identified. Presence of these risk factors should alert clinicians to carefully manage pericardiectomy patients peri-operatively.

EP-123

Correction of Left Ventricular Mass Expression Relative to Body Surface Area by Echocardiography in Overweight and Obese Children and Adolescents with Hypertension: Effect on the Diagnosis of Left Ventricular Hypertrophy and Potential Practice Change

Jennifer Lehmberg[1], Dan Dyar[2], Lieuko Nguyen[1], Brian Fagan[1], Jessica Haley[1], Serena Sah[1]. [1]University of California, San Diego/Rady Children's Hospital, San Diego, CA; [2]Rady Children's Hospital, San Diego, CA.

Background: The determination of left ventricular hypertrophy (LVH) by echocardiography is critical in the evaluation of hypertension in the pediatric population. Lean body mass is the strongest determinant of left ventricular mass (LVM), but is difficult to measure and prediction methods are underutilized. Current guidelines use the expression of LVM normalized to body size, indexing to height or body surface area (BSA). While LVM Z-scores based on BSA provide superior estimation and perform well on normal-weight pa-

EP-124

Two-Dimensional Strain Derived Parameter as Independent Predictor of Progression to Chagas Cardiomyopathy in Patients with Chagas Disease

Roberto M. Saraiva, Mauro Felippe Mediano, Gilberto Marcelo Sperandio da Silva, Andréa Da Costa, Andrea Sousa, Luiz Henrique Sengenis, Fernanda Mendes, Henrique Veloso, Sergio Xavier, Marcelo Holanda, Alejandro Hasslocher-Moreno, Evandro Chagas National Institute of Infectious Diseases/Oswaldo Cruz Foundation, Rio de Janeiro, Brazil.

Background: Around 30% of the chronic Chagas disease (CD) patients present Chagas cardiomyopathy. However, the factors that influence the progression to Chagas cardiomyopathy are poorly understood. We aimed to evaluate if two-dimensional (2D) speckle tracking echocardiographic deformation (ε) parameters are associated with CD progression. **Methods:** This is a single-center prospective longitudinal study. Adult patients with chronic CD and no evidence of Chagas cardiomyopathy based on electrocardiogram (ECG) and echocardiogram exams were consecutively recruited among those referred for echocardiograms between March 2010 and February 2014. Echocardiographic evaluation included 2D Doppler echocardiography and left ventricular (LV) function on ε analyses. CD progression

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was defined by the occurrence of new changes typical of CD in ECG, sustained ventricular tachycardia, new wall motion abnormalities, or diagnosis of heart failure. Multivariable Cox-proportional-hazards regression analyses adjusting for age, sex, and presence of hypertension, diabetes mellitus, and left anterior hemiblock at baseline were performed to test the association between 2D ε derived parameters and subsequent CD progression. Receiver operating characteristic curves were generated to define optimal cut-off values for the construction of cumulative survival curves using the Kaplan–Meier method. The null hypothesis was rejected at P<0.05. All subjects gave written informed consent. **Results:** A total of 144 patients with chronic CD (41.0% men; 49.6 ± 11.5 years) without evidence of cardiac disease at baseline were followed for 6.2 ± 2.6 years. CD progression occurred in 26 patients (2.9 events/100 patient-years). Time to CD progression was 4.4 ± 2.1 years. CD progression was diagnosed by the occurrence of a new change in ECG (primary T wave changes n=11; right bundle-branch block n=6; electric inactive areas n=4; atrial fibrillation n=1), new wall motion changes (n=2), sustained ventricular tachycardia (n=1), and diagnosis of heart failure (n=1). LV radial ε (HR 0.96, 95% CI 0.93-0.99, P=.02) was the only independent predictor of CD progression among 2D ε parameters. Optimal cutoff value for LV radial ε prediction of CD progression was 41.8% (AUC 0.66, sensitivity 64%, specificity 75.2%, P=.01). According to Kaplan-Meier analysis, patients with LV radial ε < 41.8% had 4.1 times

