Real-time 3D Echocardiography as New Gold Standard in Assessment of Rheumatic Mitral Valve Stenosis Undergoing Percutaneous Balloon Mitral Valvuloplasty

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Background and objectives:

Determine the accuracy of real-time 3D echocardiography in the assessment of mitral valve area before and after percutaneous balloon mitral valvuloplasty. Comparison between Anwar et al 3D scoring system and Wilkins 2D scoring system in assessment of the mitral valve before percutaneous balloon mitral valvuloplasty.

Methods:

Fifty patients; all of them had rheumatic mitral valve stenosis, being candidates for valvuloplasty as proved by investigations 24-48 hours before and after PBMV: (2D TTE)echocardiographic assessment(mitral valve area by planimetry and by pressure half time, degree of mitral regurgitation, mean and maximum pressure gradient, estimated pulmonary artery pressure, chordal separation, tip separation,2D Wilkins score and commissural splitting),(2D TEE) with special attention toward assessment of the mitral valve and the sub valvular apparatus as well as the left atrial appendage. (3D TTE) Echocardiographic assessment of the same patients (mitral valve area, 3D-Anwar et al score and commissural splitting) and immediately before and after PBMV, Mitral valve area by Gorlin method in the Cath Lab were measured.

Result:

Comparison between mitral valve area (MVA)before and after percutaneous balloon mitral valvuloplasty (PBMV) by 2D, PHT,3D and Gorlin method shows significant difference between pre and post PBMV(P value < 0.0001), Correlation between (MVA) by 2D (planimetry) and Mitral valve area by Cath Lab(Gorlin method) before and after (PBMV) Show no significant correlation(p value =0.1132(NS) r=0.2268), (p value =0.6228(NS) r =0.0712) respectively, Correlation between (MVA) by PHT and Mitral valve area by cath lab(Gorlin method) before and after (PBMV) Show no significant correlation(p value =0.1600(NS) r =0.2018), (p value =0.1784(NS) r = 0.1934) respectively. , Correlation between (MVA) by 3D (planimetry) and Mitral valve area by cath lab(Gorlin method) before and after (PBMV) Show significant correlation(r=0.6150(S) , value < 0.0001), (r= 0.7836(S) and p value < 0.0001) respectively and best agreement.

From the previous correlation and agreement results we found that 3D was the most accurate method in Assessment of Mitral valve area before and after PBMV when compared with invasively derived MVA by Gorlin method (3D had The largest r value with significant P value) and (The smallest Mean difference with the narrowest limits of agreement).

Comparison between 3D-Anwar score and 2D Wilkins score before PBMV shows no significant difference in Comparison between Mobility and thickness assessed by 3D Anwar score and those assessed by 2D Wilkins score before PBMV while shows significant difference in Comparison between calcification, sub valvular apparatus and total score assessed by 3D Anwar score and those assessed by 2D Wilkins score before PBMV.

Conclusion:

Real-time 3D echocardiography is the most accurate method in the assessment of mitral valve area before and after percutaneous balloon mitral valvuloplasty. In comparison with the Wilkins score, the 3D-Anwar score added more valuable information in the assessment of calcification and sub valvular apparatus before PTMV that may help in the selection of patients and could predict the outcome.

Keywords:

Rheumatic mitral valve stenosis, Percutaneous balloon mitral valvuloplasty (PBMV), Mitral valve area (MVA), Gorlin method, Subvalvular apparatus, Mitral valve calcification, Mitral regurgitation, Pressure half-time (PHT)