Discussion to: Infant heart transplant following donation after circulatory death using normothermic regional perfusion and distant transport: First reported case in North America

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Invited Discussant: James Jaggers, MD\textsuperscript{c}
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Presenter: Dr Douglas Overbey

Unidentified Speaker 1. Very nicely presented, and I think I inadvertently said this is from Colorado, but certainly from Duke, but Dr Jaggers, who’s going to open the discussion, is certainly from Colorado. Dr Jaggers.

Dr James Jaggers (Aurora, Colo). Well, thank you to the association for the opportunity to comment on this innovative, innovative process and paper. You should be congratulated for being the first to utilize this technology in an organ donation in pediatric patients. There’s huge enthusiasm for trying to capitalize on these brain-dead donors—or these non-donation after circulatory death (DCD) donors. It hasn’t been useful in pediatric patients for obvious reasons. You can’t use the mechanical perfusion device in a pediatric patient, so normothermic perfusion was your only option. Because this is a case report, I’ll just kind of get to my questions and then I’ll let other people come up and ask theirs. A couple of technical questions about your process. Do you use just the echocardiogram to evaluate this organ? Or do you use any biochemical markers? And how labor-intensive was it to resuscitate this organ?

Dr Douglas Overbey (Durham, NC). We do use only visual inspection and echocardiography to analyze it. On the device side, of course, TransMedics will use lactates, but we haven’t found that as usable on this side. Echocardiography is I think the standard we’ll watch and make sure the organ’s functioning well.

Dr Jaggers. And I noticed you used 2 doses of del Nido cardioplegia, 1 at the time of going on perfusion and then another 1 before transplant. Is that your normal practice or is that just specific for this particular case?

Dr Overbey. For longer transport times, that is our preference.

Dr Jaggers. It’s your normal practice. Okay. So, the Achilles’ heel with DCD is that agonal period or the functional ischemic period. As you mentioned, in adults, there is a period that’s too long where that organ may not [well?] and it’s somewhere around 30 minutes or so. Do you think that pediatric patients will tolerate a longer agonal period or is it going to be about the same?

Dr Overbey. Absolutely. I think they’ll tolerate much longer times. And that’s what Dr Schroeder has been indicating to us is that in donors that were younger and healthier originally on the adult side they’ve seen better performance from longer ischemic times in agonal periods.

Dr Jaggers. Absolutely. I think they’ll tolerate much longer times. And that’s what Dr Schroeder has been indicating to us is that in donors that were younger and healthier originally on the adult side they’ve seen better performance from longer ischemic times in agonal periods.

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had these extracorporeal membrane oxygenation (ECMO) circuits available at the donor hospitals, this could be a lot less labor-intensive and be a lot easier. So, I think that might be the direction it goes.

Dr Jaggers. Okay. Well, congratulations on this report. It’s a great innovation.

Dr Overbey. Thank you.

Unidentified Speaker 1. I think we’ll have time for 1 last question.

Unidentified Speaker 2. Thank you. Great presentation. I just wanted to mention that we just submitted our first publication of the first pediatric case of using normothermic regional perfusion. We’ve had this program at University of California Los Angeles (UCLA) since August 2022. And my question to you is, How do you define the agonal phase? What is the cutoff for blood pressure, saturations, and what is your maximum limit that you go to? At UCLA, we use 60 minutes of agonal phase, and we define it as 20 mm below the 50th centile for age.

Dr Overbey. Great questions. I mean, in making the protocol, we had to start changing everything over to percentages instead of absolutes like they were using on the adult side. So similarly, we use <60% for saturation, and then we’ll go 60 minutes. That was initially what we had decided on these. Blood pressure <20 mm Hg is what we had set. But it’s going to be a percentage of what your original blood pressure was. So, what’s going to change, like you mentioned, is percentile for that particular age group. So those are cutoffs that we set, and we know that ahead of time, and we won’t use the organ. It is a good opportunity to use it for something like a partial heart transplant if you need the roots, or there’s other utilization for those organs afterward, if it extends past that, but we would not take the entire organ if it’s beyond that time frame.

Unidentified Speaker 2. Thank you. And then the heparin dose. We’ve noticed with the traditional dose of 300 IU/kg, we actually do develop clots. We’ve had a few losses. Have you gone up to the higher dose of 500 IU?

Dr Overbey. We set the protocol at 400 because of that. Dr Schroeder mentioned to us that they saw a lot more thrombus forming in these. And so, we elevated it, but we use 400.

Unidentified Speaker 2. And the circuit, it’s not truly an ECMO circuit—it’s a modified ECMO circuit. Do you use a reservoir?

Dr Overbey. We do not have a reservoir, but in the ECMO servers, we have syringes set up to where they can add for these small babies.

Unidentified Speaker 2. And you haven’t had a problem with air entrainment?

Dr Overbey. No, we have not.

Unidentified Speaker 2. Okay. Thank you very much.

Unidentified Speaker 1. Okay, great. Thanks. Very, very nicely presented. [applause]