

HOSTED BY



ELSEVIER

Contents lists available at ScienceDirect

## The Egyptian Heart Journal

journal homepage: [www.elsevier.com/locate/ehj](http://www.elsevier.com/locate/ehj)

## Original Article

# Mitral leaflet separation index. An easy two dimensional echocardiography technique for assessment of mitral valve area before and after percutaneous balloon mitral valvuloplasty

Sameh S. Raafat<sup>a,\*</sup>, Ali A. Ramzy<sup>b</sup>, Amr F. El-Hadidy<sup>c</sup>, Mohamed A. Abd Allah<sup>a</sup>, Hany F. Hanna<sup>a</sup><sup>a</sup> Cardiology Department, Ain Shams University, Egypt<sup>b</sup> Cardiology Department, Al-Azhar University, Egypt<sup>c</sup> Cardiology Department, Ministry of Health Hospitals, Egypt

## ARTICLE INFO

## Article history:

Received 15 February 2018

Accepted 19 April 2018

Available online xxx

## Keywords:

Mitral valve

Rheumatic heart disease

Mitral stenosis

Balloon mitral valvuloplasty

## ABSTRACT

**Aim:** To evaluate the reliability of the mitral leaflet separation (MLS) index against the traditional echocardiographic methods in measuring mitral valve area (MVA) pre and post percutaneous balloon mitral valvuloplasty (PBMV).

**Methods:** Ninety patients suffering symptomatic moderate to severe MS underwent PBMV at Ain Shams University Hospital in cardiology department. Seventy of the patients were females representing 77.8% and 20 were males representing 22.2%. Their age ranged from 22 to 56 years. All patients were subjected to full transthoracic echocardiography (TTE) examination pre and post PBMV. MLS index was introduced as a comparative parameter with traditional echocardiographic methods for assessment of MVA, measuring average of distance between tips of MV leaflets in parasternal long axis and four chamber two dimensional echocardiographic views.

**Results:** MVA increased from  $0.95 \pm 0.28$  to  $2.21 \pm 0.41$  cm<sup>2</sup> (P=0.001) using 2D planimetry; and increased from  $0.93 \pm 0.23$  to  $2.21 \pm 0.46$  cm<sup>2</sup> (P= 0.0011) by pressure half time method (PHT). MLS index was correlated with MVA by 2D planimetry pre and post PBMV (r=0.453) and (r=0.668) respectively (p=0.0001) and strongly correlated with MVA using PHT post PBMV (r=0.768) (p=0.0001). Post PBMV 14 patients suffered significant mitral regurgitation 3 of them were transferred to surgery. MLS index above 11.75 mm and below 9.15 mm had excellent positive predictive value for detecting mild and severe MS respectively.

**Conclusion:** The MLS index it is a simple and effective method for assessment of the MVA, it has an excellent correlation with MVA with an excellent sensitivity and specificity for the prediction of effective MVA. The MLS index cannot evaluate outcome of PBMV because it is an anatomical parameter and not flow dependent thus does not correlate with grades of mitral regurgitation.

© 2018 Egyptian Society of Cardiology. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Rheumatic heart disease remains a major cause of cardiovascular disease in developing nations, although the prevalence of rheumatic heart disease (RHD) has declined sharply in industrialized countries during the last century.<sup>1</sup> RHD is by far the most important form of acquired heart disease in children and young adults living in developing countries which are inhabited by 80 percent

of the world's population; RHD accounts for about a quarter of all patients with heart failure in endemic countries.<sup>2,3</sup>

In the great majority of cases, mitral stenosis is caused by rheumatic involvement of the mitral valve,<sup>4,5</sup> although only 50 to 70 percent of patients report a history of rheumatic fever.<sup>6,7</sup>

Mitral stenosis (MS) is a disabling and eventually lethal disease. Untreated progressive disease can lead to significant symptoms (eg, dyspnea and fatigue) and serious complications (eg, pulmonary edema, systemic embolism, and pulmonary hypertension).<sup>8–10</sup>

Although medical therapy can relieve symptoms, it does not affect the obstruction to flow. As a result, surgical commissurotomy and open valvuloplasty were, for many years, the only methods by which MS could be corrected. However, the development of

Peer review under responsibility of Egyptian Society of Cardiology.

\* Corresponding author at: Cardiology Department, Ain Shams University, 36 Ali Ibrahim Ramez St., Heliopolis, Cairo, Egypt.

E-mail address: [drsnaguib@yahoo.com](mailto:drsnaguib@yahoo.com) (S.S. Raafat).

<https://doi.org/10.1016/j.ehj.2018.04.006>

1110-2608/© 2018 Egyptian Society of Cardiology. Production and hosting by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Please cite this article in press as: Raafat S.S., et al. Mitral leaflet separation index. An easy two dimensional echocardiography technique for assessment of mitral valve area before and after percutaneous balloon mitral valvuloplasty. The Egypt Heart J (2018), <https://doi.org/10.1016/j.ehj.2018.04.006>

percutaneous balloon mitral valvuloplasty (PBMV) by Inoue in 1984 and Lock in 1985 for the treatment of selected patients with MS has revolutionized the treatment of this disorder.<sup>8–10</sup> The long-term results, lower costs, and the avoidance of thoracotomy make PBMV the treatment of choice in patients with MS who have the following features:

- Moderate to severe MS
- Pliable, noncalcified mitral valves
- Symptomatic or, if asymptomatic suffering from pulmonary artery hypertension
- The absence of left atrial thrombus or moderate to severe mitral regurgitation