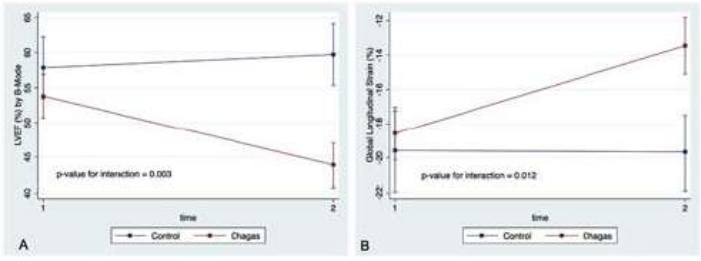
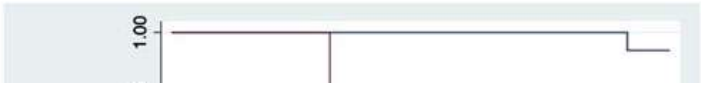


Figure 1



P=.01). According to Kaplan-Meier analysis, patients with LV radial ε < 41.8% had 4.1 times greater risk (95% CI: 1.8 to 9.5, P=.0009) of CD progression (Figure). **Conclusion:** Our results suggest that CD patients with no evidence of cardiac disease and LV radial ε < 41.8% had an increased risk for CD progression. This is the first report of an echocardiographic predictor of CD progression. Our results support the inclusion of echocardiogram in the routine evaluation of CD patients regardless of a normal ECG.

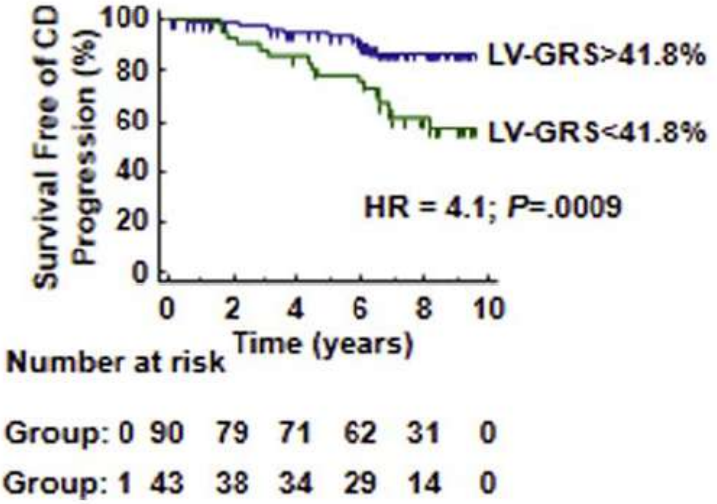


Figure 1

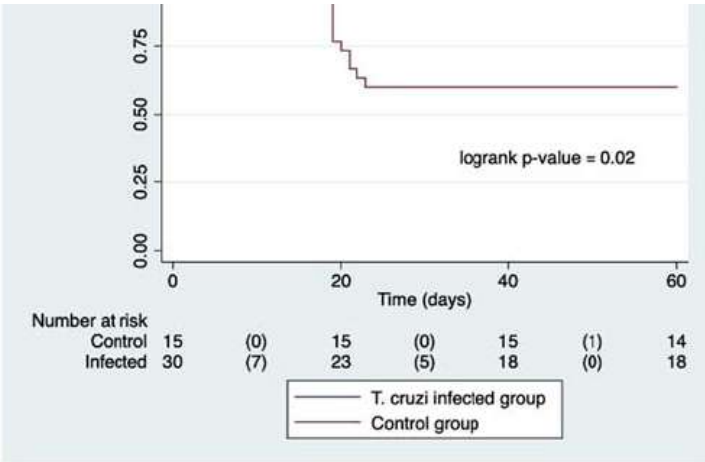


Figure 2

EP-126

Libman-Sacks Endocarditis: Clinical Predictors

Lucas Chacon-Lutrick[1], Michelle Ratliff[2], Clifford Clifford Qualls[1], Wilmer Sibbitt Jr[1], Carlos Roldan[2]. [1]University of New Mexico, Albuquerque, NM; [2]New Mexico VA Health Care System, Albuquerque, NM.

Background: Libman-Sacks endocarditis (LSE) characterized by Libman-Sacks vegetations

Two-Dimensional Strain Derived Parameter as Independent Predictor of Progression to Chagas Cardiomyopathy in Patients with Chagas Disease

Roberto M Saraiva, Mauro Felippe F Mediano, Gilberto M Sperandio da Silva, Andréa R Costa, Andrea S Sousa, Luiz Henrique C Sangenis, Fernanda SNS Mendes, Henrique H Veloso, Sérgio S Xavier, Marcelo T Holanda, Alejandro Marcel Hasslocher-Moreno.

