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Key Words: cardiogenic shock, mechanical circulatory support, Impella, VA-ECMO

Discussion

Presenter: Olina Dagher

Dr M. Faraz Masood *(St. Louis, Mo)*. Thank you so much. Thanks so much for the panelists and the association for allowing me to do the discussion on this paper. I would like to congratulate you and your coauthors for assimilating these data and presenting this important data in a surgical meeting because we hear this a lot in the medical society, but less so in the surgical society, that a protocolized approach to high-output mechanical circulatory support device selection can help achieve acceptable outcomes. I also appreciate that you sent me the paper for review in due time. I have a couple questions and a few comments. Why did you think that the patients in the venoarterial extracorporeal membrane oxygenation (VA-ECMO) group were younger in age? Do you have an age cutoff in which—because it looked like, in your paper, older people got more so Impella. And the old is not really old from St Louis criteria. The 50-year-old or 55-year-old or older patients more got Impella, and 55-year-olds or younger got VA-ECMO. Is there a cutoff at your institute for that?

Dr Olina Dagher *(Montreal, Canada)*. First of all, thank you, Dr Masood, for taking the time to review our manuscript and for the feedback. At our institution, we don't typically use age as a threshold for decision-making. It's a multidisciplinary discussion, and I am sure it is taken into consideration, but we don't have the same criteria as your institution. Age is increasingly recognized as an independent predictor for mortality. Therefore, it's definitely something that we should take into consideration in the future iterations of our protocol. And then, when it comes to why the VA-ECMO group were younger, that's a difficult question. We included all shock etiologies, so it wasn't just the acute myocardial infarctions. It was also the familial cardiomyopathies. It was the shock caused by ongoing arrhythmias. So maybe that's why we saw this lower age tendency. And then, again, that's difficult to gather from reviewing the charts, but maybe was the team more tempted to go toward VA-ECMO in younger patients because they really wanted them to make sure that they had all the chances?

Dr Masood. And in your presentation and in your comments now, as well, you mention about the team. And it's really important to have a shock team approach. It looks like you do, on the paper. I have a question about your left ventricular (LV) venting strategy. In your paper, you mention various LV venting strategies, from pharmacologic to mechanical. My questions are, is mechanical LV loading done in all patients? Because I couldn't really pinpoint from your paper.

Dr Dagher. So great question, and I'll just—

Dr Masood. One second. I got—

Dr Dagher. Oh, sorry.

Dr Masood. I got a few more. And what is your preferred strategy of LV venting? Is it a balloon, like we saw in the first talk, or is it Impella unloading only at your center? And what are the timings of the LV vent? Because you also mention in your paper that not everybody gets ECMO Impella at the same time. Maybe we can sleep at night and wake up in the morning and do the Impella 5.0?

Dr Dagher. Thank you for your question. So, regarding the venting strategy, most of the patients had LV venting. And so I do mention it—I mentioned it in the manuscript, but so we had a balloon pump, we had a LV pigtail drainage catheter, we had a septostomy, so transeptal. The vast majority of patients on VA-ECMO had a venting strategy. Most often, it was a balloon pump, because it was actually already in. We did not have a VA-ECMO strategy. So, there was no combination. There was no patient who had an Impella as a venting strategy. And then, in terms of—so timing of the venting. So we typically do it in, especially in patients who have LV dilatation, pulmonary edema, high LV end-diastolic pressure, or no aortic valve opening. Does it mostly happen

at night? I don't know. But it's something, again it's an ongoing process. It's ongoing evaluation, discussion, again, to highlight the importance of multidisciplinary team, and serial assessments, reevaluations of the patient.

Dr Masood. So not everybody gets a mechanical LV unloading?

Dr Dagher. No. Not everybody.

Dr Masood. Got it.

Dr Dagher. The vast majority did.

Dr Masood. Got it. Congratulations and thank you for your answers.

Dr Dagher. Thank you so much. Thank you.

Unidentified Speaker 1. This paper's open for discussion.

Unidentified Speaker 2. Thank you. Very nice paper. Just looking forward in your decision-making process of the shock team, would you consider right ventricular assist device ECMO support, right ventricular assist device ECMO plus Impella instead of using VA-ECMO?

Dr Dagher. That's a very good question. So, with the development of new technology, we see new combinations of support. At our institution, we wouldn't typically do that. We would favor VA-ECMO. Thank you.

Unidentified Speaker 3. Hello. Thanks very much for your presentation. I guess one question for you, if you can kind of shed some light on is did you have data on the original sort of intention of the therapy? Because in some of these circumstances, for instance, you have someone in cardiogenic shock, where you try an Impella strategy but then their lactase continues to go up. And then, you're then crossing over to the VA-ECMO arm. I think that would be really helpful to better understand the original sort of intention to therapy, and then what happens with those patients. And then, certainly as a bridge strategy, looks like some of your patients got transplanted, for instance. Where your kind of, your thought process, about trying a therapy, maybe bridging them to transplant, or bridging them to VA-ECMO, ventricular assist device, those things, I think, would be really helpful to try to better understand kind of this treatment algorithm. Thank you.

Dr Dagher. Thank you. So, yeah. We might find a way to sort of include in the manuscript or get a sense of the treatment. Thank you.

Unidentified Speaker 4. So based on what your experience is, what do you think is a role of Impella CP? Should we just take it off the shelf? It should not be there anymore?

Dr Dagher. We're in a cardiac surgery congress. Maybe it would have been different if we had combined cardiology-cardiac surgery.

Unidentified Speaker 1. Great. I'll let my colleague, Dr LeMarsh, senior author, make the final comment on this paper.

Dr LeMarsh. Thank you. Excellent presentation. Thank you. To that last comment, one very interesting thing we saw, and that's why we had to evaluate the strategy as an intention to treat, when we did put Impella in, and we needed to escalate, these are the strategies in which we had the longest organ suffering and complication, access-site complication, because of the rush emergency insertion of VA-ECMO as a second support. So, this is why in our local [inaudible], which is at its eighth iteration, we are going toward an earlier, heavier support to make sure we don't undersupport patients. And deescalation is way less morbid than escalation, in our experience.

Unidentified Speaker 1. Great. Thank you.

Dr Dagher. Thank you.