Peer Review File

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Reviewer A

The authors are congratulated on their successful initial early experiences of HeartCon LVAD implantation. Early results were promising, but the final equality with or superiority over the other devices will be known by showing at least 5-year survival. The reviewer has several comments and questions.

1. The authors combined left ventricular cryoablation in 2 cases, however, one of the most common reasons for unplanned readmission was malignant arrhythmia. were these arrhythmias seen in these 2 patients, or were more patients complicated with arrhythmias? If so, did the authors have any idea to reduce the readmission rate due to malignant arrhythmia?

Reply: We thank the reviewers for pointing out this problem. Unplanned readmissions due to arrhythmias did not occur in these 2 patients; there were other patients with comorbid arrhythmias, and, in fact, readmissions for malignant arrhythmias did occur in some of these patients because of the early inexperience in recognizing such conditions. As our practice progressed, we realized that the arrhythmias were actually secondary to intrinsic myocardial pathology rather than heart failure, and that the implantation of LVADs improved the heart failure situation but did not solve the problem at all. Therefore, we currently perform a comprehensive preoperative electrophysiologic evaluation of each patient ready for LVAD implantation, and if arrhythmia risk is identified and indications for treatment are present, we perform an ablation procedure concurrently with the procedure. In addition to the patients included in this study, we have subsequently performed 16 LVAD implantations, and no patient has had a recurrence of postprocedural malignant arrhythmia on follow-up, and experience in this area is being summarized. Therefore, we believe that this solution is effective.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

2. Warfarin control seemed to be based on the patient's metabolism genotype. Did the authors' group check the warfarin metabolism genotype in all patients?

Reply: We thank the reviewers for raising this issue. All patients were tested for warfarin drug metabolism genotype, and we will calculate the initial dosage (loading dose) based on warfarin metabolism genotype. The warfarin dosage will be adjusted according to the INR of the patients in the follow-up treatment to maintain a good anticoagulation effect.

Changes in the text: We have made the suggested changes (page 7, line 140-147). Within 24 hours of postoperative transfer to the ICU, if the drainage is continuously less than 0.5 ml/kg/h for 3 hours, initiate heparin with a loading dose of warfarin sodium (the loading dose is usually 1.5-2 times the maintenance dose predicted by genetic testing, adjusted individually, with a maximal loading dose of 6 mg), and APTT is maintained for 40-50 s. On postoperative days 1-2, continue to Intravenous heparin, target APTT was adjusted to 50-60s, while oral maintenance dose of warfarin sodium was given (target INR 2.0-2.5), and heparin was discontinued when INR reached 2.0. Inadequate anticoagulation was defined as an INR of <1.8 at two-week intervals. All patients were tested for warfarin drug metabolism genotype.

3. The authors experienced 2 cases of BTR. Please show the type and dose of anti-heart failure medication, which were administered to these patients.

Reply: Thank you to the reviewers for raising this issue. First case: sacubitril valsartan 150 mg bid; bisoprolol 1.25 mg qd; spironolactone 20 mg, qd; viliciclovir 10 mg, qd; mexiletine 100 mg, tid ; torasemide 5 mg, qod; potassium chloride 1 g, qd. Second case: spironolactone 10 mg qd; mexiletine 100 mg bid; sacubitril valsartan 200 mg bid; benidipine 2mg bid; betalactam 6.25mg bid.

In addition, in addition to the routine early use of the above combination of therapeutic agents, we adjusted the LVAD pump parameters from 2 weeks postoperatively to try to achieve the optimal (minimum) unloading, so as to allow the heart to be fully exercised without overstressing it, and to obtain the opportunity for cardiac reverse remodeling.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

Reviewer B

The present manuscript evaluates in a 2 years-long follow-up a relatively new LVAD device of Chinese production, the HeartCon≠type by ROCOR Medical Technology Co. Ltd., on a relatively small population of 36 subjects of both sex with severe HF, scheduled for LVAD implant.

The results are interesting, but several points require the attention of the authors for being clarified or better detailed, as the study is not publishable in the present version.

• Short-term (90days) effect of HeartCon≠type LVAD has been previously investigated by n TEDA International Cardiovascular Hospital researchers on a smaller population (20 individuals; DOI: 10.3760/cma.j.cn121430-20220106-00015) and in a more extended Chinese

experience (doi: 10.59958/hsf.7445; including 27 cases in TEDA International Cardiovascular Hospital with Ethic Committee approval in 2019). The present Study possibly represents an extension of the previous ones, including more patients and long-term outcomes. Data on long-term follow-up are crucial to establish the usefulness of devices. The authors should precise whether the population is including the already studied patients or not and how many new individuals. have been enrolled to ensure no overlap in short-term data. If this study is part of a CT should be stated.

Reply: Thank you to the reviewers for pointing this out. As you mentioned, the previous studies included data from September 2020-August 2021 and September 2020-March 2023, respectively, with a short-term 90-day follow-up. The present study is an extension of the two previous studies by further including data from March 2023-November 2023, adding 9 new patients, and increasing the follow-up time points to 6 months, 1 year, and 2 years, with the aim of conducting further follow-up studies on the mid- and long-term conditions of patients after LVAD.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

• Patient' data are not divided based on sex: If no gender-related difference are found this should be stated. If any difference is present, it should be either written in the text or added in Table by structuring tables in 3 columns: total, males, females.

Reply: Thank you to the reviewers for raising this issue, no gender-related parameter or prognostic difference was found in this study, so it was not mentioned, thank you.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

• In the Methods, the incomplete FU and loss to FU are indicated as excluding criteria: please specify what does it means. I may suppose that incomplete FU refers to patients that will not attend to all FU visits but not because of negative outcomes. Moreover, the paper with DOI: 10.1056/NEJMoa1900486 is here indicated as reference: this ref concerns the MOMENTUM 3 C, where no analogous criteria were indicated. Please, clarify.

Reply: Thank you to the reviewer for the question. As you stated, incomplete follow-up refers to failure to attend all follow-up exams for a variety of reasons, not an adverse outcome. Also the reference in this article does not cite this article (DOI:10.1056/NEJMoa1900486).

Changes in the text: Not involved. The 36 patients included in this study are all those who have successfully undergone LVAD implantation. There were no patients who were lost to follow-up. To avoid any unnecessary misunderstandings, the relevant content regarding the criteria for loss to follow-up in the article has been deleted. Thank you.

• In the Methods the previous ref.(s) from the same hospital concerning the surgical procedure adopted for implant of HeartCon≠type, and eventually the international guidelines for LVAD implant should be cited for patients' inclusion instead of those indicated please reconsider carefully if applicable.

