Author's response to reviews

Title: Abdominal Aortic Peripheral Intervention to Facilitate Intra-Aortic Balloon Pump Support during High Risk Percutaneous Coronary Intervention

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Author's response to reviews: see over
Dear Dr. Shipley,

It is our pleasure to re-submit our case report “Abdominal Aortic Peripheral Intervention to Facilitate Intra-Aortic Balloon Pump Support during High Risk Percutaneous Coronary Intervention” with responses to editorial comments.

This manuscript has not been published elsewhere and is not under consideration for publication in any other journal. If accepted in BMC Cardiovascular Disorders, it will not be republished in any other journal in the same or similar form without the written consent of the Editor of BMC Cardiovascular Disorders. There are no potential conflicts of interest. All authors have read and approved the final version of this manuscript.

Our case report is unique because it highlights distal abdominal aortic stenosis as a potential barrier to successful percutaneous coronary intervention with intra-aortic balloon pump support, and angioplasty as an effective means to overcome it.

Responses to Reviewer’s comments are as follows:

1. There is no information about anti-thrombotics and anticoagulants use in this patient.

We have included information about anti-coagulation in the manuscript. The anticoagulation used in our patient was intravenous heparin.

2. The authors don't mention about acute complications like bleeding requiring transfusion, pseudo aneurysm, limb ischemia, distal embolization after the procedure. Line 104 “made a good initial clinical recovery” is very non-specific. The authors should elaborate more on this.

The text was modified to elaborate on the absence of acute postprocedural complications in our patient. Our patient made good initial clinical recovery without any acute post-procedural complications such as bleeding requiring blood transfusion or pseudo-aneurysm on the IABP insertion site.

3. Additional data regarding in-hospital mortality or long term follow will be informative.

We modified the text to include further description on our patient’s hospital course. Our patient had continued deterioration of his renal function due to acute tubular injury from his previous episodes of hypotension and cardiorenal syndrome, to the point where dialysis was required. The patient and family decided against dialysis, and the patient subsequently succumbed to his renal failure.

4. In order to make it more clinically relevant to the readers, the authors should comment on the clinical and bleeding risk profile of the patient. There are established risk factors for bleeding in patients with IABP including age >75 years, female sex, peripheral vascular disease, diabetes, body surface area <1.65m2 and medications.

The text has been modified to further describe the risk factors for bleeding in patients with IABP, and comments on the clinical and bleeding risk profile were included. “Established risk factors for bleeding in patients with IABP includes female gender, peripheral vascular disease, diabetes, body surface area (<1.65 m2), age (>75 years), and aggressive anticoagulant regimens (eg, glycoprotein IIb/IIIa inhibitor). Our patient is a 68-year-old man with multiple risk factors namely, history of coronary artery disease, diabetes mellitus, obesity and systolic heart failure. However, he did not suffer from any post-procedural bleeding complications.”

5. Authors should also comment about general complications of IABP and why no outcome benefits with the use of IABP even for complex PCI and cardiogenic shock.

The comment on general complications of IABP was included in the manuscript, and a discussion on the
IABP-SHOCK-II trial was included in the manuscript. “IABP SHOCK-II trial was the first large-scale multicenter randomized trial of balloon pump–supported early revascularization in AMI complicated by cardiogenic shock. No significant differences in the 30-day mortality and secondary outcomes were found. Although the timing, clinical scenarios and conditions which IABP demonstrates its beneficial effects remain unclear and despite the randomized controlled trial data suggesting no IABP-supported revascularization in post-myocardial infarction cardiogenic shock patients, the IABP insertion should still be tailored to the clinical condition of the patient and the caution of the operating physician”

6. Transbrachial approach could have been another potential option in the absence of radial pulse. Authors must explain why wasn’t it considered.

The text was modified to further highlight the decision-making process in the choice of access for IABP insertion. A discussion on transfemoral compared to transbrachial insertion was included in the manuscript. “In a retrospective study, the use of transbrachial versus transfemoral was compared and it only showed the use of transbrachial to have reduced bedrest time (0 minutes vs 340.0 ± 104.9 minutes; P<.001) and duration of hospital stay (1.4 ± 0.6 days vs 5.4 ± 7.1 days; P=.04) [13]. The use of transbrachial approach has not been widely reported as the small diameter of the brachial artery requires smaller devices and has the potential to increase the vascular compromise to the distal vasculature.”

7. The authors should consider comparing the complication rates in different commonly used approaches for IABP access like transfemoral vs tranbrachial vs transaortic from registry data and retrospective studies.

We found and included two references on transaxillary and transaortic approach. The text was modified accordingly.

8. In the discussion section - the authors mention the "Radial versus femoral approach comparison in percutaneous coronary intervention with intraaortic balloon pump support: The RADIAL PUMP UP Registry" study. In addition they state that there is limited data about the superiority of transradial approach for IABP placement is limited. While the data may be limited the authors should expound and justify the following in the discussion section - why is bilateral femoral approach (which had higher bleeding rates in the RADIAL PUMP UP trial) superior to the radial approach used in that study or other modalities of IABP (e.g. axillary or brachial artery approach). Since the associated morbidity in patients requiring stenting for the occlusive aortic disease may be higher.

In the RADIAL PUMP UP trial, it is shown that the use of transradial approach in high risk patients who is undergoing PCI and requires IABP support is associated with fewer thirty days net adverse clinical events (NACEs) of postprocedural bleeding, cardiac death, myocardial infarction, target lesion revascularization and stroke, mainly because of lower access-related bleeding events although there is no significant differences in the hospital stay length. In patients who are hemodynamically unstable, transaxillary or transaortic approach is not appropriate, as it requires general anesthesia or surgical procedures. Our patient was hemodynamically unstable and required immediate IABP support for PCI, thus the transfemoral approach was chosen.

9. And why is the stenting of the aorta safe when there is active ongoing myocardial ischemia simultaneously.

There was no stenting of the aorta in our case, and the patient would have died without hemodynamic support. Access options in him were limited and the decision to adopt this approach instead of pursuing a trans-axillary or trans-brachial approach was due to the need for rapid correction of his deteriorating status. The total procedural time from the decision to angioplasty his distal aorta to placement of the IABP was approximately 5 minutes. The choice of another approach would have taken considerably longer, and he would likely not have survived this delay.

10. A critical appraisal of the literature on similar case reports and why the present case stands out will be useful.

To our knowledge, this is the first published case report that described the use of angioplasty to overcome distal abdominal aortic stenosis to proceed with PCI and IABP insertion for hemodynamic support.

Author contributions:
See-Wei Low, MD: Drafting of manuscript
Justin Z Lee, MD: Drafting of manuscript, collection of images
Kwan S Lee, MD: Conception and design, final approval of manuscript submitted

Disclosures:
See-Wei Low and Justin Z Lee have no existing conflicts of interest.
Kwan S Lee MD has received honoraria from St. Jude and Maquet Medical.

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Thank you in advance for consideration of our paper.

Sincerely,

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