

We thank the reviewers for their insightful comments which helped us improve our manuscript

Reviewer no. 258135

The review of Kontogiannis et coll focuses on the role of continuous internal counterpulsation in acute and chronic heart failure. The review is complete and well written. Only minor comments: - when the role of IABP in chronic heart failure is considered, it should better clarified its role. The use of this support in some patients as bridge to recovery is not common.

Based on the reviewer's suggestion we added Table 3 (page 38) in the revised version on the manuscript, in order to better explain the potential roles of long-term IABP counterpulsation in chronic HF. In addition, in the revised manuscript we now state (page 15): "The potential roles of long-term IABP support in chronic LV and RF heart failure are summarized in table 3. Converging data suggest safety and efficacy of long-term IABP support as a bridge to transplantation or bridge to LVAD implantation. In addition, limited clinical data suggest that long-term IABP support may promote myocardial recovery. However, additional studies are warranted in order to clarify whether IABP-induced myocardial recovery can be consistently achieved or represents an anecdotal experience."

The authors should better explain also the possible adverse effects of a prolonged IABP.

Based on the reviewer's suggestion, we now describe the potential adverse effects of prolonged IABP use. On page 12 we now state: "However, long-term IABP support is not risk-free; major complications include acute limb ischemia, severe bleeding, embolic events, infection and sepsis. However, sheathless implantation technique in combination with thinner catheters application significantly minimized the rate of complications from 20.7% for 12 French catheters to 8.4% for 9.5 French catheters. Though more recent data are not available, it is reasonable to assume that the contemporary complication rate with the use of 6 and 7 French IABP catheters is significantly lower. In addition, several recent studies (described later in this review)

have demonstrated that long-term IABP support appears to be associated with a favorable safety profile.”

Analogously they should better explain the role of cardiopulmonary testing in chronic patients with IABP (Table 1).

Cardiopulmonary testing has long been used to monitor cardiac recovery induced by mechanical support (N Engl J Med. 2006 Nov 2;355:1873-84) However, since: a) cardiopulmonary testing can be performed in patients supported by IABP only after subclavian/ axillary IABP insertion, and b) there are no data on cardiopulmonary testing in patients implanted with IABP, we decided to remove cardiopulmonary testing from the criteria of sufficiency of counterpulsation-induced recovery.

In chronic heart failure with signs of pulmonary hypertension and RV failure, temporary IABP could be useful as diagnostic tool in order to detect patients who will benefit by left ventricular assist device or in which pulmonary hypertension can be reversed after heart transplantation. Authors should revise available literature about this topic.

The role of IABP support in RV failure is extensively discussed in the manuscript. While the points raised by the reviewer are interesting from a theoretical standpoint, we could not find any data to support such claims; thus we chose not to discuss these points in the revised manuscript.

Reviewer no. 227677

The authors make a complete review about the counterpulsation devices and their beneficial effects for cardiac recovery not only for acute but also for chronic HF. Although more carefully-designed, clinical studies are needed to clarify the role of IABP support in promoting cardiac recovery in acute heart failure, chronic counterpulsation appears to substantial cardiac (left and right ventricle) reverse remodeling, as assessed by hemodynamic and echocardiographic indices. They also discussed the advantages of the different counterpulsation devices with respect to ventricular assistance ones. Although the review is vast, I suggest to put in perspective a very recent paper about the current understanding of the potential for myocardial recovery in patients with HF with reduced ejection fraction, with an emphasis on the importance of phenotyping the chronic HF population (JACC Heart Fail 2015;3:661-9). The authors proposed a strategy to phenotype patients with HF that focuses to identify dysfunctional but viable myocardium. This achievement would be very important to recover "normal" cardiac structure and function. How can the phenotype HF patients by cardiac magnetic resonance and molecular imaging rebound on the counterpulsation indications and results?

We thank the reviewer for this comment. We agree that prospective identification of patients who are more likely to undergo cardiac recovery is of critical significance. Based on the reviewer's suggestion, we now cite the aforementioned work in the revised version of our manuscript. On page 15 we now state: "However, additional studies are warranted in order to clarify whether IABP-induced myocardial recovery can be consistently achieved or represents an anecdotal experience. The potential for myocardial recovery would undoubtedly be enhanced by prospective identification of patients who are more likely to undergo cardiac recovery."

Reviewer no. 2639698

We suggest the Authors to add a table summarizing the role of IABP in chronic HF

We thank the reviewer for this comment. The role of IABP is now summarized in the newly-added table 3 (page 38) of the revised manuscript”.

Reviewer no. 2639698

This is a well-written review on the use of devices as a bridge to recovery in acute and chronic heart failure. The authors convincingly advocate for continuous internal counterpulsation instead of LV assisted devices for this purpose. I have the following minor concerns: -The article is too long. I suggest reducing it to a half, deleting the sentences regarding to the history of the techniques and shortening the paragraphs from page 12 to the end of the manuscript which describes each article of the references. -Try to no repeat in the body of the manuscript the information already provided in Table 2.

Based on the reviewer's suggestion we tried to shorten the overall length of the manuscript.

Finally, for better understanding of the readership I am sure that figures of each of the new internal counterpulsation devices would be welcome.

While we agree with the reviewer's suggestion, due to copyright reasons we chose not to add figures of most of the new internal counterpulsation devices (we only added a figure of PULVAD).