Reply: Since all previously published articles in our organization are in Chinese, direct quotations cannot be made. This article is a retrospective observational study. All patients who successfully completed LVAD implantation with follow-up data will be included. To avoid ambiguity, the expressions in the data collection section of the original article have been modified.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

• At Line 124 "Failure of sterile implanted components including pump thrombosis, pump replacement and percutaneoud lead breakage" is lightly incorrect as pump thrombois is not a decvice failure but a negative event occurring in. patient and related to its blood activation, please rephrase.

Reply: We thank the reviewer for raising this issue, which should have read "pump failure due to thrombosis", and we have corrected it in the text.

Changes in the text: We have made the suggested changes (page 7, line 148). " Failures of sterile implanted components, including pump failure due to thrombosis, pump replacement, and percutaneous lead breakage "

• At Line 128 "Refer to the INTERMACS database for statistics and calculation" I suppose that authors would like to state that they use the INTERMACS engine for performing statistical analyses: please rephrase and add the website https://intermacs.kirso.net into the text as site to refer to.

Reply: Thank you to the reviewers for raising this issue. We have corrected it here in the text and added a reference to the website.

Changes in the text: We have made the suggested changes (page 8, line 154). "The statistical data and incidence calculation results of postoperative complications were analyzed using the INTERMACS engine (https://intermacs.kirso.net). The main complications included bleeding, infection, right heart failure and neurological complications."

• HTx is indicated as survival and only one patient undergo it: the outcome description is missing of the FU time point when HTx was done and LVAD removed as well as of that of the 5 deaths: please add information, specifying causes of deaths if available.

Reply: We thank the reviewers for raising this issue. The time point of death and cause of death have been added to the text.

Changes in the text: We have made the suggested changes (page 10, line 201). "The pump removal times were on the 403 days and the 719 days after the surgery. The time of death for the 5 patients was 23 days, 93 days, 159 days, 598 days and 769 days after the surgery."

• In Table 1 the aetiology is missing (coronary artery disease, cardiomyopathy, other?) as well it is not specified whether AMI are the recent event leading to worsening of the HF conditions or are previous events. NYHA class I and II are usually not associated to LVAD implant, thus could be deleted from the table.

Reply: We thank the reviewers for raising this issue. The predominant etiology of the patients included in this study was dilated cardiomyopathy (88.9%), followed by ischemic cardiomyopathy (2.8%) and other types of lesions (hypertrophic nonobstructive cardiomyopathy, congenital myocardial insufficiency of densification) (8.3%). Infarction was a previous event and has been labeled in Table 1. In addition, NYHA classifications I and II have been removed from Table 1 as requested.

Changes in the text: We have revised Table 1 as suggested.

• In Table. 2, describing the different types and timing of adverse events, it is evident that bleedings (GIB and others) occur within 90days, while haemorrhagic strokes (which are to ascribe to the bleeding category thus to move up in the Table) within 180 days. This point deserves to be discussed. In addition, infections were not occurring during FU but only post-operatively, within 90 days while thrombosis occurs later: this needs discussion. The occurrence of RV dysfunction and de novo arrythmias also is interesting and should be possibly explained or contextualized in the specific cases.

Reply: Thank you to the reviewers for raising this issue. Three patients with right heart failure, preoperative severe left heart failure combined with right heart insufficiency. Four patients with new-onset arrhythmias, including one patient with preoperative combined hypothyroidism taking oral levothyroxine tablets for a long period of time, postoperatively due to inappropriate increase in the dose, which led to an increase in heart rate and induced ventricular tachycardia. One patient with preoperative diagnosis of dilated cardiomyopathy, sustained ventricular tachycardia and ventricular fibrillation occurred in the postoperative period of 366-730 d. It is considered to be related to the progression of the primary disease. Two patients with severe total heart failure, poor postoperative recovery, the presence of multiple proarrhythmic factors such as infection, internal environmental disorders, and the application of positive inotropic drugs.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

• Comparing Table 2 with Table 3 it is not clear how it is possible that 4 patients were re-admitted to the hospital for drive-line infection (Table 3) if the total of this type of infection was1 with 1 event in the total of 2 years FU (Table 2). Moreover, the term "Malignant arrhythmias" has no correspondence in Table 2, where "new arrhythmias after implant" were listed. Please also specify if the pump suction alarm and the deactivation were in the same patient or not. Define substandard anticoagulation levels, please.

Reply: We thank the reviewers for raising this issue. In Table 2, the data on wire infection were missing due to an omission by the authors during the writing process, and they have been completed according to the original data. In addition, the phrase "new arrhythmia after implantation" in Table 2 has been changed to "malignant arrhythmia" as requested. Pump alarms and deactivations occurred in one patient. Inadequate anticoagulation was defined as an INR of <1.8 at two-week intervals.

Changes in the text: We have made the suggested changes (page 8, lines 145-146). "Inadequate anticoagulation was defined as an INR of <1.8 at two-week intervals."

• Globally the results are very synthetic (34 lines), the Discussion is long (126 lines). However a comparative paragraph between HeartCon≠type and other LVADs (either HM3 or domestic ones) is missing, excepted for comparison with HVAD, which is obsolete, being this device dismissed. Interestingly, a multicentre trial using Chinese LVAD is mentioned but the citation ref is missing and the comparison with the present study poor.

Reply: We thank the reviewers for raising this issue. We have also noticed this problem and have made corrections and additions at appropriate places in the text. In addition, the domestic multicenter trial mentioned in the article had not yet been systematically summarized and published in an SCI article at the time of our submission, and therefore could not be directly cited at the time of submission.

