



ORIGINAL ARTICLE

Biventricular diastolic function assessed by Doppler echocardiogram in children vertically infected with human immunodeficiency virus[☆]

Mauricio L. Silva^{a,b,*}, Silvia M. Nassar^{b,c}, André P. Silva^b, Leandro L. Ponce^a,
Maria M. de S. Pires^{a,b}

^a Hospital Infantil Joana de Gusmão, Secretaria de Estado da Saúde de Santa Catarina, Florianópolis, SC, Brazil

^b Hospital Universitário, Universidade Federal de Santa Catarina, Florianópolis, SC, Brazil

^c Department of Informatics and Statistics, Universidade Federal de Santa Catarina, Florianópolis, SC, Brazil

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KEYWORDS

Ventricular function;
Infectious diseases;
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Abstract

Objective: to determine, by Doppler-echocardiography, the frequency of cardiac diastolic dysfunction in asymptomatic and clinically stable pediatric patients with vertical infection by the human immunodeficiency virus (HIV), from the cardiovascular viewpoint.

Methods: this was an observational, prospective, and cross-sectional study, performed at a regional referral clinic for patients with HIV, in a convenience sample of 94 individuals, assessing biventricular diastolic function by Doppler-echocardiography, and weight, blood hemoglobin, and percentage of lymphocytes T-CD4⁺.

Results: fifty patients had diastolic dysfunction. Left ventricular dysfunction occurred in 38.7%, and the predominant type of dysfunction was decreased myocardial compliance. Right ventricular dysfunction was observed in 29.4% of the sample, and abnormal relaxation was the most prevalent type. Simultaneous biventricular dysfunction occurred in 14.1% of the individuals. There was no association between dysfunction and the immune status.

Conclusions: diastolic dysfunction occurred, individually or simultaneously, with no association with immune status; decreased myocardial compliance was predominant in the left ventricle, and abnormal relaxation in the right ventricle.

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* Corresponding author.

E-mail: mauricio.laerte@unisol.br, mauricio.silva@ufsc.br (M.L. Silva).

PALAVRAS-CHAVE

Função ventricular;
Doenças infecciosas;
Crianças

A função diastólica biventricular por meio da análise com ecocardiograma com Doppler em crianças infectadas verticalmente pelo vírus da imunodeficiência humana

Resumo

Objetivo: verificar, por meio do ecocardiograma com Doppler, a frequência de disfunção cardíaca diastólica em pacientes com infecção vertical pelo vírus da imunodeficiência humana na faixa pediátrica, assintomáticos e clinicamente estáveis do ponto de vista cardiovascular.

Métodos: estudo observacional, prospectivo e transversal, realizado em um Ambulatório de Referência Regional para pacientes portadores do vírus da imunodeficiência humana, com uma amostra de conveniência de 94 pacientes, avaliados pelo sexo, idade, peso, função diastólica biventricular ao Doppler, hemoglobina sanguínea e percentual de linfócitos T-CD4⁺.

Resultados: apresentaram disfunção diastólica 50 pacientes. Disfunção ventricular esquerda ocorreu em 38,7% deles, e o tipo de disfunção predominante foi diminuição da complacência miocárdica. A disfunção ventricular direita foi evidenciada em 29,4% da amostra, sendo o tipo relaxamento anormal o mais prevalente. Disfunção biventricular simultânea ocorreu em 14,1% dos indivíduos. Não houve associação da disfunção com o estado imunológico.

Conclusões: foi verificada disfunção diastólica, isolada ou simultânea, sem associação com o estado imunológico, sendo a diminuição da complacência miocárdica mais comum no ventrículo esquerdo e relaxamento anormal no ventrículo direito.

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Introduction

Cardiovascular manifestations often occur in children with vertical infection by the human immunodeficiency virus (HIV), and the most likely cause is multifactorial. In a prospective study, the cumulative five-year incidence of cardiac dysfunction in children ranged from 18% to 39%, and was the HIV-related cause of death in 11.8%.¹⁻⁴

Subclinical cardiac abnormalities may develop in early HIV infection, even among individuals with asymptomatic disease or without cardiac dysfunction.^{1,4-9}

The resolution of dilated cardiomyopathy in vertically infected children has been reported in those treated with a combination of drugs.^{6,10-12} It is possible that a change in diastolic function will precede systolic dysfunction, as observed in other clinical conditions, both in adults and in children and adolescents.^{3,13-23}

The aim of this study was to determine the frequency of diastolic dysfunction in children vertically infected with HIV, both symptomatic and asymptomatic, and clinically stable from the cardiovascular perspective. The association between diastolic dysfunction and immunological status, malnutrition, and anemia was also investigated.

Methods

This was an observational, cross-sectional study performed in a regional pediatric outpatient clinic for follow-up of patients with the acquired immunodeficiency syndrome (AIDS), consisting of a convenience, non-probabilistic sample.

The protocol and the informed consent were approved by the institutional ethics committee, and all participants consented to the study through their legal guardians. From June to November of 1999, 139 children vertically infected

with HIV were evaluated, of whom 94 were selected according to the inclusion criteria. Age ranged from 20.3 to 170.6 months (mean 69.7 months) and 52 (55.0%) were males.

The definitive diagnosis was made according to the parameters of the Centers for Disease Control and Prevention (CDC, Atlanta, United States) of 1994: positive enzyme-linked immunoassay test (ELISA) and confirmatory test (Western blot).²⁴

Forty-five patients were excluded from the analysis due to at least one of the following conditions: congenital heart disease; congestive heart failure; arrhythmia; aneuploidy; HIV-related infections; use of medications, including digitalis, beta-blockers, vasodilators, and antiarrhythmic drugs; use or previous use of cardiotoxic chemotherapeutic agents; percentage of T CD4⁺ lymphocytes obtained at intervals greater than four months before or after the date of inclusion; and legal guardian's refusal of patient's participation in any phase of the study.

After obtaining the informed consent and determining patient eligibility for the study, blood samples were collected and the Doppler study was completed.

Variables

The following variables were observed and recorded: gender, age (months), weight/age Z-scores²⁵ using the software Epi Info™ 6.04 (GA, USA), blood hemoglobin level (g/dL), percentage of T CD4⁺ lymphocytes, peak velocity of the E and A waves in the mitral and tricuspid valves (cm/s), and their ratios. The normal reference values used for the analysis of diastolic function in both ventricles were obtained from the available literature.^{26,27}

Cardiac variables were obtained by pulsed Doppler in the apical four-chamber view, using a commercially available electronic transducer with a frequency of 3.5 or

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