Peer Review File

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Reviewer A

Thank you for allowing me the opportunity to review this paper about mitral valve repair for primary mitral regurgitation using CG Future Band.
I read the manuscript with interest. My comments are as follow:

Comment 1: The manuscript should be edited by a native English speaker. Additionally, please correct some typos (i.e. frail -> flail).

Reply 1: Thank you for pointing out our misspelling.

Changes in the text:
We corrected the spell as shown on Page 13, Line 287. In addition, we attached the certification of English editing by a native English speaker.

Comment 2: Page 1 line 35. As the authors mentioned, sizes of implanted prosthesis were relatively small. And the rate of the patients with rest MPG >4.5 (28 patients; 11%) at one year were a bit high. If the authors could show prosthetic sizes of the patients who had high rest MPG, it would be helpful to understand.

Reply 2: Thank you for your suggestion to improve the manuscript. We added the prosthetic size as follows on Page 9, Lines 201-204.

Changes in the text:
Patients with rest MPG >4.5 mmHg one year after surgery exhibited varying prosthesis sizes: 4 patients received a 26mm prosthesis, 14 patients received a 28mm prosthesis, 7 patients received a 30mm prosthesis, and 3 patients received a 32mm prosthesis.

Comment 3: Figure 1. There are 32 patients with mod MR and 2 patients with mild MR preoperatively. What was surgical indications for these patients (active infection, stenosis, etc)?

Reply 3: Thank you for your suggestion to improve the manuscript. We added the surgical indications for these patients as follows on Page 8, Lines 165-168.
Change in the text:
Thirty-two patients with moderate MR and 2 patients with mild MR underwent MVr (Figure 1). Surgical indications for these patients were concomitant surgeries in 24 cases, infective endocarditis in 3 cases, and a history of heart failure in 5 cases.

Comment 4: Table 3. It seems that Alfieri stitch includes P2-A2 edge-to-edge (typical

Alfieri stitch) and commissuroplasty (commissure closure). In addition, use of Alfieri seems frequent. Considering P2-A2 itself can affect the rate of SAM (in other words, P2-A2 Alfieri is used for SAM treatment in some cases), P2-A2 edge-to-edge and commissuroplasty should be reported separately. Moreover, given high frequency of Alfieri's technique and lack of comparison between full ring and CG band, the authors cannot conclude 'These results clarified that superior hemdynamic performance…. (page 8 lines 276-277).

Reply 4: Thank you for your suggestion to improve the manuscript. We underwent only commissure closure using the edge-to-edge technique. The wording of the surgical procedure was changed to avoid misunderstanding as follows on Page 5, Lines 107-108. Table 3 was also modified.
Change in the text:
The commissure closure is often used in commissural mitral leaflet prolapse and segmental prolapse of AML and/or PML near the commissure. This technique was also used to reinforce MVr as an additional procedure after inspecting the closure line using a saline solution test.

Comment 5: Page 6 lines 207 to 209. In patients with mild residual MR in the operating theater, the relative risk for recurrence in the first year and after the first year was 3.9 and 4.0 times…. Please add the reference.

Reply 5: Thank you for pointing out our lack of reference. We added the reference as follows on Page 12, Lines 250.
Change in the text:
In patients with mild residual MR in the operating theater, the relative risk for recurrence in the first year and after the first year was 3.9 and 4.0 times, respectively, compared to those without mild residual MR [17].

Comment 6: Page 7 lines 236 to 237. EDD, BSD, and AMA were already defined previously.

Reply 6: Thank you for pointing out our lack of confirmation. We corrected these sentence as follows on Page 13, Lines 283-285.
Change in the text:
Varghese et al. have described EDD <45mm, BSD >15mm, C-sept<25mm, AML length>25mm, PML length>15mm, and AMA<120°were independent predictors of SAM [21].

Reviewer B

I am proud of reviewing the manuscript for journal of Thoracic Disease, in which the authors investigated a 10-year outcomes of mitral valve repair (MVr) using CG Future band. I congratulate the authors' excellent results of MVr. Although this study is the

single-center retrospective study, the number of cases are large and the authors evaluated mid-to-long term outcomes including all-cause mortality and MACCE as well as hemodynamic status. This manuscript is considered to be promising. In order to unclear matters, there are several questions and comments to which the authors should respond.

Comment 1: Follow-up rate is necessary. The authors should describe 1-year, 5-year, and 8-year follow-up rates.

Reply 1: Thank you for your suggestion to improve the manuscript. We added the follow-up rates as follows on Page 6, Lines 140-141.
Change in the text:
The follow-up rate was 98% at 1 year, 97% at 3 years, 95% at 5 years, and 91% at 8 years.

Comment 2: The definition of MACCE was missing.