Changes in the text: We have made the suggested changes (page 11, lines 226-233; page 12, lines 254-277). **The following content has been deleted:** According to the 2023 INTERMACS Annual Report (3), 2,517 LVADs were implanted in 2022, of which 2,512 (99.8%) were third-generation fully magnetically-levitated LVADs. Patients supported by fully magnetically-levitated LVADs exhibited higher one-year (86% vs. 79% and 81%) and five-year (64% vs. 44% and 44%) survival rates compared to those with non-magnetically-levitated devices in the same and previous eras. A recent comparative study demonstrated that after propensity score matching to minimize confounding variables (4), there was no longer a significant difference in the 3-year survival rate between the 185 patients implanted with HeartMate III, a third-generation LVAD, and the 196 cardiac transplant recipients (83.7% vs. 87.0%, P = 0.91; RR = 1.00, 95% CI = 0.45- 2.20). **The following contents have been added:** The large-scale multicenter RCTs such as MOMENTUM 3 (with more than 1,000 patients and long-term follow-up) have demonstrated the outstanding safety and efficacy of HeartMate Ⅲ in both bridge to transplantation (BTT) and DT indications. In 2017, it was approved for pre-transplantation auxiliary support treatment, and in 2018, it was approved for permanent replacement therapy. HeartMate 3 employs a completely contactless suspension technology. HeartCon utilizes blood or a very thin lubricating fluid layer to provide additional fluid dynamic pressure for stable support. Both perform exceptionally well in terms of blood cell damage, but the principles are slightly different. The size and weight of HeartCon-type LVAD have limited its application potential in patients with small body sizes (especially those with small thoracic cavities or children). In contrast, HeartMate 3 is applicable to a wider range of patients. Therefore, we are currently developing the second-generation small-sized HeartCon-type LVAD, and it is about to be applied in clinical practice.When comparing the data of this study with other types of LAVD studies worldwide, some differences were found. Our patients were relatively younger, mainly due to the fact that HeartCon-type LVAD is one of the earliest devices on the Chinese market. We first needed to observe its feasibility and safety, so we selected young patients with severe heart diseases but relatively normal organ functions. Secondly, our cohort mainly consisted of patients who had undergone surgery and those awaiting transplantation. The proportion of non-ischemic causes was higher, including 88.9% of dilated cardiomyopathy and 8.3% of other types of heart diseases (such as hypertrophic non-obstructive cardiomyopathy and congenital myocardial hypoplasia, etc.). This is consistent with the higher prevalence of non-ischemic causes in transplant patients in China, as most ischemic cardiomyopathy patients still prefer coronary artery bypass grafting as the treatment of choice. Moreover, due to the fact that this new technology of left ventricular assist device is still in the early stage of application in China, most patients have a low acceptance of this new technology, resulting in difficulties in recruitment and a smaller number of included cases than other large international studies.

• Discussion should be revised by summarizing the general information about LVAD history (for example by deleting statements on 2nd generation device and on HM3 vs. HTx that does not apply to this study_ see lines 198-206).

Reply: We thank the reviewers for raising this issue. The relevant content has been deleted and revised.

Changes in the text: We have made the suggested deletions (page 11, lines 226-233). "According to the 2023 INTERMACS Annual Report (3), 2,517 LVADs were implanted in 2022, of which 2,512 (99.8%) were third-generation fully magnetically-levitated LVADs. Patients supported by fully magnetically-levitated LVADs exhibited higher one-year (86% vs. 79% and 81%) and five-year (64% vs. 44% and 44%) survival rates compared to those with non-magnetically-levitated devices in the same and previous eras. A recent comparative study demonstrated that after propensity score matching to minimize confounding variables (4), there was no longer a significant difference in the 3-year survival rate between the 185 patients implanted with HeartMate III, a third-generation LVAD, and the 196 cardiac transplant recipients (83.7% vs. 87.0%, P = 0.91; RR = 1.00, 95% CI = 0.45- 2.20)."

• Technical details on the HeartCon≠type and implant surgery have already been presented in https://doi.org/10.59958/hsf.7445 and can be resumed.

Reply: Thank you to the reviewer for raising this issue, a citation has been added.

Changes in the text: Supplement has been completed.

• Eventual advantages (or disadvantages) of HeartCon≠type over the competitors in terms of patient' outcomes in FU should be added to the discussion.

Reply: We thank the reviewers for raising this issue. We have revised and added to the text.

Changes in the text: We have added as suggested (page 12, lines 254-277). "The large-scale multicenter RCTs such as MOMENTUM 3 (with more than 1,000 patients and long-term follow-up) have demonstrated the outstanding safety and efficacy of HeartMate Ⅲ in both bridge to transplantation (BTT) and DT indications. In 2017, it was approved for pre-transplantation auxiliary support treatment, and in 2018, it was approved for permanent replacement therapy. HeartMate 3 employs a completely contactless suspension technology. HeartCon utilizes blood or a very thin lubricating fluid layer to provide additional fluid dynamic pressure for stable support. Both perform exceptionally well in terms of blood cell damage, but the principles are slightly different. The size and weight of HeartCon-type LVAD have limited its application potential in patients with small body sizes (especially those with small thoracic cavities or children). In contrast, HeartMate 3 is applicable to a wider range of patients. Therefore, we are currently developing the second-generation small-sized HeartCon-type LVAD, and it is about to be applied in clinical practice.When comparing the data of this study with other types of LAVD studies worldwide, some differences were found. Our patients were relatively younger, mainly due to the fact that HeartCon-type LVAD is one of the earliest devices on the Chinese market. We first needed to observe its feasibility and safety, so we selected young patients with severe heart diseases but relatively normal organ functions. Secondly, our cohort mainly consisted of patients who had undergone surgery and those awaiting transplantation. The proportion of non-ischemic causes was higher, including 88.9% of dilated cardiomyopathy and 8.3% of other types of heart diseases (such as hypertrophic non-obstructive cardiomyopathy and congenital myocardial hypoplasia, etc.). This is consistent with the higher prevalence of non-ischemic causes in transplant patients in China, as most ischemic cardiomyopathy patients still prefer coronary artery bypass grafting as the treatment of choice. Moreover, due to the fact that this new technology of left ventricular assist device is still in the early stage of application in China, most patients have a low acceptance of this new technology, resulting in difficulties in recruitment and a smaller number of included cases than other large international studies."

• The style of the last part of the discussion (lines 258-303) is reminiscent of a review and does not refer to the results obtained in the present study: please reconsider carefully.

Reply: We thank the reviewers for raising this issue. We have revised and added to the text.

Changes in the text: We have added as suggested (page 12, lines 254-277). "The large-scale multicenter RCTs such as MOMENTUM 3 (with more than 1,000 patients and long-term follow-up) have demonstrated the outstanding safety and efficacy of HeartMate Ⅲ in both bridge to transplantation (BTT) and DT indications. In 2017, it was approved for pre-transplantation auxiliary support treatment, and in 2018, it was approved for permanent replacement therapy. HeartMate 3 employs a completely contactless suspension technology. HeartCon utilizes blood or a very thin lubricating fluid layer to provide additional fluid dynamic pressure for stable support. Both perform exceptionally well in terms of blood cell damage, but the principles are slightly different. The size and weight of HeartCon-type LVAD have limited its application potential in patients with small body sizes (especially those with small thoracic cavities or children). In contrast, HeartMate 3 is applicable to a wider range of patients. Therefore, we are currently developing the second-generation small-sized HeartCon-type LVAD, and it is about to be applied in clinical practice.When comparing the data of this study with other types of LAVD studies worldwide, some differences were found. Our patients were relatively younger, mainly due to the fact that HeartCon-type LVAD is one of the earliest devices on the Chinese market. We first needed to observe its feasibility and safety, so we selected young patients with severe heart diseases but relatively normal organ functions. Secondly, our cohort mainly consisted of patients who had undergone surgery and those awaiting transplantation. The proportion of non-ischemic causes was higher, including 88.9% of dilated cardiomyopathy and 8.3% of other types of heart diseases (such as hypertrophic non-obstructive cardiomyopathy and congenital myocardial hypoplasia, etc.). This is consistent with the higher prevalence of non-ischemic causes in transplant patients in China, as most ischemic cardiomyopathy patients still prefer coronary artery bypass grafting as the treatment of choice. Moreover, due to the fact that this new technology of left ventricular assist device is still in the early stage of application in China, most patients have a low acceptance of this new technology, resulting in difficulties in recruitment and a smaller number of included cases than other large international studies.”

