

# Echographic Data of Left Ventricular Morphological Condition in Inflammatory Heart Disease

*Merab Matiashvili, Manana Zhvania, George Chakhunashvili*

Department of Pediatrics, Tbilisi State Medical University;  
Jo Ann Medical center

## **Abstract**

The important problem is the diagnosis and morphological evaluation of Acute Nonrheumatic Carditis in children. The aim of this trial is to study left ventricle wall morphology with two-dimensional Echocardiography in acute nonrheumatic carditis and the evaluation of the indices both in normal children and with other diseases. More than 222 patients were examined during this trial which have the diagnosis of acute nonrheumatic carditis. With two-dimensional echocardiography was evaluated the myocardium (MIO), endocardium (END) and epicardium (EPI). These indices were compared with the same ones of the healthy children, children with cardiomyopathy and rheumocarditis. With statistical analysis we got the following: Myocardial (MIO), epicardial (EPI) and endocardial (END) sizes are certainly increased during acute nonrheumatic carditis (ANRC) and rheumocarditis (RC). In case of acute nonrheumatic carditis and rheumocarditis the size difference between myocardium, endocardium and epicardium is insignificant. In case of cardiomyopathy the sizes of myocardium, endocardium and epicardium comparing with normal data changes uncertainly.

**Keywords:** *rheumatic carditis, nonrheumatic carditis, echocardiography, myocardopathy, endocardium, myocardium, epicardium*

## **Introduction**

**H**ear disease is one of the main pediatric problem in clinical practice, in which inflammatory heart disease, such as acute nonrheumatic carditis (ANRC) represents a significant part. According to some statistical data, disease distribution guidance of ANRC in children is high enough among all cardiovascular pathology and it shows 3,5-5% (Steven PJ; Ground KE.; McCarthy and at al; Белозеров Ю.М. и др). Carditis may be asymptomatic or may give origin to a more severe pathology such as cardiomyopathy, which is the main reason of invalidity and lethality in majority of cases (Garson A. and at.al; Evans N; Ocal, B and at al.).

Nowadays, it's clear how important is to early detection of ANRC and to estimate the functional condition of myocardium. Ultrasonographic values of two-dimensional echocardiography which gives chance to evaluate digital and morphological characteristics of the heart is very informative in this condition (Фейгенбаум Х.; Christine H. and at al.; Белобородов В.Б.; Гогин Е.Е.).

According to above mentioned, the aim of our study was to estimate the functional condition of myocardium by echocardiography during ANRC.

## **Material and methods**

The study was conducted among 222 patients between 4 day-12 years of age (1992-1998yr.). From them 112

patients had been diagnosed with ANRC, 110 were control group patients.

These patients were divided into five age groups:

- Group I - from 4 day to 1 month
- Group II - from 1 month to 1 year
- Group III - from 1 to 3 years
- Group IV - from 3 to 6 years
- Group V - from 6 to 12 years

Patients were examined by lying on the back or on the left side in supine position. Two and four chambered images of heart were given by performing apical and parasternal scanning using 2D echocardiography.

Echocardiographic examinations were performed on "Mark-600" (firm ATL, U.S.A.) and "Sonos 2500" (firm Hewlett Packard, USA.). Given data were elaborated by statistical computer program SPSS-10.

### Results

Comparing the given results of first age group, increased thickness of miocardium (MIO), endocardium (END) and epicardium (EPI) were detected respectively by 47,16%, 47,35%, and 55,24% ( $p < 0,001$ ).

	Normal	ANRC
END	1,21-0,08	2,29-0,39
MIO	2,29-0,35	4,35-0,70
EPI	1,28-0,15	2,86-0,30

**Tab.1** Data of group I..

In second age group comparing with group I, END thickening is less remarkable 15,22% ( $p < 0,001$ ). In case of dilated myocardiopathy its size is increased by 1,76% ( $p = 0,38$ ) relatively to normal data and 13,70% comparing to carditis ( $p < 0,004$ ). Myocardial thickness increased by 41,03% comparing to normal data ( $p < 0,001$ ) in ANRC. During dilated myocardiopathy, in contrast, its size decreased by 12,80% relatively to normal data and by 48,58% comparing with carditis

( $p < 0,001$ ). In ANRC epicardial thickness increased by 14,15% ( $p < 0,001$ ) comparing with normal data and by 34,51% relatively to carditis ( $p < 0,001$ ).

	Normal	ANRC	Myocardiopathy
END	1,67-0,16	1,97-0,21	1,7-0,16
MIO	2,5 - 0,55	4,24-1,10	2,18-0,38
EPI	1,94-0,30	2,26-0,59	1,48-0,10

**Tab.2** Data of group II..

In third age group increased END thickness by 10,52% relatively to normal data was detected in case of ANRC ( $p < 0,001$ ). In dilated myocardiopathy its thickness was close to normal ( $p = 0,36$ ) and increased comparing with carditis ( $p < 0,004$ ).

EPI thickness increased by 12,4% ( $p < 0,001$ ) in ANRC. In Dilated myocardiopathy its thickness increased by 23,71% ( $p < 0,002$ ) comparing to carditis ( $p < 0,002$ ).