Reply 2: Thank you for your suggestion to improve the manuscript. We added the definition of MACCE as follows on Page 6, Lines 131-133.
Change in the text:
Major adverse events were defined according to the previous guideline as the following: valve-related mortality, thromboembolism (ie, stroke, transient ischemic attack, systemic embolism), major bleeding, endocarditis, reoperation, and congestive heart failure [16].

Comment 3: The authors described 1-year results of the MPG and MVA. It might be a good idea if the authors can add 5-to-8-year results of the MPG and MVA. In addition, the authors should describe follow-up number of echocardiographic results (1-year and 5-8-year).

Reply 3: Thank you for your suggestion to improve the manuscript. We added the follow-up rates of echocardiography as follows on Page 6, Lines 144-145. Unfortunately, echocardiography in the late phase was often performed by family physicians, and hemodynamic evaluation was not adequately accomplished. Thus, we could not describe the MPG and MVA at 5 and 8 years after surgery
Change in the text:
The TEE follow-up rate was 98% at 1 year, 97% at 3 years, 87% at 5 years, and 82% at 8 years.

Comment 4: The authors should describe whether antiplatelet agents were used postoperatively or not.

Reply 4: Thank you for your suggestion to improve the manuscript. We added the indication to use antiplatelet agents as follows on Page 5, Lines 124-125.

Change in the text:
Patients who underwent concomitant coronary artery bypass surgery received antiplatelet agents.

Comment 5: Page 6, Line 178-180; the authors described about cerebral infarction and intracranial hemorrhage cases. It might be a good idea if the authors can describe relationship between stroke and anticoagulant or antiplatelet agents.

Reply 5: Thank you for your suggestion to improve the manuscript. It was noted whether anticoagulation therapy was being administrated on Page 10, Lines 215-218.
Change in the text:
Eighty percent of patients with intracranial hemorrhage and 50% of patients with cerebral infarction received anticoagulation therapy for AF.

Reviewer C

First, I want to appreciate the amount of time and effort that authors spent preparing this manuscript. I have a very high regard for authors' work. In this report, the authors have reported their experience regarding mitral valve repair with a semi-rigid partial annuloplasty ring (The Colvin-Galloway Future Band) in Asian population.
My reviews and criticisms about the article are listed below.
I appreciate the authors for their excellent results after MVr in terms of operative and hospital mortality, residual MR.
The results of the CGFB in MVr have been already reported by various papers [1-3]. But as emphasized by authors, it could be the first large cohort in Asian population.
What were the criterion to choose the CGFB rather than other types of annuloplasty rings such as Memo3D, Memo4D, Physio-II, Simulus etc.

Comment 1: I would suggest to include the pre-repair C-Sept distance (commissural line to septum distance) to identify the anatomical risk for post-repair SAM, as reported in discussion.

Reply 1: Thank you for your comment on improving the manuscript. We measured C-sept distance and described the result as follows on Page 8, Line 168-172.
Change in the text:
We identified patients with the anatomical risk of SAM; 16 (8.8%) patients with EDD<45mm, 15 (8.2%) patients with BSD>15mm, 43 (23.6%) patients with C-sept<25mm, 83 (45.6%) patients with AML length>25mm, 78 (42.8%) patients with PML length>15mm, and 96 (52.7%) patients with AMA<120°.

Comment 2: I would hesitate to indicate that CGFB can guarantee similar quality and durability to a complete ring without relation to the etiology, because in this study the both types of annuloplasty ring models (ring and band) have not been compared. That´s why its not possible to emphasize about similarity between the ring models.

Reply 2: Thank you for your comment on improving the manuscript. We agreed your comment and changed the sentence of discussion and conclusions as follows on Page 12, Lines- 245-247, Page 13, Lines 271-272, and Page 18, Lines 386-387.

Change in the text:

・This study has shown that CGFB exhibits satisfactory quality and durability following MVr in Japanese patients. The study also observed a low occurrence of SAM and noted acceptable hemodynamic and functional statuses after MVr using CGFB.

・ These results clarified that the quality and durability of MVr using CGFB were acceptable compared to those of other similar studies.

・In conclusion, CGFB exhibits satisfactory quality and durability of MVr for PMR.

Comment 3: Whas was the reason that the surgeons have preferred a resection technique rather than respect technique. It can be clarified in discussion section
The text is grammatically well written.

Reply 3: Thank you for your suggestion on improving the manuscript. We added the reason for preferring a resection technique as follows on Page 12, Lines 251-256.
Change in the text:
Hence, the implementation of precise repair techniques and the use of annuloplasty devices play a pivotal role in maintaining the efficacy and endurance of MVr. While prior studies have indicated comparable outcomes between leaflet resection and chordal replacement [3-5], our preference veers toward segmental resection due to its reproducibility and simplified approach, especially in cases of PML prolapse.