Reviewer C

This is a small, single-center, retrospective study of the use of a singular LVAD device in adult patients with HF. This is an important topic, since many patients are supported with VADs prior to heart transplantation with improved organ function compared to those who receive medical therapy alone. Certainly, the case is made that this device has been successful in supporting HF patients, but I would avoid grand generalized statements with the small cohort.

I do find certain aspects of this hard to read due to awkward wording and frequent use of the passive voice. I wonder if this is due to translation by a non-native English speaker? I think it would be beneficial to have another individual help with the wording and construction of this manuscript.

Specific comments:

Abstract:

- LVAD should be defined prior to use of the acronym- "left ventricular assist device"

Reply: Thank you to the reviewers for raising this issue, which has been revised.

Changes in the text: We have made the suggested changes (page 2, line 23). “left ventricular assist device (LVAD)”

- I would spell out days rather than use "d" and the first number in a sentence should be spelled out rather than subsequent (i.e. ninety days, 6 months...)

Reply: Thank you to the reviewers for raising this issue, which has been revised.

Changes in the text: We have made the suggested changes (page 2, line 30). “Patient survival was calculated at 90 days, six 6 months, 1 year, and 2 years after LVAD implantation, respectively.”

- 28 survivals is not a correct term - it should say "28 patients were alive with continued pump support at follow up"

Reply: Thank you to the reviewers for raising this issue, which has been revised.

Changes in the text: We have made the suggested changes (page 2, line 36). “28 patients (28/36, 77.8%) were alive with continued pump support at follow up”

- What is a "definite satisfactory therapeutic effect"?

Reply: This refers to a high rate of postoperative survival and a low rate of serious adverse events.

Changes in the text: Not involved.

Intro:

- How much does the annual rate of transplants compare to other countries of similar size?

Reply: We thank the reviewers for raising this issue, and after reviewing the data, our annual heart transplantation rate is about 0.57-0.60 cases/million population.

Changes in the text: Not involved.

- Provide reference for the superiority of LVAD over medical therapy

Reply: We thank the reviewers for raising this issue and have included the relevant references at the appropriate places in the text.

Changes in the text: Not involved.

- Can you comment on how these devices may improve candidacy for transplant?

Reply: We thank the reviewers for raising this issue. We believe that improvements can be made in the following ways: (1) maintaining hemodynamic stability and prolonging survival during the transplant waiting period; (2) reversing contraindications to transplantation (e.g., pulmonary hypertension, end-organ failure); (3) optimizing the patient's physiological status (nutrition, exercise capacity); and (4) as a standardized strategy for “transition to transplantation,” the American AHA has classified LVADs as a class I indication for graft bridging. In short, implantation of an LVAD can alter the course of malignant heart failure and significantly improve pulmonary, hepatic, renal, and intestinal function.

Changes in the text: Not involved.

-Page 5 line 89 "until the end of..." should be "as of.."

Reply: Thank you to the reviewers for raising this issue, which has been revised.

Changes in the text: We have made the suggested changes (page 5, line 98). "In our cardiac center, 36 cases of HeartCon-type LVAD implantation had been completed as of November 2023"

- the sentence about international studies is not necessary.

Reply: Thank you to the reviewer for raising this issue, which has been removed.

Changes in the text: We have made the suggested changes (page 5, line 100). The following content has been deleted: Based on our knowledge and literature review, few international studies have investigated the treatment of ESHF patients using Chinese-made LVADs.

Methods:

- Sentence one does not make sense. Would say "Clinical data from x consecutive patients admitted to x hospital with ESHF and LVAD implantation between X were analyzed

Reply: Thank you to the reviewer for raising this issue, which has been revised.

Changes in the text: We have made the suggested changes (page 6, line 107). "This single-center, retrospective, observational study included all patients who underwent HeartCon-type LVAD implantation from the start of our program in September 15, 2020 to November 30, 2023."

-page 6, 118: Is gender usually an exclusion? IF not, would take this out.

Reply: Thank you to the reviewer for raising this issue, which has been revised.

Changes in the text: We have made the suggested changes (page 7, line 135). Since all patients who successfully underwent LVAD implantation were included in this study and no patients were excluded, the exclusion criteria section was deleted.

-page 6 line 120: How do you define renal dysfunction and RH failure

Reply: Thank you to the reviewers for raising this issue. Severe renal dysfunction is usually characterized by an eGFR <30 mL/min/1.73m² for more than 3 months; right heart failure should be judged by a combination of clinical manifestations and tests: jugular venous distension, hepatomegaly, lower limb edema, CVP >15 mmHg, CVP/PCWP ratio >0.6, RVEF<40%, right ventricular end-diastolic diameter (RVEDD) >4.5 cm, etc. (RVEDD) >4.5 cm, etc. In addition, given that this study was a retrospective observational study that included all patients who had successfully undergone surgery, the indications and contraindications for surgery here are not very relevant to this study and have been removed to avoid ambiguity.

Changes in the text: We have made the suggested changes (page 7, line 134). Since all patients who successfully underwent LVAD implantation were included in this study and no patients were excluded, the exclusion criteria section was deleted.

-page 7 124: what are pump related advese effects and how do these differ from 20 and 3)

Reply: We thank the reviewers for raising this issue. Adverse reactions related to the pump include (i) failure of sterile implanted components, including pump stoppage due to thrombus, pump replacement, and rupture of percutaneous leads; and (ii) failures of nonsterile active components, such as controller startup errors, monitor failures, and battery output failures.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

- Page 7 128: I would expand on adverse events and not make the reader refer to another reference

Reply: Thank you to the reviewer for raising this issue, which has been revised.

Changes in the text: We have made changes as suggested and as requested by another reviewer (page 7, line 154). "The statistical data and incidence calculation results of postoperative complications were analyzed using the INTERMACS engine (https://intermacs.kirso.net). The main complications included bleeding, infection, right heart failure and neurological complications."

Page 7, 135: Reword. Survival was defined as ..." "

Reply: Thank you to the reviewer for raising this issue, which has been revised.

Changes in the text: We have made the suggested changes (page 8, line 162). "Survival was defined as patients who were successfully bridged to HTx"

-Page 8 160: what kind of RVAD?