	Normal	ANRC	Myocardiopathy
END	1,70-0,16	1,91-0,24	1,7 -0,16
MIO	2,78-0,55	4,24-1,30	2,18-0,38
EPI	1,94-0,30	2,21-0,63	1,48-0,10

**Tab.3** Data of group III.

In forth age group increased END thickness by 8,32% relatively to normal value was detected in ANRC ( $p < 0,001$ ). In case of myocardiopathy END size is decreased by 48,32% comparative to carditis ( $p < 0,001$ ). MIO thickness is increased by 8,42% ( $p < 0,001$ ) relatively to normal data. In dilated myocardiopathy its decreased by 21,78% ( $p < 0,003$ ) comparatively to normal data and by 59,55% relatively to ANRC ( $p < 0,001$ ). EPI thickness is increased by 55,80% comparatively to normal data ( $p = 0,001$ ) in ANRC. In case of dilated myocardiopathy its size decreased by 23,71% ( $p < 0,002$ ) by 62,28% relatively to carditis ( $p < 0,001$ ).

	Normal	ANRC	Myocardiopathy
<b>END</b>	1,70-0,16	3,29-0,66	1,7 -0,16
<b>MIO</b>	2,78-0,55	5,395-0,78	2,18-0,38
<b>EPI</b>	1,94-0,30	4,39-1,09	1,48-0,10

**Tab.4** Data of group IV.

In fifth age group during carditis END thickness increased by 57,92% comparing to normal data ( $p < 0.001$ ). In case of rheumatic carditis (RC) increased thickness by 59,81% ( $p < 0.001$ ) was detected. In dilated myocardiopathy END size increased by 11,45% ( $p < 0.001$ ) relatively to normal data.

During ANRC degree of END thickness comparing with carditis was 4,49% ( $p = 0,43$ ). In case of myocardiopathy END thickness decreased by 52,48% relatively to ANRC ( $p < 0.001$ ) and by 54,60% relatively to RC ( $p < 0.001$ ).

MIO size during ANRC is increased by 58,40% comparing to normal data ( $p < 0.001$ ). In RC -by 59,61% ( $p = 0.001$ ). During dilated myocardiopathy- by 34,21% ( $p < 0,001$ ). In ANRC increased MIO thickness by 2,90% ( $p = 0.44$ ) comparing with RC was detected, while in case of myocardiopathy MIO thickness decreased by 36,71% relatively to carditis ( $p < 0,001$ ).

EPI thickness in ANRC increased by 77,81% comparing to normal data ( $p < 0.001$ ), while in RC it

increased by 75,54% ( $p = 0.001$ ) and by 51,54% ( $p < 0.001$ ) in dilated myocardiopathy.

In ANRC increased EPI thickness by 16,09% ( $p = 0.067$ ) comparing with RC was detected. In case of myocardiopathy its thickness decreased by 56,2% comparing with ANRC, and by 51,95% ( $p < 0,001$ ) comparing with RC.

Summarizing these values, it is getting clear that predictive value ( $p$ ) between normal endocardial size and during myocardiopathy is 0,3-0,4 which excludes the correlation between them. The same relationship was detected between ANRC and RC when  $p = 0.07-0.4$ . It must be mentioned that, the size difference between normal condition and myocardiopathy, and between ANRC and RC is very insignificant. In all other above mentioned cases predictive value of difference was quite important (0.02-0.001).

### Conclusions

1. Myocardial (MIO), epicardial (EPI) and endocardial (END) sizes are certainly increased during acute nonrheumatic carditis (ANRC) and rheumocarditis (RC).
2. In case of acute nonrheumatic carditis and rheumocarditis the size difference between myocardium, endocardium and epicardium is insignificant.
3. In case of myocardiopathy the sizes of myocardium, endocardium and epicardium comparing with normal data changes uncertainly.
4. Using 2D echocardiography it's possible to make exact diagnosis of noninfectious carditis and myocardiopathy.

	Normal	ANRC	RC	Myocardiopathy
<b>END</b>	1,70-0,16	4,04-0,45	4,23-0,51	1,92-0,16
<b>MIO</b>	2,5 -0,55	6,01-1,37	6,19-0,83	3,8 -0,43
<b>EPI</b>	1,94-0,30	8,70-1,4	7,93-1,35	3,81-0,49

**Tab.5** Data of group V.

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## **Двухмерное эхокардиографическое исследование морфологического состояния левого желудочка во время воспалительных заболеваний сердца**

*Мераб Матиашвили, Манана Жвания, Георгий Чахунашвили*

Кафедра педиатрии Тбилисского государственного медицинского университета;  
Медицинский центр им. ДжоЭнна

### **Р Е З Ю М Е**

Важной проблемой является диагностическая оценка миокарда (MIO), эндокарда (END) и эпикарда (EPI) при неревматическом кардите у детей. Цель этого исследования состоит в том, чтобы изучить морфологию стенок левого желудочка с двух -мерной Эхокардиографией при остром неревматическом кардите и полученные данные сравнить данными здоровых детей и больных другими заболеваниями. Обследовали более 222 детей с диагнозом Острый неревматический кардит. С Двумерной эхокардиографией был оценен миокард (MIO), эндокард (END) и эпикард (EPI) у здоровых детей и детей с диагнозом Острый неревматический кардит, дилатационная кардиомиопатия и Ревмокардит. После статистического анализа мы получили следующее: размеры миокарда (MIO), эндокарда (END) и эпикарда (EPI) значительно увеличены как во время острого неревматического кардита (ANRC) так и при Ревмокардите (RC) . Во время острого неревматического кардита (ANRC) диаметр миокарда (MIO), эндокарда (END) и эпикарда (EPI) незначительно отличаются от токовых во время Ревмокардита (RC). Во время дилатационной кардиомиопатии размеры миокарда, эндокарда и эпикарда незначительно отличаются с данными здоровых детей.

**Ключевые слова:** *ревмокардит, неревматический кардит, эхокардиография, кардиомиопатия, эндокардиум, миокардиум, эпикардиум*