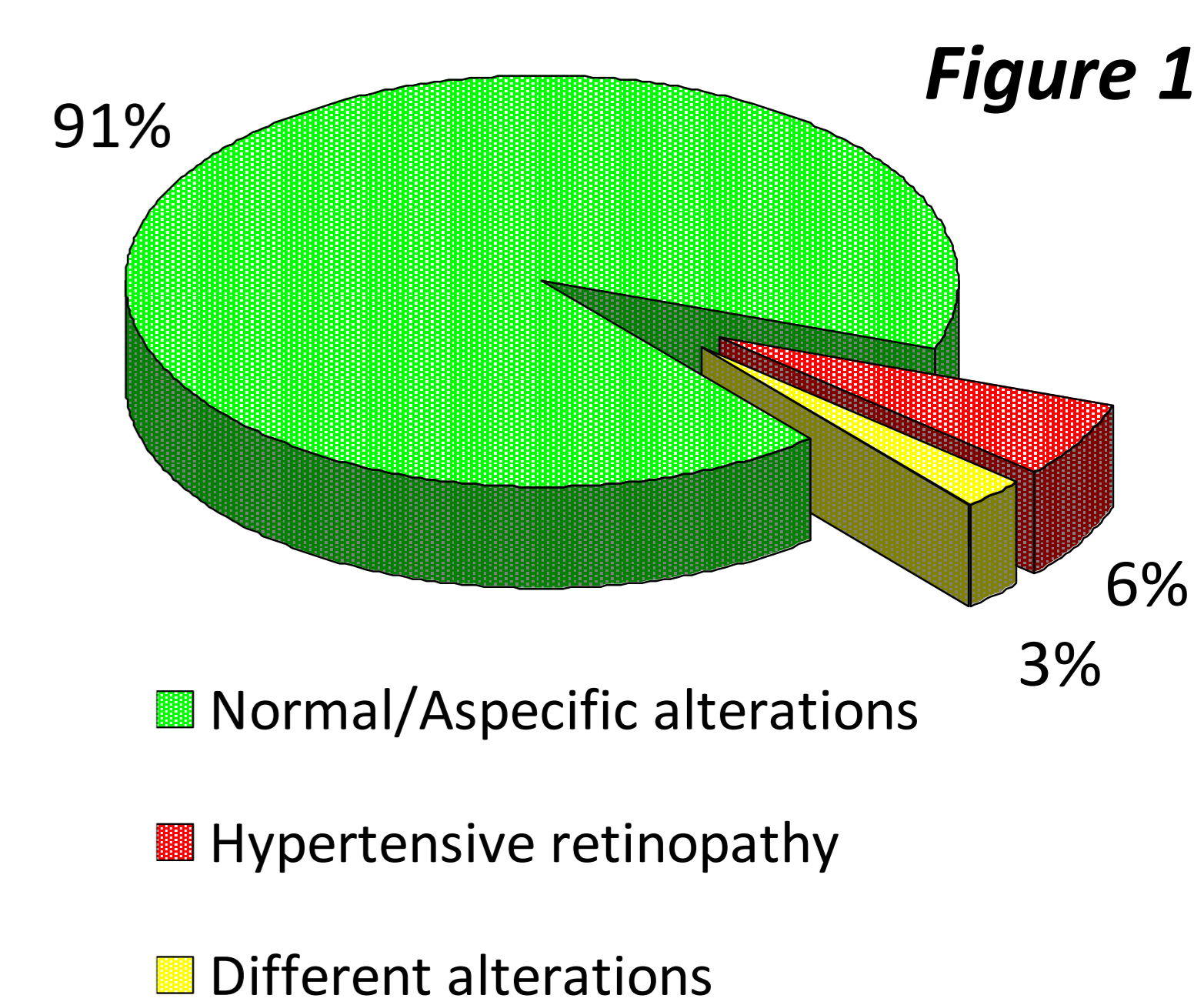
All subjects underwent **retinography, anthropometric examination, blood pressure** measurement, oral glucose tolerance test (**OGTT**), **lipid profile** assessment, **ECG** and **DEXA scan** to evaluate body composition.

The same paediatric endocrinologist examined all patients and all retinographies were evaluated by the same ophthalmologist.