Reply: We thank the reviewers for raising this issue. Currently, there is no device specifically for right heart assistance in China, and we still use HeartCon type VAD, which is implanted into the patient's right ventricle.

Changes in the text: Not involved.

Outcomes:

-P9, 167: I though one of the primary end points was 90d, 6 mon, one year. This does not match the paper

Reply: Thank you to the reviewer for raising this issue, which has been revised.

Changes in the text: We have made the suggested changes (page 10, line 194). “The 90 days, 6 months, 1 year, and 2 years survival rates were 94%, 94%, 91%, and 91%, respectively”

- 168: is this median LVEDD and LVEF? need to specify

Reply: We thank the reviewers for raising this issue; the median is shown here and has been added to the text.

Changes in the text: We have made the suggested changes (page 10, line 198). “Additionally, the median of left ventricular ejection fraction (LVEF) improved from 25.2 ± 6.8% to 34.6 ± 8.4% ($t = -7.311$, $P < 0.01$)”

- When did the deaths occur? early post-op or after discharge?

Reply: We thank the reviewers for raising this issue; the five patients died on postoperative days 23, 93, 159, 598, and 769, respectively.

Changes in the text: We have made the suggested changes (page 10, line 201). “The pump removal times were on the 403 days and the 719 days after the surgery. The time of death for the 5 patients was 23 days, 93 days, 159 days, 598 days and 769 days after the surgery.”

Discussion:

- I would expand why you think the outcomes are better than other devices in the intermacs registry. It is important to note the limitation of small sample size and the impact of center surgical factors and post-op care. Were these patients less sick? What is the criteria for excluding a patient for VAD support? These all need to be expanded on in the limitations.

Reply: I thank the reviewers for raising this issue. This statement is indeed a bit too absolute and has been revised by reorganizing the language in the text and adding the relevant content to the limitations of this paper.

Changes in the text: We have made the suggested changes (page 11, line 218, page 17, line 351). “from a numerical perspective, its performance was not inferior to that of other devices” “There are some limitations in this study: First, the sample size of this study is relatively small, which needs to be further expanded; Secondly, the observation time is not long enough, and the long-term prognosis of postoperative patient needs to be further observed”.

-Page 13 250: Is there physiologic evidence to support this? Or is it postulated? If the former, need to expand and/or provide a reference.

Reply: We thank the reviewers for raising this issue. There are currently no international articles examining this, and this is a reasonable speculation based on the assumptions made in the previous paper.

Changes in the text: Not involved.

-Line 282: one you have defined DT, no need to spell it out again.

Reply: Thank you to the reviewer for raising this issue, which has been revised.

Changes in the text: We have made the suggested changes (page 16, line 331). We have removed duplicate content.

- I think the portion about center experience brings up some good points, but I think some references can be added here.

Reply: Thank you to the reviewer for raising this issue, which has been revised.

Changes in the text: We have made the suggested changes (page 12, line 255-278). “The large-scale multicenter RCTs such as MOMENTUM 3 (with more than 1,000 patients and long-term follow-up) have demonstrated the outstanding safety and efficacy of HeartMate Ⅲ in both bridge to transplantation (BTT) and DT indications. In 2017, it was approved for pre-transplantation auxiliary support treatment, and in 2018, it was approved for permanent replacement therapy. HeartMate 3 employs a completely contactless suspension technology. HeartCon utilizes blood or a very thin lubricating fluid layer to provide additional fluid dynamic pressure for stable support. Both perform exceptionally well in terms of blood cell damage, but the principles are slightly different. The size and weight of HeartCon-type LVAD have limited its application potential in patients with small body sizes (especially those with small thoracic cavities or children). In contrast, HeartMate 3 is applicable to a wider range of patients. Therefore, we are currently developing the second-generation small-sized HeartCon-type LVAD, and it is about to be applied in clinical practice.When comparing the data of this study with other types of LAVD studies worldwide, some differences were found. Our patients were relatively younger, mainly due to the fact that HeartCon-type LVAD is one of the earliest devices on the Chinese market. We first needed to observe its feasibility and safety, so we selected young patients with severe heart diseases but relatively normal organ functions. Secondly, our cohort mainly consisted of patients who had undergone surgery and those awaiting transplantation. The proportion of non-ischemic causes was higher, including 88.9% of dilated cardiomyopathy and 8.3% of other types of heart diseases (such as hypertrophic non-obstructive cardiomyopathy and congenital myocardial hypoplasia, etc.). This is consistent with the higher prevalence of non-ischemic causes in transplant patients in China, as most ischemic cardiomyopathy patients still prefer coronary artery bypass grafting as the treatment of choice. Moreover, due to the fact that this new technology of left ventricular assist device is still in the early stage of application in China, most patients have a low acceptance of this new technology, resulting in difficulties in recruitment and a smaller number of included cases than other large international studies."

Reviewer D

I thank the opportunity to review this original manuscript entitled "Survival prognosis and clinical experience of HeartCon-type left ventricular assist device implantation for treating patients with end-stage heart failure: a single-center retrospective study from China".

The authors presented the results of their clinical experience using the HeartCon, a Chinese-made LVAD, as a bridge to heart transplantation. The study included 36 consecutive subjects who were enrolled retrogradely and received a HeartCon between 2020 and 2023. The mean support duration was 620 days. The study's primary objective was to evaluate the safety of the device, including post-implantation complications and LVAD survival, at 4 time points up to 2 years. The results showed an excellent 2-year survival rate of 91% (five deaths), which may be attributed to the low rate of adverse events observed during that same period. The authors concluded that the HeartCon is an effective and safe treatment option for patients with end-stage heart failure, offering improved quality of life and potential long-term survival on the LVAD.

The timeliness of this manuscript is noteworthy, particularly given the scarcity of implantable LVADs in the current global market. However, while the results of this study are remarkable, its limitations (e.g., small sample size, retrospective design, single-center study, etc.) and the absence of a comprehensive comparative study may restrict its generalizability and relevance to all end-stage heart failure patients requiring device support. Nevertheless, the manuscript presents a subject of global interest, particularly within the LVAD community. To that end, the paper would benefit from more detailed comparisons with recently published results for other contemporary continuous-flow LVADs, especially the HeartMate 3. Furthermore, several sections of the manuscript require clarification and improvement. The authors may wish to consider the following comments.

1. The latter half of their discussion (from line 234 onwards) is redundant. Given the international scope of this journal and the study's primary objective, the authors should place greater emphasis on discussing the HeartCon's non-inferiority (or superiority) compared to other contemporary continuous-flow devices that are more commonly used on the international platform. If the authors wish to share their experiences and knowledge related to LVAD management, I would advise to only refer to them to support their explanation of the differences, if any, in device outcomes.

