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MITRAL LEAFLET SEPERATION INDEX IN ASSESSMENT OF SUCCESSFUL PERCUTANEOUS BALLOON MITRAL VALVOPLASTY.

Cardiology

Dr. Midhun Kumar. B Post Graduate In Dm Cardiology, Madras Medical College

Dr. G. Ravi Shankar* Professor, Institute Of Cardiology, Madras Medical College *Corresponding Author

Dr. S. Nambirajan Assistant Professor, Institute Of Cardiology, Madras Medical College

ABSTRACT

INTRODUCTION: Percutaneous Balloon mitral valvuloplasty (PBMV) has emerged as the treatment of choice for selected patients with severe rheumatic mitral stenosis. Our aim of the study is to evaluate the possibility of the mitral leaflet separation (MLS) index as an echocardiographic parameter in aiding successful PBMV and to evaluate its reliability in assessing the morphology and hemodynamic of mitral valve in pre and post mitral valvuloplasty (PBMV).

MATERIALS AND METHODS: This is a single centre, observational study of twenty six patients suffering from symptomatic moderate to severe MS who underwent PBMV at Rajiv Gandhi government general hospital, Chennai in cardiology department from January 2018 to June 2018.

RESULTS: MVA increased from 0.86 ± 0.12 to 1.72 ± 0.21 cm2 (P=0.02) using 2D planimetry. MVA increased from 0.92± 0.13 to 1.78± 0.22 cm2 (P= 0.02) by pressure half time method (PHT) .MLS index had good correlation with MVA by PHT pre (r=0.92) and post (r=0.81) PMBV (p=0.0001) .MLS index had strong correlation with MVA using 2D Planimetry pre (r=0.92) and post PBMV (r=0.89) (p=0.0001) MLS index had weaker correlation with mean LA pressure pre (r=0.003) and post PBMV (r=0.239) (p=0.98).

CONCLUSION: MLS demonstrated a very good correlation with MVA measured with 2D planimetry and PHT methods and is very easy to obtain in the hands of the inexperienced and in special setting like Cath lab. It can be used as an important parameter for assessing the success of percutaneous mitral balloon valvuloplasty.

KEYWORDS

Mls- Mitral Leaflet Seperation Index, Pbmv- Percutaneous Balloon Mitral Valvuloplasty, Ms-mitral Stenosis, Mva-mitral Valve Area

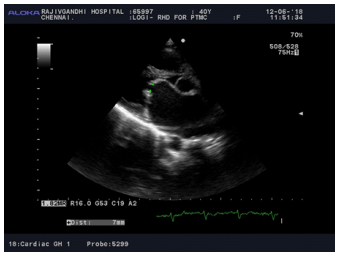
INTRODUCTION:

Percutaneous Balloon mitral valvuloplasty (PBMV) has emerged as the treatment of choice for selected patients with severe rheumatic mitral stenosis[1]. Evaluation of immediate results following PBMV is mainly done using Trans thoracic echocardiogram, aimed to attain a Mitral valve area (MVA) larger than 1.5 cm^2 without greater than moderate mitral regurgitation. Mitral leaflet separation index measures the distance between the tips of the mitral leaflets (inner edge to inner edge in end diastole) in Para sternal long axis and four chamber views[3]. These two readings are averaged to yield the mitral leaflet separation index.

MATERIALS AND METHODS:

The aim of the study is to evaluate the possibility of the mitral leaflet separation (MLS) index as an echocardiographic parameter in aiding successful PBMV and to evaluate its reliability in assessing the morphology and hemodynamics of mitral valve against the traditional echocardiographic methods in pre and post mitral valvuloplasty (PBMV). Twenty six patients suffering from symptomatic moderate to severe MS underwent PBMV at Rajiv Gandhi government general hospital ,Chennai in cardiology department from January 2018 to June 2018.Seventeen were females (65.4 %) and 9 were males (34.6%). Their age ranged from 18 to 60 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 Mitral valve area (MVA)(FIGURE 1). All patients underwent PBMV using Single balloon INOUE technique with ACCURA and LIFETECH balloons after Trans septal Puncture. Mean Left atrial (LA) pressure was recorded Pre and post PBMV. Linear regression analysis was used to correlate MLS INDEX against MVA by PLANIMETRY, PHT and LA pressure. Quantitative variables are expressed as mean + SD. Quantitative variables were assessed using paired t-test.

Figure 1: Mitral Leaflet Separation Index In Plax View.



RESULTS:

MVA increased from 0.86 ± 0.12 to 1.72 ± 0.21 cm2 (P=0.02) using 2D planimetry. MVA increased from 0.92± 0.13 to 1.78± 0.22 cm2 (P= 0.02) by pressure half time method (PHT) (Table.1 and FIGURE .2). MLS index had good correlation with MVA by PHT pre (r=0.92) and post (r=0.81) PMBV (p=0.0001) .**MLS index had strong correlation with MVA using 2D Planimetry pre (r=0.92) and post PBMV (r=0.89) (p=0.0001)(FIGURE 5)**. MLS index had weaker correlation with mean LA pressure pre (r=0.003) and post PBMV (r=0.239) (p=0.98)

Table 1: Mva, Mls And La Pressure -pre And Post Pbmv

VARIABLE	PRE PBMV	POST PBMV	"p" VALUE
MVA-2D	O.86 ± 0.12	1.72 ± 0.21	0.02
MVA-PLANIMETRY	0.92 ± 0.13	1.78 ± 0.22	0.02
MLS	6.63 ± 0.42	13.05 ± 0.51	0.001
LA PRESSURE	31.07 ± 0.82	14.84 ± 0.79	0.03

Figure 2: Table 1: Mva, Mls And La Pressure -pre And Post Pbmv

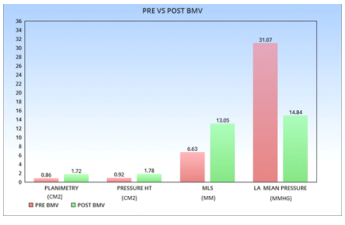
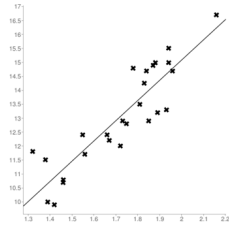


Figure 3: Correlation Between Mls And 2d Echo Planimetry After Pbmv



DISCUSSION:

Mitral valve area (MVA) can be measured by planimetry, pressure half-time, continuity equation, and proximal isovelocity surface area methods. MVA measured by planimetry is considered as reference method, however it must be acquired in the desired plane and must be precisely performed at tips of the leaflets .Trans mitral gradient and continuity equation are affected by cardiac ouput and presence of MR. MLS measurement in 2D is easier, accurate as the narrowest part of mitral funnel can be easily identified. A MLS index above 11.75 mm and below 9.15 has excellent positive predictive value for detecting mild and severe MS respectively.

CONCLUSION:

MLS demonstrated a very good correlation with MVA measured with 2D planimetry and PHT methods and is very easy to obtain in the hands of the inexperienced and in special setting like Cath lab. Since it is a two point measurement when compared to planimetry which requires multiple point tracings, it can be used easily to evaluate the outcome of success in PMBV .However the MLS index had only weak correlation with mean LA pressure .It cannot evaluate the outcome of PBMV because it is an anatomical parameter and not flow dependent and thus does not correlate with hemodynamics of mitral valve and grades of mitral regurgitation.

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