

3D TTE Assessment of Mitral Commissural Calcification; Does its Open Scope for more Effective New Scoring?

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Rheumatic mitral valvular disease is characterized by the involvement of their commissures. The intervention of mitral stenosis is directed at the commissures, either Balloon commissurotomy (PTMC) or surgical commissurotomy (OMC or CMC). So, knowing the pathological and morphological changes that involve the commissures of the mitral valve is of paramount importance. But interestingly two mainly used scoring systems for PTMC- the Wilkins score and Abascal score did not focus on commissures [1,2]. Those scores are based on valve thickness, valve calcification, sub-valvular changes, and mobility of leaflets. Cannan CR and his colleagues in 1997 suggested that including the calcification of the commissures could predict the outcome of PTMC better, even if the Abascal score was high in 149 patients undergoing PTMC and having a mean follow-up of 1.8 years [3].

Earlier Tuzcu EM, et al. (1994) evaluated the commissural calcification using fluoroscopy. But it was difficult to differentiate between the valves and the commissures by fluoroscopy examination [4]. Also, Fatkin D, et al. (1993) in 1993 evaluated commissural calcification as a short-term predictor of the outcome of PTMC in 30 patients [5]. Sauria N, et al. (2006) in their 300-patient reviewed, absence of commissural calcification resulted in a satisfactory gain in mitral valve area after PTMC [6]. The use of 3D Echo in assessing the commissures was reported by Massik and it also shows satisfactory imaging of commissural morphology after commissurotomy [7]. Schlosshan D, et al. (2010) could detect commissural fusion in all his 93 patients by using 3D TEE in contrast to the detection of commissural fusion of only 78% of the patient by using 2D TTE [8].

Sarath B, et al. (2013) proposed a score involving commissural fusion and calcification as assessed by 2D TEE. In which score '0' was assign for the presence of commissural calcification, whereas scoring '1' for partial fusion of commissure and '2' for extensive commissural fusion for each commissure. So, the total score was 0-4. The outcome of PTMC was found to be better with a score of 3-4, while the cases with a 0-2 score landed with unfavorable PTMC outcomes [9].

Shakil SS, et al. (2021) compared the 2D versus 3D TTE imaging for

the detection and detailing of commissural calcification [10]. Mitral commissures were well visualized in all the cases by 3D TTE whereas 18% of the cases were not well visualized by 2D TTE. Furthermore, the false-positive detection rate of commissural calcification was significantly more by 2D TTE. 2DE found 30% of their cases having calcification on commissure & based on which plan of PTMC was logically rejected initially. However, the 3D TTE review showed that 20% of these cases that would otherwise be rejected based on 2DE are found to be free of commissural calcification so possibly suitable for BMV. Finally, these 20% cases were sent for PTMC, all of them had successful PTMC [10]. Anwar AM, et al. (2010) proposed a new scoring involving 3D TEE which gave an emphasis on calcification of mitral valve scallops adjunct to commissure yet did not include commissural morphology or calcification in his scoring [11]. 3D echo imaging can well demonstrate the bulk and extent of calcification and can separate the calcific involvement of commissure from leaflet involvement. TTE 3D in addition can acquire the cross-sectional view of the mitral valve and can characterize the commissural calcification in detail despite its limitation of low frame rate, heavy calcification causing tissue and missing the endothelial calcification. These limitations to some extent can be minimized by adjusting gain setting and threshold setting. Other imaging modalities like CT and MRI can be used to demonstrate MV commissure morphology along with calcification. Especially MRI is excellent to delineate the commissure, but the use of MRI in rheumatic mitral valve is limited as most patients with rheumatic mitral valve involvement do have atrial fibrillation. Considering all these facts scoring based on calcification and the extent of commissural fusion assessed by 3D TTE can be the choice of scoring in predicting the outcome of PTMC.

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