Reply: We thank the reviewers for raising this issue, and we believe that sharing experiences in LVAD management is one of the purposes of this paper, which is reflected in the title. We have also added a comparison with other LVAD devices as requested by the reviewers.

Changes in the text: We have made the suggested changes (page 12, line 255-278). "The large-scale multicenter RCTs such as MOMENTUM 3 (with more than 1,000 patients and long-term follow-up) have demonstrated the outstanding safety and efficacy of HeartMate Ⅲ in both bridge to transplantation (BTT) and DT indications. In 2017, it was approved for pre-transplantation auxiliary support treatment, and in 2018, it was approved for permanent replacement therapy. HeartMate 3 employs a completely contactless suspension technology. HeartCon utilizes blood or a very thin lubricating fluid layer to provide additional fluid dynamic pressure for stable support. Both perform exceptionally well in terms of blood cell damage, but the principles are slightly different. The size and weight of HeartCon-type LVAD have limited its application potential in patients with small body sizes (especially those with small thoracic cavities or children). In contrast, HeartMate 3 is applicable to a wider range of patients. Therefore, we are currently developing the second-generation small-sized HeartCon-type LVAD, and it is about to be applied in clinical practice.When comparing the data of this study with other types of LAVD studies worldwide, some differences were found. Our patients were relatively younger, mainly due to the fact that HeartCon-type LVAD is one of the earliest devices on the Chinese market. We first needed to observe its feasibility and safety, so we selected young patients with severe heart diseases but relatively normal organ functions. Secondly, our cohort mainly consisted of patients who had undergone surgery and those awaiting transplantation. The proportion of non-ischemic causes was higher, including 88.9% of dilated cardiomyopathy and 8.3% of other types of heart diseases (such as hypertrophic non-obstructive cardiomyopathy and congenital myocardial hypoplasia, etc.). This is consistent with the higher prevalence of non-ischemic causes in transplant patients in China, as most ischemic cardiomyopathy patients still prefer coronary artery bypass grafting as the treatment of choice. Moreover, due to the fact that this new technology of left ventricular assist device is still in the early stage of application in China, most patients have a low acceptance of this new technology, resulting in difficulties in recruitment and a smaller number of included cases than other large international studies."

2. What were the causes of death? Figure 3 shows that a number of patients died within 6 months of implantation. What were the characteristics of these patients?

Reply: Thank you to the reviewers for raising this issue. The causes of death in 5 individuals were circulatory failure, cerebral infarction, cerebral hemorrhage, and pump failure. Two patients died within 90, and the cause of death was circulatory failure in both cases.

Changes in the text: We have made the suggested changes (page 10, line 201). "The pump removal times were on the 403 days and the 719 days after the surgery. The time of death for the 5 patients was 23 days, 93 days, 159 days, 598 days and 769 days after the surgery."

3. How was the number of events per patient-year calculated? What was the total cumulative number of days on LVAD support for this group? Also, please include the incidence rate of readmission due to adverse events per patient-year in Table 2.

Reply: Thank you to the reviewers for raising this issue. Calculations need to be made using the total number of events/(person×year). The cumulative total number of days the group received LVAD support was 22,330. Information related to readmission has been presented in Table 3.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

4. The authors noted that malignant arrhythmia was one of the two most common causes of unplanned readmission, a result that is not typically observed in most other series. Were these patients treated for intractable VF/VT before LVAD implantation? Of the 36 HeartCon patients, how many had VF/VT prior to the implantation? What is the authors' opinion on the cause of post-implant VF/VT in their cohort? Given a similar incidence of pump-related readmission as shown in Table 3, could the high incidence of arrhythmia be related to impaired or inadequately optimized LVAD performance?

Reply: We thank the reviewers for raising this issue. The high incidence of arrhythmias was not associated with impaired and insufficiently optimized LVAD performance. Remote blood pump parameters were reviewed regularly in all postoperative patients, and there were no abnormalities in blood pump operating parameters before arrhythmia development. Patients were regularly followed up to assess blood pump offloading and to optimize blood pump offloading, and arrhythmia occurrence was considered to be related to the patient's primary disease and not to inadequate offloading. In fact, some patients did experience readmission for malignant arrhythmias due to early inexperience in recognizing such conditions. As practice continued, we realized that the arrhythmias were actually secondary changes due to the patient's myocardial pathology and not due to heart failure, and that LVAD implantation did not solve this problem. Therefore, we currently perform a preoperative electrophysiologic evaluation of each patient with an LVAD, and if an arrhythmia risk is identified, we perform a concomitant intraoperative ablation procedure. In addition to the patients included in this study, we subsequently performed 16 LVAD implantations, and none of the patients experienced further postoperative malignant arrhythmias. Therefore, we believe that this solution is effective.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

5. How were patients optimized in terms of LVAD pump speed and medication after implantation? Given the remarkable survival rate shown in this study, it would be helpful if the authors could provide a brief description of their optimization protocols.

Reply: Thank you to the reviewers for raising this issue. Pump rate optimization is a continuous dynamic process, with ultrasound at the core, multi-team collaboration and patient education to achieve optimal hemodynamic status. The main optimization protocols:

(1) Unloading was assessed daily at 1 week postoperatively and weekly at 1 month postoperatively. Outpatient follow-up at 3 and 6 months postoperatively and every 6 months thereafter. Unloading was assessed at the follow-up visit.

(2) Clinical assessment: clinical symptoms, blood pressure (including pulse pressure), 6-minute walk test, body weight and body water (body composition examination)

(3) Laboratory indicators: BNP/NT-proBNP

(4) Ultrasound indicators: LVEDD narrowing, LVEF elevation, septal position maintained midline or slightly rightward, aortic valve opening (1 opening per 3-5 heartbeats), mitral regurgitation: significantly reduced or only mildly.

(5) Consider downward adjustment of pump speed if clinical symptoms and exercise tolerance continue to improve, pulse pressure difference increases and LVEDD decreases and aortic valve opening frequency increases and BNP/NT-proBNP decreases.

(6) Adjustment: 100 rpm at a time.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

6. Please show the data for pre-implant valve insufficiency for each valve (aortic, mitral, and tricuspid) in Table 1. How did the patients' valve insufficiency status change after implantation and particularly after optimization?

Reply: We thank the reviewers for raising this issue. In this study, we did not follow up and compare the valve function of the patients, and we will further improve it in the future long-term follow-up.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

7. The authors indicated that the upper limit of PTINR was set to 2.5. What was the lower limit of PTINR? Were there any exceptions?

