

Discussion to: Minimally invasive approach associated with lower resource utilization after aortic and mitral valve surgery



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Presenter: Dr NaYoung K. Yang

Unidentified Speaker 1. Thank you. Very nice presentation. The paper will be discussed by Dr Michael Halkos of Emory.



Dr Michael Halkos (*Atlanta, Ga.*).

Thank you for the opportunity to discuss this paper, and thanks for sending me the manuscript well in advance and congratulations to your group on a great research project and for furthering the understanding of minimally invasive cardiac operations and what the potential benefits are. So, like your group, we also believe that there are many benefits, and those have been published extensively, although all observationally. We see lower blood transfusions. We see shorter length of stays in the hospital, less ICU time, less ventilator time, maybe less readmissions, and all of those contribute to less costs, even if they come at the expense of maybe higher procedural costs with all the tools and toys sometimes used to do these minimally invasive procedures. I also appreciate it, because one of my questions that you actually answered

was related to the surgeon's identity. Because if you take a very high-volume, experienced valve surgeon, and compare their mix versus traditional operations, that would be very pure to be able to tell is it truly the different approach or is it just the operating surgeon? Because if you take that high-volume surgeon who's doing 53% of the minimally invasive procedures and compare them against a bunch of other surgeons who are doing all sternotomies, that may cloud the results, which was one of my main concerns with the presentation. So did you look—you showed that slide, which was very helpful at the end that they performed with regards to the surgeon ID. And I know you included that in your logistic regression model, but did that surgeon do all the mitrals? Did they do some of the mitrals? How does that break out? And is it possible to look at that in a subgroup analysis, even though your sample size is diminished?

NaYoung Yang (*New Brunswick, NJ*).

So, I do think—and thank you, Dr Halkos—our updated logistic model is a little different from what I sent you a couple of weeks ago.



Dr Halkos. It's okay. That's okay.

Ms Yang. But a subanalysis is definitely called for to see how much of an impact our 2 surgeons who I have in mind would have on the resource utilization despite the small number. As for your question of who's doing what surgery, surgeon A does an equal number of aortic and mitral valves, whether it be replacement or repair. And the same I highly believe for surgeon B.

Dr Halkos. Great. The red flag that came up was when the bypass and ischemia times were significantly shorter in the minimally invasive group, which to me raised a red flag with regards to who was the surgeon, not what was the approach. The second question is, or something just to consider, is you have to be careful when you're comparing different patient populations. A severe AS patient is going to be a lot different than your degenerative mitral patient, even if they have very similar PROMs, because overall your PROM scores are the same between the 2 groups. But that's something else. I mean, you could have a lot of different subgroup analysis, and then your paper's unintelligible because you don't know what to look at. But

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comparing degenerative mitral repair patients to severe AS patients can be challenging from a statistical standpoint, especially as we try to interpret what the results are.

Ms Yang. We definitely thought about only focusing on one valve for this study out of purity of our analysis, but we were also curious about instead of allocating the applicability of our study whether just to one type of valve versus all the valve operations that our hospital does. But certainly, that's another subanalysis that our group would have to do to tackle the problem of the number of patients in our groups, like extending our study over many more years to get answers—and also more clinical inquiry of the statistics of each patient and the severity of their disease, like you mentioned.

Dr Halkos. And then really the last question I had was with regard to the financial metric, to the direct costs. Was that just related to procedural costs, or was it direct variable costs, fixed costs?

Ms Yang. So, we used a little bit of the literature and asked our data collectors about that. It is a direct procedure cost.

Dr Halkos. Is it just the OR stuff?

Ms Yang. Yes.

Dr Halkos. Because what we've looked at is—and you have to engage your hospital administrators, and I mean, they have all this stuff. And it can be very challenging to interpret, but you're interested in cost of blood products, cost of the ICU, cost of being on a ventilator postoperatively, because I suspect a lot of your patients are extubated in the operating room. And all those things add up, even if your procedural costs are slightly higher. So, something just to think about with further analysis downstream.

Ms Yang. Definitely, those are added columns in our Excel sheets. So, I would keep that in mind for future studies. Thank you.

Dr Halkos. Very nice work. Thank you.

Ms Yang. Thank you so much.

Unidentified Speaker 1. Just a quick question. One of the other potential costs of this is the cost of the training the next generation. To what extent are residents involved in these minimally invasive procedures, and as you seek to increase adoption across the field, how do you approach that? Because again, obviously, their times you're going to be longer, they're going to affect your metrics, but they have to be trained because if this is only as good as your lead surgeon or two, it's not going to last. It's not going to really help the field.

Ms Yang. So, actually, for the purposes of research, I guess, purity, none of these studies had residents involved.

Our residency program from what I've observed from my vantage point, residents do the cardiothoracic elective, but the operations, they didn't have heavy involvement, if at all. So, for the sake of the study, residents were not a confounding factor, but certainly I believe as the cardiothoracic fellowship program at RWJ develops more and training becomes more of a question, even with attendings as they increase their experience, will be something to be thought about.

Unidentified Speaker 1. Thank you. Question from the microphone?

Unidentified Speaker 2. Congratulations on a great presentation. And so, as someone who has done minimally invasive mitral repair for many years, I often wonder about the cost with the minimally invasive port access approaches versus robotic approaches. And as we're now pushing all of the robotic approaches across the country nationally, I'm wondering at your institution, and you can ask others for help, if you have both a robotic platform and a minimally invasive right mini thoracotomy platform. And, if so, if you've looked at any of the cost comparisons and resource allocation differences.

Ms Yang. Thank you so much. Actually, RWJ does not have a significant number of robotic operations. So, while I am curious about what the difference is if we set up full sternotomy, mini, and then robotics as well, we don't have a patient population as an operative volume for robotic cardiac surgery to make such comparisons currently. So that would be—maybe your institution could help us out on that.

Unidentified Speaker 2. Great job. Nice.

Unidentified Speaker 1. Yes, sir.

Dr Anthony Lemaire (*New Brunswick, NJ*). I'm actually one of the cardiac surgeons at Robert Wood Johnson. Congratulations. Great talk. Just to answer a couple—we actually do not have a fellowship yet. We're actually hoping to start one in 2024. So, all our cases have general surgery residents, or if they can, if they're rotating, we'll have general surgery residents. No actual fellowship. And regarding the mitral cases, we don't do any robotic mitrals right now. We just do robotic CABGs. So, we don't have the volume or—right now we're just—everything for mitrals already being done minimally invasive through thoracotomy incision, but no robots are being used.

Unidentified Speaker 1. Thank you. Any other comments or questions from the floor?

Thank you. Very nice presentation.