In addition, patients who are too old or frail for surgery or those with severe valve deformities might consider PBMV as a palliative procedure in the absence of left atrial thrombus or moderate to severe mitral regurgitation.<sup>11</sup>

The mitral valve was the first structure to be identified by echocardiography. Technical advances have enabled echocardiography to identify almost any anatomic or functional abnormality of the mitral valve.<sup>12,13</sup>

Echocardiography is the most accurate approach for diagnosis and evaluation of MS.<sup>14</sup> Echocardiography is recommended in all patients with MS at initial presentation, for reevaluation of changing symptoms or signs, and at regular intervals for monitoring disease progression.<sup>15</sup>

When transthoracic images are suboptimal, transesophageal echocardiography (TEE) is appropriate.<sup>15</sup> TEE is also necessary to exclude left atrial thrombus and to evaluate mitral regurgitation (MR) severity when PBMV is considered.<sup>15</sup>

In all patients with MS, a detailed echocardiographic examination, including 2D echocardiography (transthoracic or transesophageal), a Doppler study, and color flow Doppler imaging, provides sufficient information to develop a therapeutic plan without the need for cardiac catheterization.<sup>15</sup>

The mitral leaflet separation (MLS) index, measures the distance between the tips of the mitral leaflets in parasternal long-axis and four-chamber views. These two readings are averaged to yield the mitral leaflet separation index. It was recently presented as a reliable measure of MS severity and as a surrogate for mitral valve area (MVA).<sup>16</sup>

## 2. Objective

To evaluate the accuracy of MLS index in selected patients with MS, before and after PBMV, compared to conventional methods by transthoracic echocardiography [TTE].

## 3. Methods

This study was approved by our institutional review board and informed consent was obtained from all individuals enrolled in the study.

### 3.1. Study population

This was a prospective observational study which included all patients referred for elective BMV in the Cardiology Department Ain Shams University hospital. The study included ninety patients.

The inclusion criteria for the study group were as follows: (i) patients' age from 10 to 60 years, (ii) Symptomatic moderate-to-severe MS. (iii) Asymptomatic moderate-to-severe MS with pulmonary hypertension (PASP more than 50 mmHg at rest) (iv) patients in sinus rhythm or atrial fibrillation.

The exclusion criteria were as follows: (i) patients with mild MS (MVA > 1.5 cm<sup>2</sup>), (ii) Patients who are not candidates for BMV (due to either Wilkins score > 10, commissural calcification or left atrial thrombus), (iii) Moderate-to-severe valvular disease other than MS. (iv) Congenital MS. (v) Patients with organic tricuspid valve disease. (vi) Evidence of rheumatic activity during the preceding 6 months.

### 3.2. Standard trans-thoracic echo- cardiographic study

All patients were studied in the left lateral decubitus position using an ultrasound system (GE vivid 5). Standard 2D and M-mode echocardiograms were obtained according to the American Society of Echocardiography guidelines. The conventional indices for assessment of the severity of MS; MVA by planimetry and pressure half-time and the mean mitral valve pressure gradients and PASP were measured as recommended.

All echocardiographic examinations as well as follow-up measurements were done by a senior echocardiographer with 10 years' experience in performing echocardiograms. To avoid personal bias in assessing the anatomic scores and the mitral valves, these parameters were graded by at least two experienced echocardiologists and in case of disparity, by a third one to ensure correct measurements.

Grading of the severity of the MS and MR was done according to ACC 2006 guidelines for valvular heart disease.<sup>15</sup>

### 3.3. Severity of MS was determined using the following methods

Severe MS was defined as a MVA of 1 cm<sup>2</sup> or less by planimetry or pressure half-time method and/or a mean transmitral gradient of greater than 10 mm Hg (Figs. 1 and 2). Moderate MS was defined as a MVA between 1 cm<sup>2</sup> and 1.5 cm<sup>2</sup> by planimetry or pressure half-time method, with a mean transmitral gradient of 5 to 10 mm Hg. Mild MS was defined as a MVA of greater than 1.5 cm<sup>2</sup> by planimetry or pressure half-time and/or a transmitral gradient of less than 5 mm Hg.

Mitral valve scoring using Wilkin's scoring system of mitral valve on scale of 1 through 4, with a score of 1 representing normal. The four elements were the mobility of the anterior leaflet, the severity of subvalvular disease, the calcification of the anterior leaflet, and the thickness of the anterior leaflet. The value for each of these four scores was added together for a total "splitability index" of 4 to 16.<sup>17</sup>

### 3.4. Severity of MR was determined using the following methods

Severe MR was defined as a large central color doppler jet area more than 10 cm<sup>2</sup> or more than 50% of LA area or variable size

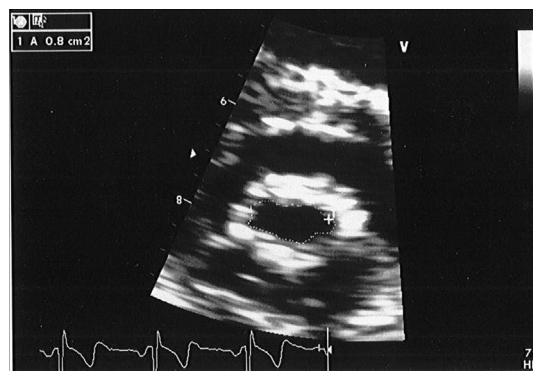


Fig. 1. MVA by 2D planimetry echocardiography pre PBMV from a patient included in our study number 79.

Download English Version:

<https://daneshyari.com/en/article/8957071>

Download Persian Version:

<https://daneshyari.com/article/8957071>

[Daneshyari.com](https://daneshyari.com)