Reply: Thank you to the reviewers for raising this issue. The lower limit of INR is 2.0. Currently, the international standard for INR is usually set at 2.0-3.0. However, with the deepening of our research and experience, as well as discussions with Chinese and Japanese experts, we found that setting the INR at 2.0-2.5 seems to be more appropriate for Asians, and the risk of hemorrhage and thrombosis is greatly reduced. Bleeding and thrombosis are greatly reduced. Exceptions: (1) In the presence of malignant fluid, significant deterioration of liver function after surgery, and progressive decline of platelet count $<50\times10^9$/L, a lower level of anticoagulation (INR 1.8-2.0) was adopted, and then adjusted according to the recovery situation. (2) Left anterior thoracotomy was adjusted to an INR of 2.5-2.8 because of the increased risk of supravalvular thrombosis due to the "silent zone" on the aortic valve.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

8. In lines 160-164, were the RVAD placement, mitral/tricuspid valvuloplasties, AVRs, left atrial closures, and cryoablations performed concomitantly with LVAD implantation or separately from implantation? Please clarify.

Reply: We thank the reviewers for raising this issue; the RVAD implantation was performed in the perioperative period, and all others were performed at the same time as the LVAD implantation.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

9. Please provide a flowchart showing the total number of participants initially enrolled (i.e., patients implanted with a HeartCon device between 2020 and 2023), as well as the number excluded due to the study's inclusion/exclusion criteria. In the Methods section, please

mention the total number of LVADs implanted during the same period, including those from other brands. Including these data could strengthen the credibility of a single-center study.

Reply: Thank you to the reviewers for asking this question. This is a retrospective observational study, all patients who successfully completed the procedure and were followed up on time were included and there were no excluded patients. The total number of patients implanted with the HeartCon device from 2020/9/15 to 2023/11/30 was 36. The number of people excluded due to inclusion/exclusion criteria requires medical clarification and no other brands of LVADs were implanted during the same period.

Changes in the text: We have made the suggested changes (page 6, line107). "This single-center, retrospective, observational study included all patients who underwent HeartCon-type LVAD implantation from the start of our program in September 15, 2020 to November 30, 2023."

10. A reference is required for the information regarding the prospective, multicenter trial using HeartCon (lines 83-86).

Reply: We thank the reviewers for raising this issue. The relevant multicenter study has only been published in Chinese, and there are no SCI articles yet, so we are unable to cite it for the time being.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

11. "from China" may be unnecessary in the title. Please consider omitting.

Reply: We thank the reviewers for raising this issue, and we believe that research in the field of LVAD in China is still in its infancy, and there are fewer relevant studies and experiences, and this article is the first international follow-up study of HeartCon type LVAD, so we suggest to keep "from China".

Changes in the text: Not involved.

12. Do not abbreviate "d" for days in the abstract or main text. If it needs to be used, it should be defined at first mention. Additionally, some abbreviations (e.g., BMI) may be unnecessary as they only appear once.

Reply: Thank you to the reviewers for their questions. Revised.

Changes in the text: We have made the suggested changes (page 2, line 30). “Patient survival was calculated at 90 days, 6 months, 1 year, and 2 years after LVAD implantation”

Reviewer E

In this article, the authors describe their single center experience with a Chinese domestically produced LVAD. The authors demonstrate a 2 years survival comparable to the INTERMACS registry, with a reported low rate of complications. I believe the results are relevant, however I think the introduction and discussion should be rewritten to improve the manuscript.

1. The introduction is too long, reviewing many aspects of LVAD therapy that are not necessarily needed in this article. I believe everyone reading an article about a new LVAD has the background about indications, survival, and others. Also part of the data in the introduction is present also in the discussion, and the text should me more concise. Probably the main point for the introduction is the financial limitation of this therapy out of the United States and Europe, and in this context a new device is very interesting. So I think the introduction should focus on the need for new devices and the background about the use of HeartCon-type magnetic liquid suspension LVAD and the already published multicentric study.

Reply: The reviewers are thanked for their questions. The introduction section has been redacted.

Changes in the text: We have made the suggested changes (page 4, line 63). The following content has been deleted: “In China, the prevalence and mortality of HF have also been increasing. The standardized prevalence rate is 1.1%, translating to an estimated 12.1 million HF patients aged ⩾ 25 years and 3 million new cases annually.”

2. About the inclusion and exclusion criteria: did the authors exclude patients based on left ventricular ejection fraction or based on LV and diastolic diameter? This should be stated. What criteria were used to define right ventricular failure as an exclusion criteria?

Reply: We thank the reviewers for asking this question. This is a retrospective observational study and all patients who successfully completed the surgery and followed up on time will be included, so the screening and exclusion criteria for the surgery are not the inclusion and exclusion criteria for this study. Regarding the inclusion and exclusion criteria for patients undergoing surgery for LVAD, we have a complex and standardized evaluation system with more content, which has not been listed yet because it is not included in the study and discussion of this paper. We can provide it if needed.

Right heart failure definition criteria: expected need for right ventricular assist device (RVAD) support or extracorporeal membrane pulmonary oxygenation (ECMO) or use of multiple positive inotropic medications at the time of the screening group with a right atrial pressure > 20 mmHg, a right ventricular ejection fraction (RVEF) of < 15% or the presence of lower extremity edema, ascites, or pleural effusion that is difficult to treat with diuretics and two positive inotropic medications.

Changes in the text: We have already addressed this issue in reply. Since this question was raised by the reviewer and does not require any additional information to be provided in the text, there is no need for further explanation.

3. In the evaluation of post operative adverse events, I suggest including the reference for post operative complications.

Reply: Thank you to the reviewers for their questions. Relevant citations have been added.

Changes in the text: We have made the suggested changes (page 8, line 161).

4. How was the anticoagulation protocol? This is all in the discussion, and I believe the authors should state in the methods the protocol for anticoagulation and explain if there is any difference from other devices in market.

Reply: We thank the reviewers for raising this issue. Postoperative anticoagulation strategy: at the beginning of the clinical trial, the ISHLT anticoagulation strategy was referenced: aspirin (100 mg/d) was initiated within 24 hours of transfer to the ICU, intravenous heparin anticoagulation was initiated on postoperative days 1-2, and if there was no evidence of hemorrhage, activated partial thromboplastin time (APTT) was set at 40-60 s. On days 2-3, oral warfarin sodium therapy was initiated (target INR of 2.0-3.0), while continuing intravenous heparin anticoagulation. time (APTT) was set at 40-60 s. Oral warfarin sodium therapy was started on days 2-3 (target INR of 2.0-3.0) while heparin was continued (target APTT adjusted to 60-80 s). Since November 2020 due to intracranial hemorrhage in 1 patient (36 days postoperatively), aspirin was discontinued and the APTT target was adjusted. The adjusted postoperative anticoagulation strategy was as follows: within 24 hours of postoperative transfer to the ICU, heparin was initiated if drainage was ⩽ 0.5 ml/kg/1/h for 3 consecutive hours and APTT was maintained for 40-50 s. On postoperative days 1-2, intravenous heparin was continued and the target APTT was adjusted to 50-60 s. Oral warfarin sodium was given (target INR 2.0-2.5). Heparin was discontinued when INR reached 2.0.