Reviewer D

This manuscript described the mid-term results of mitral valve repair for primary mitral regurgitation using the Colvin-Galloway Future Band (CGFB). The authors should be congratulated for their excellent results of mitral valve repair.

Comment 1: However, the flaw of this study is in that there is no control group. The authors may conclude that the CG Future band can yield the satisfactory results in most of the primary MR cases, but cannot say that the CG Future band is better than other bands or rings.
In that sense, there is not much information for the readers.

Reply 1: Thank you for your comment on improving the manuscript. We agreed your comment and changed the sentence of discussion and conclusions as follows on Page 12, Lines- 245-247, Page 13, Lines 271-272, and Page 18, Lines 386-387.
Change in the text:

・This study has shown that CGFB exhibits satisfactory quality and durability following MVr in Japanese patients. The study also observed a low occurrence of SAM and noted

acceptable hemodynamic and functional statuses after MVr using CGFB.
・These results clarified that the quality and durability of MVr using CGFB were acceptable compared to those of other similar studies.
・In conclusion, CGFB exhibits satisfactory quality and durability of MVr for PMR.

Reviewer E

First I would like to congratulate the authors for their article in this field.
The authors comprehensively analyzed the data of 224 patients undergoing mitral valve repair surgery.
Follow-up completed in 97% of patients is a good result for analyzing the outcomes of the surgical population in the medium term.
I suggest accepting the manuscript after minor revision:

Comment 1: - on line 172 I believe there is a writing error: the percentages refer to "freedom from all-cause mortality" and not to "all-cause mortality" (I hope)

Reply 1: Thank you for pointing out our mistake in writing. We corrected the sentence Page 9, Lines 206-207.
Change in the text:
The freedom from all-cause mortality at one, three, five, seven, and nine years was 97%, 94%, 91%, 86%, and 82%, respectively (Figure 3A).

Comment2: - in patients who had SAM risk pre-operatively and developed SAM post-operatively, an echocardiographic examination was performed aimed at evaluating the persistence of SAM criteria even after surgical correction?

Reply 2: Thank you for your comment. As shown in the section "Patients and Methods", we have routinely performed a postoperative echo a week after surgery. In addition, we carefully observed patients with persistence of SAM during follow-up.
Change in the text: Nothing.

Reviewer F

Takagi and colleagues investigate an interesting topic, the paper exhibits commendable potential, showcasing a strong foundation of ideas and research. However, to reach its full potential, it would benefit from some revisions. Certain sections may need further elucidation to enhance clarity and coherence.

Comment 1: - In line 60-61 they say, "there is no evidence regarding the clinical performance of CGFB in Asian populations". Why the performance of the annular band should be different according to the race? Is the performance related to the race or to the mitral valve disease/lesion? Please explain your point of view. Cite and comment Vassileva (10.1532/HSF98.20101124)

Reply 1: Thank you for your comment. Previous studies have suggested hemodynamic disadvantages for small-diameter full rings. We believe it would be worthwhile to evaluate the clinical performance of partial bands in small-bodied Asians population, who may require the small annuloplasty device. We modified the "Introduction" to convey our intent on Page 3, Lines 68-71.
Change in the text:
However, there is no evidence regarding the clinical efficacy and hemodynamic performance of CGFB in Asian populations with smaller body surface area (BSA), who might necessitate the use of smaller-sized CGFBs.

Comment 2: - 244 patients from 2012 to 2021 means 2 patients/month, a very low volume of mitral valve repair surgery. This could lead to a bias selection. Also, according to your analysis of MV aetiologies: "two hundred and twenty-two (91%) patients had degenerative mitral disease with isolated PML (56.6%)" is an extremality selective population, with a low risk of MR recurrence after MVrepair.

Reply 2: Thank you for your comment. Your point is limitations of this study. We added the study limitations on Page 17, Lines 374-377.
Change in the text:
Additionally, the limitations include the number of patients involved and the specific etiology of mitral valve issues. Approximately 50% of the mitral valve lesions comprised degeneration of the PML, representing a subgroup with a lower risk for reMR.

Comment 3: - Pre-operative endocarditis represents only the 7% of population without the description of MV anatomy at the time of surgery. Are those valves treated with only CGFB or other technique (patch, cordae, leaflet augmentation)? Are those patients affected by acute endocarditis or "late" endocarditis (treated with 6 weeks of antibiotic drugs)? It's interesting showing a supplementary section with the results of those patients. Are those patients treated with CGFB prone to a re-endocarditis? Recently, Di Bacco et al, showed that at 10 years after MVrepair, freedom from re-endocarditis was extremely high (93.6%) if you avoid mitral prosthesis. Cite and comment this aspect (https://doi.org/10.2459/jcm.0000000000001544)

Reply 3: Thank you for your comment on improving the manuscript. We modified "Table 2" to clarify the active and healed endocarditis. In addition, we added the following sentence to be clear about the outcomes in patients with active endocarditis on Page 10, Lines 217-218.
Change in the text:
Eight patients underwent MVr with CGFB for active endocarditis with no recurrence observed during the follow-up period.

