



CARDIAC MORPHOLOGY AND FUNCTION IN ADULT PATIENTS WITH GROWTH HORMONE DEFICIENCY – A CROSS-SECTIONAL CASE-CONTROL STUDY



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BACKGROUND: The growth hormone (GH) – insulin-like growth factor-1 axis has been recognized to have a major influence on the cardiac development and the maintenance of its morphology and function. GH deficiency (GHD) may, therefore, result in impaired cardiac performance, contributing to the increased cardiovascular morbidity already proven in the patients with hyposomatotropism. However, data on the specific consequences of GHD on the cardiac structure and function are still inconsistent. Thus, ...

THE AIM OF OUR RESEARCH WAS TO ASSESS THE CARDIAC MORPHOLOGY AND FUNCTION IN PATIENTS WITH HYPOSOMATOTROPISM AND IN HEALTHY SUBJECTS.

MATERIAL AND METHODS:

This cross-sectional case-control **study included:**

➤ **23 adults with childhood-onset GHD (COGHD)**

➤ mean age - 27.2±11.0 years

➤ 19 males & 4 females

➤ **20 patients with adult-onset GHD (AOGHD)**

➤ mean age - 42.9±12.2 years

➤ 10 males & 10 females

➤ **2 control groups** (one for each of the patient groups)

➤ consisting of 23 and 20, respectively, healthy subjects.

➤ age- and gender-matched

All participants underwent a **transthoracic echocardiographic examination** by the same experienced echocardiographer.

The following **parameters** were assessed:

➤ left atrium (**LA**) anterior-posterior **dimension**

➤ interventricular septum thickness (**IVST**)

➤ left ventricular **end-systolic** and **end-diastolic volumes**

➤ left ventricular **ejection fraction**

➤ early (**E**) and late (**A**) transmitral filling velocities, and **E/A ratio** (by pulsed Doppler);

➤ systolic (**s'**), early (**e'**) and late diastolic (**a'**) mitral annular velocities, and **e'/a' ratio** (by tissue Doppler imaging, TDI).

All GHD patients had a negative medical history of cardiovascular diseases, normal clinical examination and resting electrocardiogram.

RESULTS:

In the COGHD group structural changes were found only in LA anterior-posterior dimension.

The comparison of functional measurements revealed impairment of both the systolic (**s'** wave) and the diastolic (**e'** wave; **e'/a'** ratio) mitral annular velocities of TDI.

Table 1. Comparison of the echocardiographic parameters (mean values) in patients with COGHD and healthy controls

	COGHD patients	Healthy controls	p value
IVST (mm)	10.87 ± 1.39	10.35 ± 1.56	p = 0.237
End-systolic volume (ml)	90.30 ± 21.91	88.04 ± 10.07	p = 0.655
End-diastolic volume (ml)	37.13 ± 10.0	35.13 ± 4.78	p = 0.393
Ejection fraction (%)	61.17 ± 8.42	60.09 ± 3.85	p = 0.576
E wave (cm/s)	79.91 ± 13.00	84.65 ± 8.19	p = 0.146
A wave (cm/s)	53.78 ± 3.29	53.69 ± 2.86	p = 0.976
E / A ratio	1.61 ± 0.55	1.65 ± 0.31	p = 0.796
S wave (cm/s)	9.30 ± 1.66	11.22 ± 1.35	p < 0.0001*
E' wave (cm/s)	8.09 ± 0.79	11.70 ± 2.32	p < 0.0001*
A' wave (cm/s)	6.35 ± 1.40	7.17 ± 2.37	p = 0.159
E' / A' ratio	1.34 ± 0.34	1.76 ± 0.50	p = 0.002*
Left atrium (mm)	33.13 ± 4.13	37.52 ± 2.31	p < 0.0001*

*p < 0.05

In the AOGHD patients the structural changes were observed in LA dimension and IVST.

Functional deterioration included TDI systolic (**s'** wave) and diastolic (**e'** wave) parameters as well as impaired diastolic transmitral filling velocities (**E** wave; **E/A** ratio) of the less sensitive pulse Doppler.

Table 2. Comparison of the echocardiographic parameters (mean values) in patients with AOGHD and healthy controls

	AOGHD patients	Healthy controls	p value
IVST (mm)	11.48 ± 1.16	10.45 ± 1.50	p = 0.021*
End-systolic volume (ml)	89.75 ± 26.89	87.15 ± 10.46	p = 0.689
End-diastolic volume (ml)	42.40 ± 16.54	35.05 ± 4.97	p = 0.065
Ejection fraction (%)	58.15 ± 8.13	59.75 ± 3.84	p = 0.431
E wave (cm/s)	73.25 ± 10.83	84.05 ± 8.56	p = 0.001*
A wave (cm/s)	57.98 ± 15.59	53.40 ± 14.30	p = 0.340
E / A ratio	1.33 ± 0.33	1.65 ± 0.32	p = 0.004*
S wave (cm/s)	9.60 ± 1.73	11.20 ± 1.28	p = 0.002*
E' wave (cm/s)	9.06 ± 2.74	11.85 ± 2.41	p = 0.002*
A' wave (cm/s)	6.50 ± 1.36	7.50 ± 2.31	p = 0.105
E' / A' ratio	1.43 ± 0.38	1.68 ± 0.43	p = 0.055
Left atrium (mm)	34.55 ± 4.56	37.35 ± 2.39	p = 0.020*

*p < 0.05

BOTH CHILDHOOD-ONSET AND ADULT-ONSET GROWTH HORMONE DEFICIENCY IS ASSOCIATED WITH IMPAIRMENT IN THE CARDIAC MORPHOLOGY AND FUNCTION – MORE PRONOUNCED IN THE LATTER, ESPECIALLY IN THE LEFT VENTRICULAR DIASTOLIC PERFORMANCE AND IN THE ADULT-ONSET PATIENTS.

References:

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