Oswaldo Cruz Foundation, Rio de Janeiro, Brazil

The authors have no conflict of interest to disclose.

BACKGROUND

•Chagas disease (CD) affects around 8 million people worldwide.

•Around 30% of the chronic CD patients present Chagas cardiomyopathy.

•There are few if any predictors of progression to CD cardiomyopathy.

OBJECTIVES

- To evaluate if 2D speckle tracking echocardiography (STE) indexes of left ventricular (LV) function were independently associated with progression to CD cardiomyopathy.

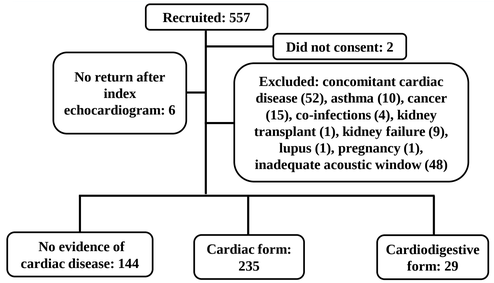
METHODS

- Longitudinal single-center study.
- Adult chronic CD patients with no evidence of CD cardiomyopathy: normal ECG or an ECG with non-specific changes and an echocardiogram without LV wall motion abnormalities.
- Inclusion period: March 2010 to February 2014.
- Consecutive recruitment among those referred for echocardiograms.
- End-point: progression to CD cardiomyopathy.
- Progression was defined by new changes in ECG (2^{nd}- and 3^{rd}- degree right bundle-branch block (RBBB), frequent ventricular premature beats, polymorphous or repetitive nonsustained ventricular tachycardia (VT), 2^{nd}- and 3^{rd}-degree atrioventricular block, sinus bradycardia with heart rate<40 bpm, sinus node dysfunction, 2^{nd}- and 3^{rd}-degree left bundle-branch block, atrial fibrillation, electrical inactive area, or primary T wave changes), or diagnosis of sustained VT, new wall motion abnormalities, or heart failure (HF).
- Echocardiogram: Vivid 7 machine.
- Cardiac chambers dimensions, LV systolic and diastolic function.
- 2D ε analyses: Echopac PC workstation software.
- Peak global LV circumferential (LV-GCS), radial (LV-GRS) and longitudinal (LV-GLS) ε, and LV torsion (LV twist divided by the end-diastolic LV longitudinal length).
- Study approved by the institutional review board.
- All subjects gave written informed consent.

METHODS

- **Statistical Analysis**
- Separate multivariable Cox-proportional-hazards regression analyses adjusted for age, sex, hypertension, diabetes mellitus, and left anterior hemiblock were performed to test if the variable of interest was associated with CD progression.
- Receiver operating characteristic (ROC) curves were generated to define cut-off values with corresponding sensitivities and specificities for the endpoint prediction. The optimal cutoff corresponded to the maximum of the Youden index.
- Cumulative survival curves dichotomized at optimal ROC were constructed by Kaplan–Meier method and compared by log–rank test.
- P values below 0.05 were considered significant.
- Softwares used: MedCalc version 12.5.0.0 and Stata version 13.0.

RESULTS



- Studied population: 144 subjects
- 41.0% men; 49.6 ± 11.5 years.
- Mean follow up for 6.2 ± 2.6 years.
- Time to CD progression: 4.4 ± 2.1 years
- CD progression: 26 patients(2.9 events/100 patient-years)
  - ❑ new change in ECG (primary T wave changes n=12; RBBB n=7; electric inactive area n=4; atrial fibrillation n=1), sustained VT (n=1)
  - ❑ new wall motion changes (n=4),
  - ❑ heart failure (n=2).
  - ❑ three patients present two or more criteria and the others present only one criterion for CD progression.

RESULTS

Table I. Clinical and echocardiographic characteristics of studied subjects.