Comment 4: - The authors say "Although AML prolapse is considered a major risk

factor for reMR and re-MVsurgery after MVr, the incidence of reMR was not significantly different between AML and PML prolapse in this study (p=0.102). These results suggest that CGFB can guarantee similar quality and durability to a complete ring without relation to the etiology of PMR".

I think that the last sentence lacks coherence logic. You should compare complete ring and CGFB in the same population (AML or PML) and see the incidence of reMR to say that CGFB can guarantee similar durability.

Reply 4: Thank you for your comment. We agreed your suggestion and deleted the sentence of "These results suggest that CGFB can guarantee similar quality and durability to a complete ring without relation to the etiology of PMR".

Change in the text:
Deleted the sentence "These results suggest that CGFB can guarantee similar quality and durability to a complete ring without relation to the etiology of PMR".

Comment 5: - Lastly, I read "Hemodynamic and functional performance" section on discussion. Please, read this recent article by Tomsic et al. (10.1093/ejcts/ezad307), are there similarities and differences? Please cite and discuss the results of both.

Reply 5: Thank you for your comments. We added the recent article by Tomsic et al. as Reference No. 28. Additionally, we described and discussed the results of both as follows on Pages 14-15, Lines 303-342.
Change in the text:
Postoperative hemodynamic performance is essential for preventing MACCE and maintaining functional performance [6,24,25,26]. The MPG > 4.5 mmHg was associated with late AF, leading to postoperative thromboembolic events [6,24]. Moreover, functional mitral stenosis (FMS) due to elevated MPG after MVr is related to a higher B-type natriuretic peptide level, lower exercise capacity, and poorer quality of life [25]. Hence, exploring potential disparities in postoperative hemodynamics between partial bands and full rings is an intriguing focal point, alongside evaluating the quality and durability of MVr and the incidence of SAM.

Previous studies have suggested that a partial band could decrease MPG after MVr because of dynamic mitral annular motion [6,25]. An in-vivo echocardiography study has also demonstrated that the semi-rigid partial band had a larger MVA (6.14±0.37 vs. 4.12±0.15 cm^2 at end-diastole) and a lower MPG (4.0±0.3 vs. 5.0±0.3 mmHg) than the rigid complete ring [27]. Conversely, a recent study has indicated that the type of annuloplasty device employed has no discernible impact on postoperative MPG and MVA [28]. However, this finding is attributed to the predominant usage of larger rings (>32 mm) in over 80% of cases involving patients with a mean BSA ranging from 1.83 to 1.90 m2, which markedly differs from the patient demographics in this study.

Numerous studies have highlighted the suboptimal hemodynamic

performance associated with smaller full rings. Chan et al. have demonstrated that the MPG after MVr using full-ring < 28mm was over 5mmHg and the elevated postoperative MPG has a possible risk of mitral re-intervention [26]. Previous studies on in vitro echocardiographic characteristics after MVr employing full rings indicated that while resting MPG post-MVr is linked to the size of implanted full rings, median MPG with full rings under 28mm was >5 mmHg, with a smaller full ring size under 28mm being the primary contributor to elevated postoperative MPG [26]. Hiraoka et al. delineated that the MPG and MVA achieved with a partial band were superior to those attained with a full ring in patients with smaller annuloplasty devices <30 mm [29]. Their report indicated an MPG of 4.0 mmHg (ranging from 2.8 to 5.0 mmHg) and an MVA of 1.44 cm2 (ranging from 1.23 to 1.79 cm2) in patients with smaller full rings <30 mm. Another study also affirmed that the MPG and right ventricular systolic pressure, both at rest and during peak exercise, were more unfavorable with a complete ring in comparison to a partial band [30]. In their investigation, resting MPG exceeded >5mmHg in all patients with full rings < 30mm.

In this study, we used 30 mm or smaller-sized CGFB in 80% of patients, with a mean BSA of 1.58 m^2, and the mean of MPG and MVA even in 26 and 28 mm sized CGFB were 3.6 ± 1.3 mmHg and 3.4 ± 1.9 mmHg, and 2.3 and 2.4 ± 0.6 cm^2 and 2.3 ± 0.5 cm^2, respectively, with a satisfactory postoperative NYHA functional status. These results clarified that acceptable hemodynamic performance is an important advantage of CGFB, especially in patients requiring a small annuloplasty device.