Discussion to: Lung recovery utilizing thoracoabdominal normothermic regional perfusion during donation after circulatory death: The Colorado experience

Presenter: Dr Michael T. Cain

Dr Errol L. Bush (Baltimore, Md). Thank you, good morning, thank you to the Western Thoracic Surgical Association and moderators for allowing me the opportunity to discuss this presentation. Congratulations to you Dr Cain and your colleagues for your work and the fabulous presentation that you just gave us. So, as you mentioned, thoracoabdominal normothermic regional perfusion (TA NRP) is a recent phenomenon over the last 3 years within our community to start using it and it is not totally accepted within the community because of ethics, complaints, or concerns. There are also concerns within the lung community about the possibility of loss of allografts because of the utilization of this technique. You obviously demonstrated the 6 cases here that you were able to go on to transplant, but you did mention you threw in the 1 case that did not go on to successful transplant. Recently, it was reported and you referenced this by colleagues who happened to be at the conference today, that but the utilization of these organs is not robust when compared with the other organs that are being recovered; heart, kidney, and liver, lungs are way behind in terms of utilization and it was reported about a 10% utilization rate of all the TA NRP donors with more than a third of those organs being discarded. So, my question for you, first question I had many, but we will take them one by one is that during your study period, could you clarify how many donation after circulatory death (DCD) donors and TA NRP donors were considered, how many you utilized and then actually even before this 6-month study period had you already utilized TA NRP so you kind of perfected the technique, or was this the initiation of your program during this study period?

Dr Michael T. Cain (Aurora, Colo). So, for your first question regarding how many other DCD donors were considered, all DCD donors during this period received NRP and so the one who did not progress was the only one who did not receive it, and was not procured. We do have a non-NRP DCD lung program historically, and we have use that technique in a number of individuals. Our abdominal team has been very excited about the impact of NRP on their allografts and so they are very aggressive about employing NRP. In those situations we have tended to join with them and procure TA NRP to aid in recovering the liver. In this series, specifically 5 of the 6 donors also had the heart taken as well and so they were getting TA NRP for heart and the lung, primarily, was a bystander to the NRP used to enhance recovery of the more sensitive organs. Remind me again of your second question?

Dr Bush. Well, actually let me follow up on your statement so during this period there were no standard DCDs, you do not have a preference for TA NRP, but it was used for all donors during your study period. Do you have standard protocol or are they all TA NRP just because of your local organ procurement organization?

Dr Cain. So, in this series they have all been TA NRP for DCD lungs and since we do not preferentially used TA NRP for lungs alone it is simply because the liver and heart have also been going for NRP as well. If it was a standalone lung allograft, we would just take the lungs as a direct procurement DCD. We do not think that NRP aids in the recovery of these lungs.

Dr Bush. In your last conclusion slide at the bottom, you highlighted you do not change the way you evaluate these organs just because it is NRP. Do you consider all DCD organs, or do you restrict by geography, like it sounds like it is kind of an organ procurement organization strategy for you using TA NRP, so are you only considering local DCDs for

See Article page XXX.
your travel and you will do thoracoabdominal elsewhere outside of the local region?

Dr Cain. So, it is resource-intensive, that is certainly true. We have restricted ourselves to local donors, meaning from Fort Collins up to Colorado Springs at this point, but our national program is starting next week, so we will have expansion of our NRP program.

Dr Bush. Great, one further question and I will allow others to have the opportunity, so congratulations again on this success your utilization rate is much higher than what has been reported in the initial experience, but I noticed for your donors they are all very young, 25-35 years of age, very minimal smoking history, all the PF ratios were greater than 415 and your total ischemic times were about 4 hours and not much over that, so those are almost donors usually don’t get to consider so do you think that your success is partially related to just highly selective donors that will allow you to just go straight forward with the transplantation?

Dr Cain. I think that yes this is a small data set, they are young donors that all goes in favor of favorable outcomes. Our success of the NRP process as a whole, meaning that we only had one that didn’t progress and we had high organ recovery, reflects I think what we have seen in other organs, meaning about a 15% nonprocurement rate with other NRP donors, such as heart donors who do not progress. So I think as we expand and we expand to a broader set of patients those numbers will change, but in an early study, these are the kind of favorable patients that we have been able to select.

Dr Bush. Thank you, congratulations again.

Unclassified Speaker 1. The question I have about the DCD NRP program that you have the question is what is the time of range of patient do you wait until NRP is established, do you wait 15 more minutes or do you do it at the time of establishing NRP?

Dr Cain. So NRP is established and we reintubate after we have had NRP flow, when the lungs are being taken.

Unclassified Speaker 1. So immediately after?

Dr Cain. Well, there is that stand off period of anywhere from 3 to 5 minutes depending on hospital policy, reconfirmation of asystole, and anywhere from an average of 3 to 5 minutes to reestablish perfusion with NRP and then they are reintubated.

Unclassified Speaker 1. Right, so immediately after establishing NRP the reason I am saying because we have been working with regional NRP for the last 18 months and we have had less than 50% organ acceptance rate because of edema induced by NRP our region typically does not vent the pulmonary artery and I think that is one of the reasons that we have seen this edema plus the delayed reintubation, so I think reintubating and maintaining that pressure is really important in avoiding edema. Also, the increased heparin dose that you give for NRP donors, does that affect the contusion and all of your trauma patients or their primary donors?

Dr Cain. I’m sorry I missed the first part?

Unclassified Speaker 1. The increased heparin dose that is given for DCD donors—does that impact the contusions in your trauma donors?

Dr Cain. We have not observed pulmonary hemorrhage as a consequence of that; again, it is a limited series with a few patients and that could be a problem that arises later, but it has not been a problem for us so far.

Unclassified Speaker 1. Thank you.

Unclassified Speaker 2. I have a question, you looked at 30-day outcomes. Is there any reason to look at longer, you know, like 60, 90, or longer?

Dr Cain. So we followed these patients out to 90 days. We stopped our evaluation for this presentation so that we could have 90-day outcomes for all 6 of the patients followed, but yes, I think long-term outcomes have yet to be determined. Early outcomes are one thing, but long-term graft function is of course the most important.

Unclassified Speaker 2. And this might be my inexperience with lung transplant, but do you think the risk could be different because in your group it was 5 double- and 1 single-lung transplant—could the risk be different in those 2 groups?

Dr Cain. I guess I cannot think of an intrinsic reason why it would be different necessarily, but again time will tell as people get more experience with this outcome.

Dr Anthony Caffarelli. What is going to be your biggest challenge with implementation on the national program?

Dr Cain. So the system itself from a technical standpoint is very mobile—I think that won’t be a terrible hurdle. I think staffing for any program that goes national with NRP is very challenging and so there is a lot of work that leads up to being able to have a reliable staffing of perfusionists who can help with the system on a national level.

Conflict of Interest Statement

The authors reported no conflicts of interest.

The Journal policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.