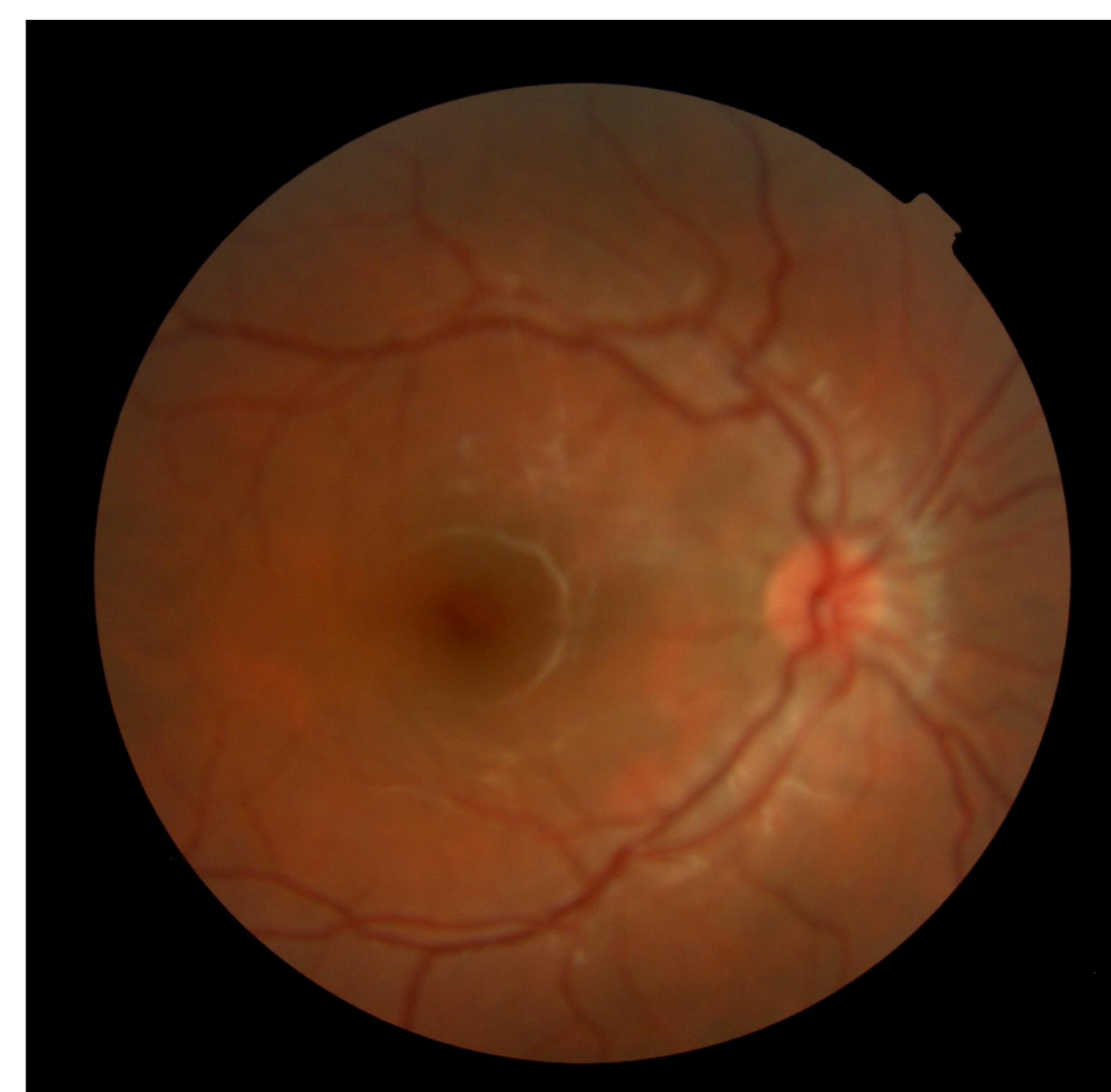
## Results

**115 children** (59 males), aged 12.83±1.96 years, were included in the study:

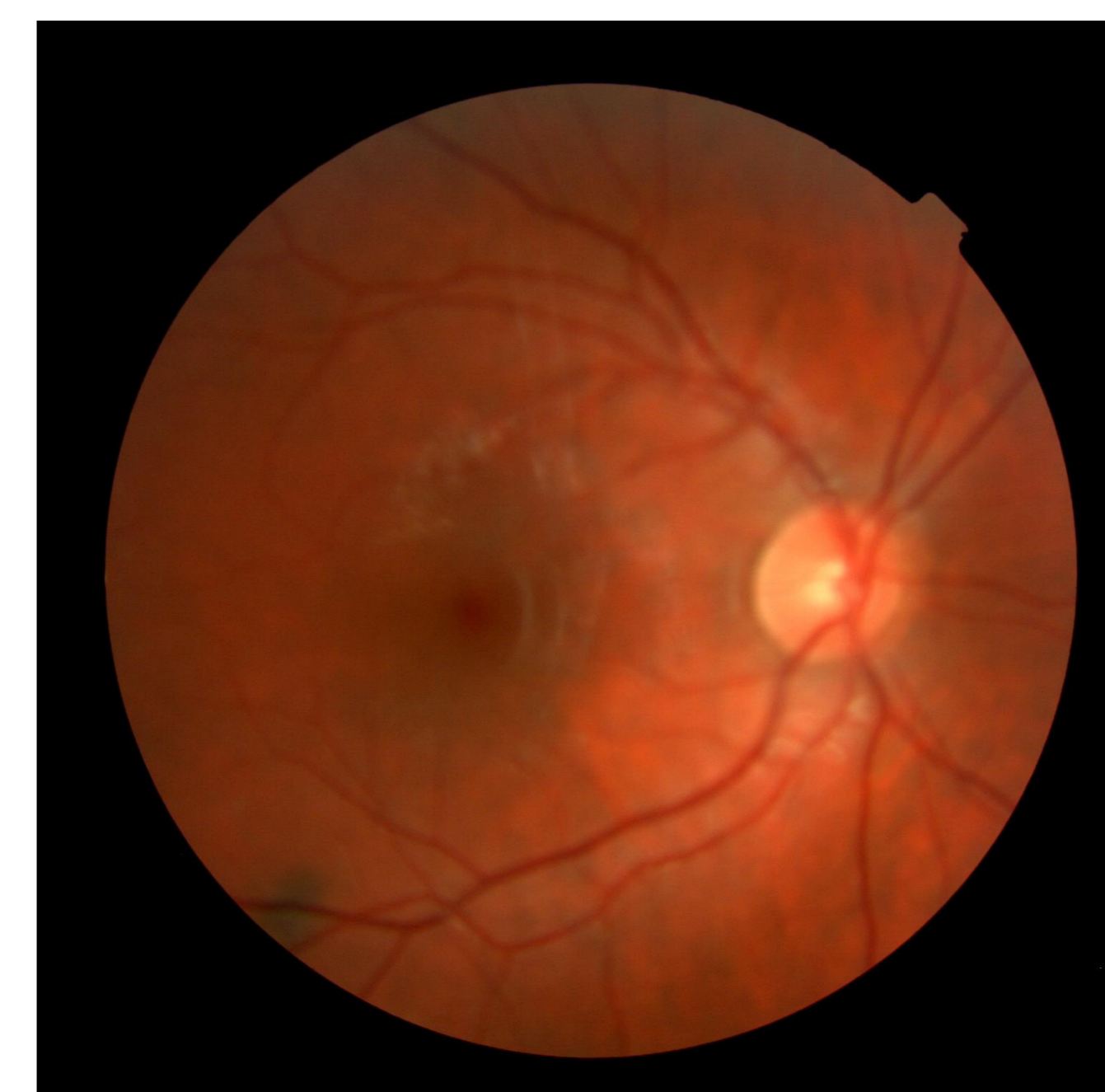
- 105 patients (**91.3%**) showed normal retinographic pattern or aspecific retinal vessel alterations (Group A);
- 7 (**6.1%**) showed signs of hypertensive retinopathy (in 1 case papilledema) representing Group B;
- 3 (**2.6%**) had different alterations, as coloboma or choroidal nevus (Fig. 1).



Papilledema



Hypertensive retinopathy



Choroidal nevus

In the comparison between **Group A** and B, the latter showed (Tab. 1) significant **higher** values in **BMI** ( $p=0.018$ ), **BMI SDS** ( $p=0.006$ ), **abdominal circumference (AC)** ( $p=0.042$ ), **wrist circumference** ( $p=0.024$ ), **AC/height ratio** ( $p=0.007$ ) and **glycemia at 120' during OGTT** ( $p=0.019$ ).

No significant differences in blood pressure or between sexes were found.

Interestingly, **3/7** patients of Group B were **overweight** but not obese.

All but one retinographies with alterations were detected in **pubertal patients**. The only prepubertal child with altered retinography had a complex form of obesity and is currently being studied.

**No ECG** alterations were found in Group B.

	Group A	Group B	p
<b>BMI(kg/m<sup>2</sup>)</b>	29.9 ± 3.5	33.4 ± 6.3	0.018
<b>BMI SDS</b>	2.5 ± 0.7	3.3 ± 1.4	0.006
<b>Abdominal circumference - AC (cm)</b>	100.9 ± 10.4	109.6 ± 15.3	0.042
<b>Wrist circumference (cm)</b>	17.3 ± 1.1	18.4 ± 2.1	0.024
<b>AC/height ratio</b>	0.6 ± 0.0	0.7 ± 0.1	0.007
<b>Glycemia at 120' during OGTT(mg/dl)</b>	110.1 ± 19.9	128.9 ± 25.0	0.019

Table 1

## Conclusions

**Retinal alterations could represent early signs of hypertension in children with overweight and obesity, even when blood pressure appears normal at routine measurements.**