Archives of Surgery and Clinical Case Reports
Maisuradze D. Arch Surg Clin Case Rep 5: 172.
www.doi.org/10.29011/2689-0526.100172
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Case Report

Reference Values of Septal-Lateral Early and Late Tissue Doppler Velocities Ratio in Subjects with Normal Diastolic Function

David Maisuradze*

Aversi Clinic, Tbilisi, Alexander Kistauri, Tbilisi State Medical University, Georgia

***Corresponding author:** David Maisuradze MD, FESC, Aversi Clinic, Tbilisi, Alexander Kistauri, Tbilisi State Medical University, Georgia

Citation: Maisuradze D (2022) Reference values of septal-lateral early and late tissue doppler velocities ratio in subjects with normal diastolic function. Arch Surg Clin Case Rep 5: 172. DOI: 10.29011/2689-0526.100172

Received Date: 6 May 2022**; Accepted Date:** 10 May 2022**; Published Date:** 13 May 2022

Introduction

Echocardiography is now the most commonly used noninvasive tool for the assessment of cardiac anatomy and function. In addition to commonly established roles such as confirming diagnosis, etiologic work-up, complication screening, and disease monitoring, echocardiography plays an important clinical role in prognostic assessment. Conventional echocardiographic predictors of poor outcome, such as left ventricular (LV) ejection fraction (EF) and restrictive filling pattern have recently been supplemented by tissue Doppler imaging (TDI). Tissue Doppler imaging (TDI) is evolving as a useful echocardiographic tool for quantitative assessment of left ventricular (LV) systolic and diastolic function. Recent studies have explored the prognostic role of TDI-derived parameters in major cardiac diseases, such as heart failure, acute myocardial infarction, and hypertension [1].

Tissue Doppler imaging is a robust and reproducible echocardiographic tool, which has permitted a quantitative assessment of both global and regional function and timing of myocardial events [2-4].

Doppler tissue imaging (DTI) echocardiography is already a part of the standardized diastolic evaluation. [3] Its ability to detect early signs of cardiac disease before it is detectable by conventional echocardiography and its strong predictive power, are encouraging [5,6].

LV diastolic dysfunction is present if more than half of the available parameters meet these cutoff values. The study is inconclusive if half of the parameters do not meet the cutoff values [7].

Diastolic Dysfunction (DD) is a significant predictor of major adverse cardiac events (MACE) in the general population [8,9]. Epidemiological studies indicate that varying severities of DD are present in the community. DD is predictive of developing overt HF and all - cause mortality. A number of echocardiographic parameters have been shown to reflect DD. How to interpret these parameters has been widely discussed and numerous classification algorithms have been proposed. However, these algorithms often leave a substantial amount of patients as indeterminate due to incongruent echocardiographic parameter [10].

Background: Tissue Doppler Imaging (TDI) detects early signs of left ventricular dysfunction; Diastolic dysfunction also is an early sign of the heart disease.

The aim of this study was to define the range of left ventricular septal and lateral, early e ’and late a’ TDI velocities ratio in subjects with normal diastolic function.

Methods: We prospectively studied 50 adult outpatients with normal diastolic function and normal LV EF. Underwent 2D echo, including septal and lateral tissue Doppler e’/a’ ratio.

We analyzed diastolic function by standard echocardiography according to the ASE/EACVI 2016 guidelines together with clinical parameters.

An E/A ratio≤0.8 with a peak E-wave velocity≤50 cm/sec indicated I grade diastolic dysfunction.

Results

The values of septal e’/a’ ratio among the studies varied from 0.9 to 2.4 (mean 1.33). (Figure 2)

The values of lateral e’/a’ ratio among the studies varied from 1 to 2.0 (mean 1.75).

The values of E/A ratio varied from 1 to 2.1 (mean E/A-1.38). (Figure 1)

Age of patients varied from 17 to 51, (mean age-31), n=50%, 25 were male, n=50%, 25 were female.