Variable	Without cardiac disease n=144
Age, years	49.6 ± 11.5
Sex, male	59 (41.0%)
Body mass index, g/m^2	26.3 ± 4.0
Hypertension	31 (21.5%)
Diabetes mellitus	6 (4.2%)
Electrocardiogram	
LAHB	13 (9.03%)
Low voltage	4 (2.8%)
2D echocardiogram	
LA, cm	3.5 ± 0.4
LA volume, ml/m^2	24.4 ± 6.6
LVd, cm	5.0 ± 0.4
LVs, cm	3.0 ± 0.4
LV ejection fraction, %	69.1 ± 6.6
LV S', cm/s	8.7 ± 1.6
RV S', cm/s	13.9 ± 2.3
TAPSE, mm	24.3 ± 3.7
PASP, mmHg	28.7 ± 4.8
E/A ratio	1.3 ± 0.5
E', cm/s	10.9 ± 3.4
E/E' ratio	7.3 ± 2.2
Strain	
LV-GLS, %	-19.0 ± 2.4
LV-GCS, %	-19.9 ± 3.4
LV-GRS, %	47.6 ± 12.9
Peak Torsion, ^{0}/cm	1.6 ± 0.7

A, peak late wave diastolic filling velocity; E, peak early wave diastolic filling velocity; E', peak early diastolic mitral annulus velocity; $\mathcal{E}$, strain; GCS, global circumferential $\mathcal{E}$; GLS, global longitudinal $\mathcal{E}$; GRS, global radial $\mathcal{E}$; LA, left atrial; LAHB, left anterior hemiblock; LV, left ventricular; LVd, LV end-diastolic diameter; LVs, LV end-systolic diameter; RV, right ventricular; PASP, pulmonary artery systolic pressure; S', peak systolic mitral annulus velocity; TAPSE, tricuspid annular plane excursion.

Values are mean ± SD or n (%).

RESULTS

Table II. Multivariable CD progression predictors.

Variable of Interest	HR	95% CI	P values	Model C-index
LV-GLS, %	1.01	0.84 – 1.21	0.92	0.60
LV-GCS, %	0.91	0.80 – 1.02	0.11	0.66
LV-GRS, %	**0.96**	**0.93 – 0.99**	**0.02**	**0.71**
Peak Torsion, ^{0}/cm	1.11	0.61 – 2.01	0.73	0.63

Abbreviations as in Table 1. Each line represents a multivariable model containing the adjustment variables and the variable of interest.

Multivariable Cox-proportional-hazards regression analyses with respective Harrell's C indexes.

Adjustment variables: age, sex, hypertension, diabetes mellitus, and LAHB.

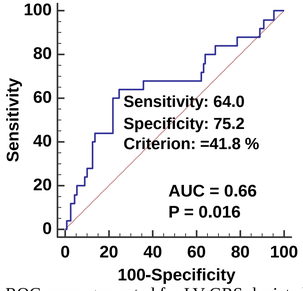


Figure 1. ROC curve generated for LV-GRS depicted a significant AUC with an optimal cut-off value of 41.2% to predict CD progression.

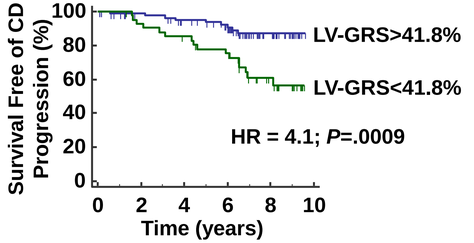
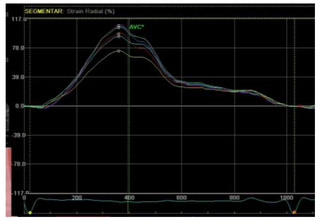


Figure 2. Cumulative survival curve free of CD progression dichotomized at LV-GRS optimal cut-off value .

RESULTS

A.



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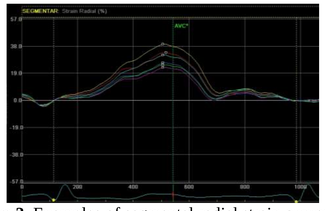

Figure 3. Examples of segmental radial strain curves measured by 2D STE from short axis view at the mid level for a patient that did not progress to CD cardiomyopathy after nine years of follow-up **(A)** and a patient that progressed to CD cardiomyopathy after six years of follow-up **(B).** Note the lower radial LV strain of the patient that progressed.

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CONCLUSIONS

- This is the first report of an echocardiographic parameter (LV-GRS) that can predict CD progression among CD patients with no evidence of cardiac disease.
- Further studies are needed to evaluate the benefit of possible interventions to be done for patents with risk of CD progression identified by this 2D STE parameter.

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E-mail: roberto.saraiva@ini.fiocruz.br