

## Peer Review File

**Article Information:** <https://dx.doi.org/10.21037/cdt-22-301>

### **Review Comments:**

#### **Reviewer A:**

Interesting manuscript that meets the requirements for publication. The topic is of interest to readers and has been appropriately developed by the authors

#### **Reply:**

Thank you very much for reviewing our manuscript in your busy schedule, and sincerely thank you for your affirmation of this study.

#### **Reviewer B:**

The submitted manuscript entitled “Number of myocardial infarction segments connected to papillary muscle is associated with the improvement in moderate ischemic mitral regurgitation” investigated the relationship between the number of myocardial infarctions assessed by cardiac MRI before CABG and the improvement of secondary MR 1 year after CABG, and concluded that more than 2 areas of myocardial infarcted segments were independent predictors of no improvement of secondary MR after CABG. Although this study is well-organized and may be useful in clinical practice, I would like to highlight the following concerns that need to be addressed to improve the quality of this article.

#### **Reply:**

Dear expert, Thank you very much for taking time out of your busy schedule to review our manuscript. I sincerely thank you for your affirmation of this study, and thank you very much for giving us valuable opinions and giving us the opportunity to improve. We have carefully read your comments and discussed with other authors. Now we will reply to your comments point-by-point, and have made corresponding corrections in accordance with the requirements, which have been marked in yellow font. Due to the limitation of our ability, we are not satisfied with the explanation of some problems. We sincerely hope that you can understand and correct us!

1. Since this study has not verified the usefulness of mitral valve interventions such as mitral annuloplasty for secondary MR, the statement that mitral valve plasty should be performed in the conclusion of this study is considered to be an exaggeration. It is also unclear whether mitral valve plasty or replacement is appropriate.

#### **Reply:**

According to the 2021 ESC/EACTS valvular heart disease guidelines (1), mitral valve replacement (MVR) should be performed concurrently with coronary artery bypass grafting (CABG) for severe ischemic mitral regurgitation (IMR), while mitral valve plasty (MVP) should be performed concurrently with CABG for moderate IMR remains controversial.

The largest Randomized controlled study to date found (2) that among patients with moderate IMR, 31% had residual mitral regurgitation (moderate or severe regurgitation) at 1 year after CABG and 11.2% had residual mitral regurgitation at 1 year after CABG+MVP. We considered that MVR might be considered for patients who had residual mitral regurgitation after CABG+MVP.

According to "2021: the AATS expert consensus document: coronary artery bypass grafting in patients with ischemic cardiomyopathy and heart failure" (3), MVR is superior to the MVP in patients with ischemic cardiomyopathy accompanied by moderate IMR, especially for the presence of basal aneurysm/dyskinesis, significant leaflet tethering and/or severe left ventricular dilatation (end-diastolic dimension >6.5 cm).

In this regard, we will further study patients with  $\geq 2$  myocardial infarction segments to compare the effect of MVP or MVR on moderate IMR. In this study, we have changed the conclusion "mitral valvuloplasty should be performed" to "mitral valve surgery should be performed".

**Changes in the text:**

We have modified our text as advised (see Page 3, lines 65 and Page 5, lines 92 to 94).

**References:**

1. Vahanian A, Beyersdorf F, Praz F, Milojevic M, Baldus S, Bauersachs J, et al. 2021 ESC/EACTS Guidelines for the management of valvular heart disease. *Eur Heart J* 2022; 43(7):561-632.
2. Smith PK, Puskas JD, Ascheim DD, et al. Surgical treatment of moderate ischemic mitral regurgitation. *N Engl J Med*, 2014, 371: 2178-88.
3. Bakaeen FG, Gaudino M, Whitman G, et al. 2021: the American Association for Thoracic Surgery expert consensus document: coronary artery bypass grafting in patients with ischemic cardiomyopathy and heart failure. *J Thorac Cardiovasc Surg*, 2021, 162(3): 829-850.

2. This study excluded atrial fibrillation, but did it also exclude paroxysmal atrial fibrillation?

**Reply:**

In this study, atrial fibrillation (AF) refers to long-term persistent AF and does not include paroxysmal AF. Because long-term persistent AF can cause left atrial enlargement, mitral annulus dilatation, resulting in atrial functional mitral regurgitation (1). The aim of this study was to exclude atrial functional mitral regurgitation and to distinguish ventricular functional mitral regurgitation.

**Changes in the text:**

We have modified our text as advised (see Page 6, lines 123 to 124).

**Reference:**

1. Alperi A, Pascual I, Avanzas P, et al. Atrial-FMR: No longer the forgotten mechanism of functional mitral regurgitation. *Int J Cardiol*, 2022, 348: 113-114.

3. Although medical therapy is considered to be important as a treatment for secondary MR, this study did not investigate postoperative medication.

**Reply:**

According to the 2020 ACC/AHA guidelines for valvular heart disease (1), patients with heart failure with chronic secondary mitral regurgitation and reduced left ventricular ejection fraction should receive guideline-directed medical therapy, including ACE inhibitors, ARBs, beta blockers, aldosterone antagonists, and/or sacubitril/valsartan.

In this study, all patients were treated with drugs after CABG, including ACE inhibitors, ARBs, beta blockers, aldosterone antagonists, and/or sacubitril/valsartan.

**Changes in the text:**

We have modified our text as advised (see Page 9, lines 186 to 194).

**Reference:**

1. Otto CM, Nishimura RA, Bonow RO, et al. 2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease: Executive Summary: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation*, 2021, 143: e35-e71.

4. Typical cases in each group should be presented with echocardiography and MRI images.

**Reply:**

Echocardiography and MRI images of typical cases in each group have been added to the manuscript.

**Changes in the text:**

We have modified our text as advised (see Page 12, lines 250 to 254; and see Figure 3D, Figure 3E, Figure 4A, Figure 4B, Figure 4C, Figure 4D and Figure 4E).