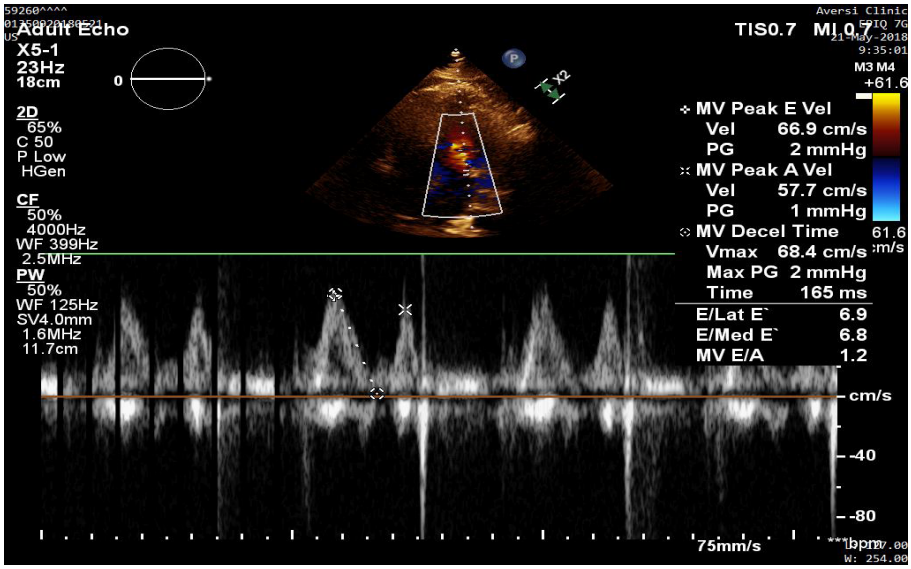

Figure 1: The values of E/A ratio varied from 1 to 2.1 (mean E/A-1.38)

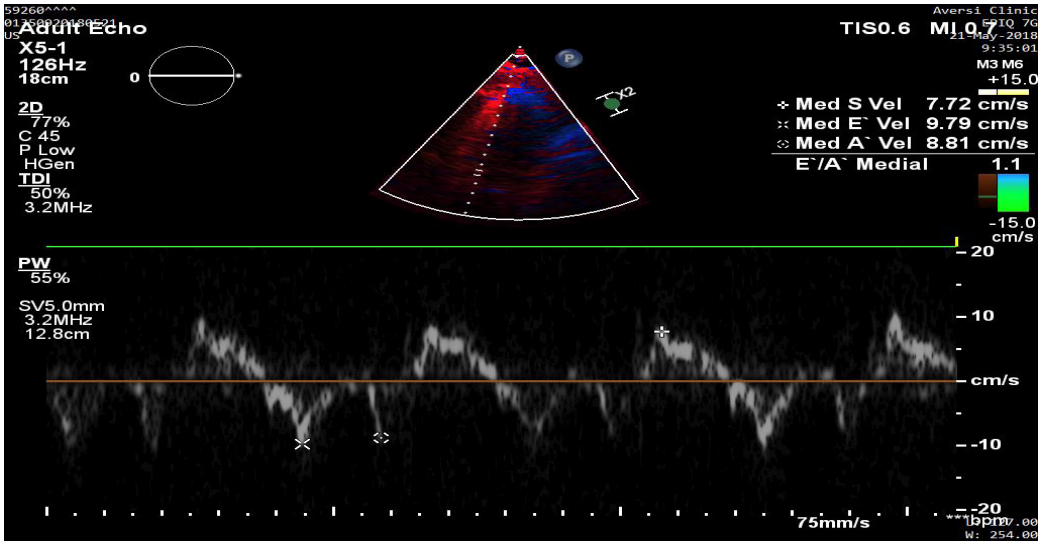

Figure 2: The values of septal e'/a' ratio among the studies varied from 0.9 to 2.4 (mean 1.33)

Conclusion

1. We have found that septal and lateral mean e'/a' ratio>one in subjects with normal diastolic function.
2. Values of tissue Doppler e'/a' ratio in-patient with diastolic dysfunction require further investigations.
3. This study determined values of septal-lateral tissue Doppler e'/a' ratio in subjects with a normal heart (Table 1).

Factor	Mean± SD	P-Value
Age	31±8.3	0.011
E to A velocity ratio (E/A)	1.38±0.26	<0.00001
e'/a'sept	1.33±0.31	<0.00001
e'/a'lat	1.75±0.53	<0.00001
*SD=standard deviation, p value is significant at<0.05,		

Table 1: e'/a' sept. and e'/a' lat. Data (N=50) in subjects with normal diastolic function.

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