

Sincerely, thanks for your detailed review and advice. I will revise the manuscript by referring to the peer review report and provide a point-by-point response to the questions raised by reviewers.

Reviewer #1

Specific Comments to Authors: The authors should be commended for their rehabilitation regime. a copy of the rehab protocol should be made available as an appendix accompanying this study. otherwise i think this is a fairly relevant study that should be published

Answer) Table 2 has been added to the manuscript that summarizes the rehabilitation program. Here, exercise type, intensity, duration, frequency are summarized.

Review #2

Specific Comments to Authors: This reviewer thinks that this case report is interesting and well written. However, this reviewer has several concerns about this report.

1. The more detailed exercise protocols in CR I and II should be described (not only intensity but also work-out duration, frequency, exercise-mode etc in both aerobic and strength trainings).

Answer) During phase-I CR after the LVAD insertion, low-intensity exercise, such as that which elevates HR by 20 bpm or an RPE of 12, was used. As aerobic exercise, supervised indoor walking 5~10min/session or lower limb ergometer 5~10min/session was performed at 10~20W intensity. Aerobic exercise was conducted in 2 sessions a day, and the exercise time was gradually increased to 20~30min per session. The exercise frequency was set to 3 times a week. In addition, resistance band exercises focused on hip flexors and knee extensors were performed. The exercise were set to

8-15 reps per set at 20-30% of 1RM and performed 2-3 days a week.

During phase-II CR after the LVAD insertion, the target intensity was set to 40%–55% based on the Karvonen formula. The patient was classified as high risk considering his medical history and functional capacity. Aerobic exercise was performed for a total of 40 minutes and consisted of 10 minutes of warm up, 20 minutes of main exercise, and 10 minutes of cool down. As muscle strengthening exercises, exercises such as biceps curl, dumbbell overhead press, leg press machine, and squat were performed. The exercise were set to 8-15 reps per set at 40-60% of 1RM. The phase-II CR was conducted for 3 months in 2 days a week. After HT, RPE 13, not HR target, was set as the target exercise intensity.

Table 2 has been added to the manuscript that summarizes the rehabilitation program. Here, exercise type, intensity, duration, frequency are summarized.

2. The patient demonstrated a greater improvement in cardiopulmonary parameters than those reported in previous studies as the authors suggested. Please discuss more about the reasons of greater improvements in this patient. Only long training period? or includes other reasons?

Answer)

1) The patient had a gout attack and underwent cholecystectomy for acute cholecystitis; therefore, hospital stay was extended to 5 months. The patient was able to secure sufficient rehabilitation sessions during the hospitalization period and maintain a relatively long phase I CR. Even after the phase 2 CR was implemented, the medical staff and the patient continued to communicate to encourage the continuation of rehabilitation treatment. In addition, as the patient moved from two hours away to nearby the hospital, access to the rehabilitation center was further improved. The participation rates in CR among patients with HF remain low, ranging from 14% to 43% worldwide. Longer and continuous exercise training interventions could improve physical fitness and quality of life.

2) A tailored exercise program for each phase led to improvement the patient's' quality of life. In phase-I CR, low-intensity exercise for the purpose of reconditioning was performed in consideration of the patient's overall condition. In phase-II CR, exercise capacity was improved by performing moderate-intensity or higher exercise. In addition, even in the same phase of CR, the target intensity settings were different after LVAD insertion or HT, so that appropriate CR was organically intervened at each stage.

3) Mechanisms contributing to the greater fatigability in patients with HF are likely due to alterations in skeletal muscle metabolism, resulting in greater glycolytic capacity and reduced oxidative capacity of the muscle and reduced blood perfusion to the muscle. In this case, the time interval from acute aggravation of HF to LVAD insertion was about one month. For this reason, although a decrease in skeletal muscle dysfunction occurred, it was presumed that there were relatively reversible and recovery was possible.

3. The patient was classified as high risk considering his medical history and functional capacity; therefore, the target intensity was set to 40%~55% Please describe what was defined for target intensity?

Answer) Usually, aerobic exercise intensity for patients with cardiovascular disease was set to 40% to 80% of exercise capacity using the Karvonen formula. The patient was classified as high risk group according to American Association of Cardiovascular and Pulmonary Rehabilitation Risk Stratification Criteria because the rest ejection fraction was less than 40% and congestive heart failure occurred. Therefore, the target intensity was set to 40%–55%(lower one third range). Since it was the lowest group among the three groups according to risk stratification, we set the intensity of 40% to 55%, which is relatively low in the normal exercise intensity range.

4. This journal is an international one. I do not understand the significance of the first case, which reported a CR performed after LVAD insertion and

after subsequent HT, in South Korea,

Answer) There are few case reports worldwide in which CR was performed after LVAD insertion and after subsequent HT. Moreover, this case report is significant because there are no previous papers that showed improvement in exercise capacity during tailored CR during LVAD insertion and subsequent HT. So, I changed the word "South Korea" to "Worldwide".

Re-review reply

The revised manuscript file will be attached. First question) The authors added Table 2 to show the rehabilitation protocol. Some of them are duplicated in the section of discussion (shown as yellow highlight in attached file). The content of the rehabilitation protocol should be described concisely in the section of method without duplication of Table 2. Answer) The contents of the text have been modified so that the contents of the rehabilitation protocol presented in Table 2 do not overlap. Second question) In Table 2 the strength of resistance training in phase 1 (resistance band training) is shown as 20-30 % of 1 RM. How did the authors estimate the strength during band exercises quantitatively? Answer) Since there was no muscle strength measuring equipment that can accurately measure 20~30% of 1RM using Thera Band, a quantitative method could not be used, and an estimate measurement was used, instead. Strength was measured based on the percent increase in band length from that of the initial length. Also, the degree of change in strength according to the degree of elongation of the band varies depending on the material of the band. For example, when the band was expanded by 50, 75, and 100%, the corresponding increase in strength using the red, green and blue bands were 1.2/ 1.5/1.8 kg, 1.5/ 1.9/ 2.3 kg, and 2.1/ 2.7/ 3.2 kg, respectively. Moreover, based on the Holten diagram, it was possible to set the 30% of 1 RM intensity relatively. Resistance exercise was performed at an intensity that could be performed for 4-5 sets with a short interval of 15 repetitions per set. In phase-I, sternotomy precautions had to be implemented, so resistance exercise was performed by limiting elongation to about 75% of the original band length. We have described the points you pointed out in the discussion of the case report. Thank you for advice.