

# The association between selected endocrinopathies and central arterial pressure in children and adolescents

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The authors have nothing to disclose



Klaudyna Noiszewska<sup>1</sup>, Hanna Borysewicz-Sańczyk<sup>1</sup>, Anna Krentowska<sup>2</sup>, Artur Bossowski<sup>1</sup>

<sup>1</sup> Department of Pediatrics, Endocrinology, Diabetology with Cardiology Division, Medical University of Białystok; <sup>2</sup> Students scientific association in the Department of Pediatrics, Endocrinology, Diabetology with Cardiology Division, Medical University of Białystok, Poland

## Introduction

Endocrine disorders have multiple adverse effects on the development and function of cardiovascular system. Blood pressure measurement enables fast and simple assessment of the condition of blood vessels and heart. Values of central arterial pressure, more precisely than peripheral pressure, predict cardiovascular disease and outcome in addition Augmentation & Amplification indices indirectly reflect arterial stiffness and peripheral vascular resistance.

## Materials & methods

- Study group comprised 93 patients (41 girls, 52 boys) mean age 13.2 years treated in Endocrinology Outpatient Clinic and/or the Dep. of Pediatrics, Endocrinology, Diabetology with Cardiology Unit. Med University in Białystok Poland, divided into sub-groups suffering from various endocrinopathies (groups 1-4):
  - Untreated GHD (n=28),
  - GHD Treated with GH for 3-5 years (n=25)
  - Obesity (n=20),
  - Diabetes mellitus type 1 diagnosed <5 years (n=20).
- Control group – group 5: 29 pts (16 girls, 13 boys) mean age 13.52 years with no cardiac irregularities or endocrinopathies.
- Measurements were performed using Central Blood Pressure Meter (cBP01, Centron Diagnostics) - mean values for each patient calculated from three measurements performed in 3-minute intervals on non-dominant arm
- Statistic analysis with Student's t-test performed using Statistica 10.0

## Results

	1	5	p
sysRR	104,88	119,49	0,0003
diaRR	61,33	68,33	0,002
HR	80,74	78,03	NS
CBP	90,19	99,79	0,0009
CPP	28,73	31,42	NS
AUG.Idx	0,66	0,60	0,04
Amp.Idx.	1,54	1,67	0,02

	2	5	p
sysRR	113,13	119,49	NS
diaRR	65,33	68,33	NS
HR	89,29	78,03	0,007
CBP	93,23	99,79	0,04
CPP	27,9	31,42	NS
AUG.Idx	0,58	0,60	NS
Amp.Idx.	1,74	1,67	NS

1- Untreated GHD

	3	5	p
sysRR	137,95	119,49	0,0001
diaRR	78,15	68,33	0,002
HR	83,26	78,03	NS
CBP	114,67	99,79	0,0003
CPP	36,51	31,42	0,03
AUG.Idx	0,61	0,60	NS
Amp.Idx.	0,66	1,67	NS

2- GHD Treated with GH for 3-5 years

	4	5	p
sysRR	122,0	119,49	NS
diaRR	71,09	68,33	NS
HR	83,36	78,03	NS
CBP	101,42	99,79	NS
CPP	30,33	31,42	NS
AUG.Idx	0,60	0,60	NS
Amp.Idx.	1,71	1,67	NS

3- obesity

4- Diabetes mellitus type 1 diagnosed <5 years

Group with GHD before GH treatment revealed a significantly lower peripheral and central pressure (p <0.0009), and the value of the amplification index (p <0.02), augmentation index was higher (p <0.04) than the control group. GHD treated with GH revealed an increased heart rate, compared to healthy children (p <0.004) lower central pressure with normal other parameters. Obese patients had higher central pressure (p <0.0001) and peripheral pressure in relation to the control group. Finally patients with type 1 diabetes showed no significant differences compared to the control group.

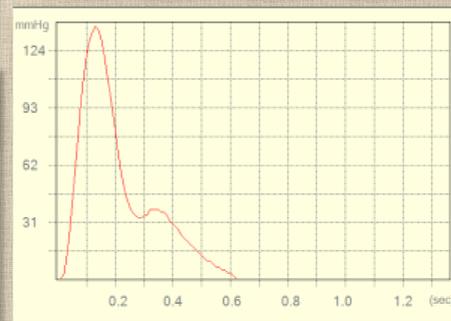
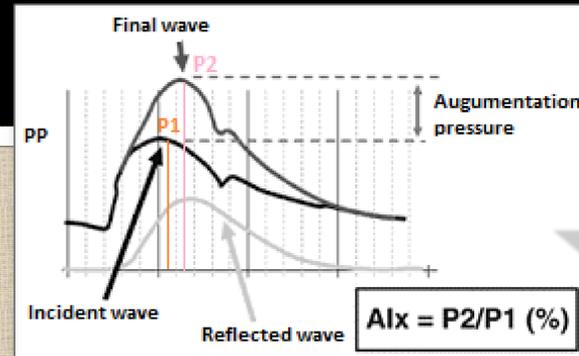


Figure 1. Proper central pressure wave (control group)

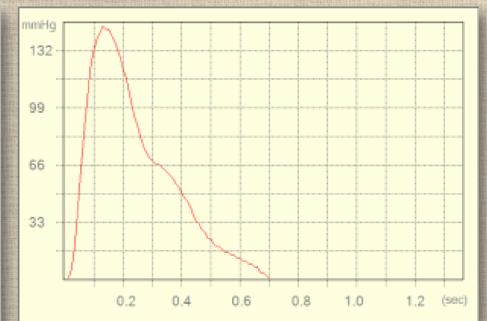
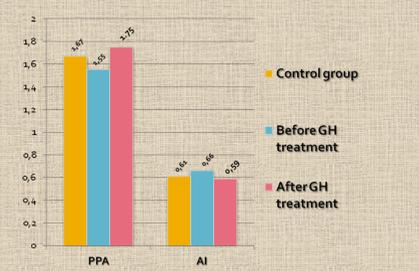
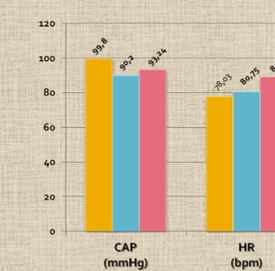
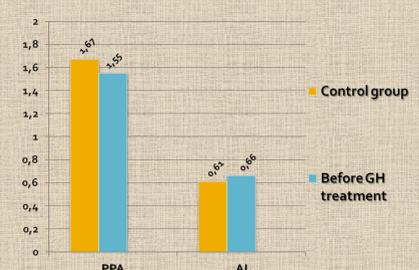
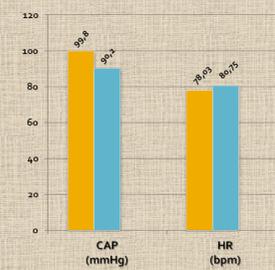


Figure 2. Incorrect central pressure wave (obesity)



## Conclusions

- The immaturity of the cardiovascular system in children with GHD prior to treatment is revealed by a low central aortal pressure value.
- The arterial stiffness indicators AUG & Amp.Idx suggest an improvement in the vessels flexibility during the substitution therapy with GH.
- Obesity is associated with higher values of peripheral and central arterial pressures, but significant changes in flexibility may not yet be present at such a young age.
- Suitable treatment of underlying diseases leads to restoration of proper endocrine function and normalization of studied parameters.