Changes in the text: We have made the suggested changes (page 7, line 139-145). "Anticoagulation program: Within 24 hours of postoperative transfer to the ICU, if the drainage is continuously less than 0.5 ml/kg/h for 3 hours, initiate heparin with a loading dose of warfarin sodium (the loading dose is usually 1.5-2 times the maintenance dose predicted by genetic testing, adjusted individually, with a maximal loading dose of 6 mg), and APTT is maintained for 40-50 s. On postoperative days 1-2, continue to Intravenous heparin, target APTT was adjusted to 50-60s, while oral maintenance dose of warfarin sodium was given (target INR 2.0-2.5), and heparin was discontinued when INR reached 2.0. Inadequate anticoagulation was defined as an INR of <1.8 at two-week intervals. All patients were tested for warfarin drug metabolism genotype."

5. Statistical analysis: considering the reduced number of patients, possibly the distribution of data in non-normal, so please state if the distribution is normal to use mean +- SD, or if data is does not have a normal distribution, modify the data to medians and interquartile ranges and the best statistical test for this type of data.

Reply: The reviewers are thanked for their questions. The data in the text has been checked.

Changes in the text: Not involved.

6. About the follow up: implants were performed between September 15, 2020, and November 30, 2023 according to the study subjects session. So patients who had LVAD implanted after may 2023 do not have 2 years of follow-up. I would like the authors to specify until when the implants were performed, and then it would be clear for us if 2-year survival data are available from all patients.

Reply: We thank the reviewers for their questions. The follow-up time was up to November, 2023.The patients were followed up from 2020.9 to 2023.9. These 36 patients were operated on from 2020.9-2023.9. Twenty-four patients met the follow-up time of more than 2 years, 3 patients met the follow-up time of more than 1 year, 3 patients met the follow-up time of more than 6 months, and 4 patients met the follow-up time of more than 3 months.

Changes in the text: We have made the suggested changes (page 6, line 117-119). "Twenty-four patients met the follow-up time of more than 2 years, 3 patients met the follow-up time of more than 1 year, 3 patients met the follow-up time of more than 6 months, and 4 patients met the follow-up time of more than 3 months."

7. In Outcomes, I think it is interesting to highlight the causes of death of the 5 patients who died using HeartCon-type LVAD.

Reply: Thank you to the reviewers for their questions. The causes of death in 5 individuals were circulatory failure, cerebral infarction, cerebral hemorrhage, and pump failure. Two patients died within 90, and the cause of death was circulatory failure in both cases.

Changes in the text: We have made the suggested changes (page 10, line 202). "The pump removal times were on the 403 days and the 719 days after the surgery. The time of death for the 5 patients was 23 days, 93 days, 159 days, 598 days and 769 days after the surgery."

8. In the baseline table, I believe it would be appropriate to state the baseline pulmonary artery pressure and right atrial pressure along with PCWP and MAP.

Reply: We thank the reviewers for their questions. PCWP and MAP have been listed in Table 1. We did not collect data on baseline pulmonary artery pressure and right atrial pressure, which will be further enriched in future large-sample studies, thank you.

Changes in the text: Not involved.

9. I find curious the low incidence of ischemic heart failure. Is there any reason these population was not enrolled or in this center the proportion of ischemic cardiomyopathy is low?

Reply: I thank the reviewers for their questions. It is true that the vast majority of patients included were dilated cardiomyopathies, and the majority of patients undergoing LVAD in China still have predominantly nonischemic cardiomyopathies, as is the case in our center.

Changes in the text: Not involved.

discussion:

10. I believe it is a promising device, however I think the authors exaggerated saying "outperforming other devices as reported in recent INTERMACS data just from a numerical perspective" based in 36 patients. It is a good result, but one can not say the device "ouperformed" others with thounds of implants all over the worlds. And these results have all the limitations of a single center retrospective study.

Reply: Thank you to the reviewers for their questions. The statements in the corresponding parts of the text have been revised.

Changes in the text: We have made the suggested changes (page 11, line 217). "from a numerical perspective, its performance was not inferior to that of other devices"

11. It is also important to point out the thrombosis events (not common with HM3).

Reply: We thank the reviewers for their questions. This may be related to the lack of experience with anticoagulation at the beginning of the trial.

Changes in the text: Not involved.

12. I suggest to describe the anticoagulaiton protocol and blood pressure control in the methods session. The authors also write a long paragraph about ventricular arrythmias and their management in the literature, but this is not something about the article.

Reply: We thank the reviewers for raising this issue. Because of the high incidence of postoperative arrhythmias in the patients included in this study, this is discussed in the text.

Changes in the text: We have made the suggested changes (page 7, line 139-145). "Anticoagulation program: Within 24 hours of postoperative transfer to the ICU, if the drainage is continuously less than 0.5 ml/kg/h for 3 hours, initiate heparin with a loading dose of warfarin sodium (the loading dose is usually 1.5-2 times the maintenance dose predicted by genetic testing, adjusted individually, with a maximal loading dose of 6 mg), and APTT is maintained for 40-50 s. On postoperative days 1-2, continue to Intravenous heparin, target APTT was adjusted to 50-60s, while oral maintenance dose of warfarin sodium was given (target INR 2.0-2.5), and heparin was discontinued when INR reached 2.0. Inadequate anticoagulation was defined as an INR of <1.8 at two-week intervals. All patients were tested for warfarin drug metabolism genotype."

13. The discussion should be about the authors' findings and what they differ from what is known from other devices: strokes, thombosis, bleedings and others. Why this is such a good device? What is the main difference in pump design from current used LVAD in US and Europe and how it could impact in clinical results? that is what should be highlighted in the text.

Reply: We thank the reviewers for raising this issue, which has been revised and added to the text.

Changes in the text: We have made the suggested changes (page 12, line 252). We will move the following content to the section on limitations: "However, there are some limitations in this study: First, the sample size of this study is relatively small, which needs to be further expanded; Secondly, the observation time is not long enough, and the long-term prognosis of postoperative patient needs to be further observed."

14. minor points: in abstract, when it is said "male" population, it is implicit the "female population".

Reply: I thank the reviewers for raising this issue and it has been revised.

Changes in the text: We have made the suggested changes (page 2, line 31). "Baseline characteristics included a mean age of 49.2 ± 14.8 years, 58.3% male"