Discussion to: Lung Recovery Utilizing Thoracoabdominal Normothermic Regional Perfusion During Donation After Circulatory Death: The Colorado Experience

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Michael.Cain@cuanschutz.edu
Dr. Errol L. Bush (Baltimore, MD):

Thank you, good morning, thank you to the WTSA 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 TA NRP is a recent phenomenon over the last three years within our community to start using it and it is not totally accepted within the community because of ethics, complaints or concerns, as well as within the lung community of loss of allografts because of the utilization of this technique. You obviously demonstrated the six cases here that you were able to go on to transplant, but you did mention you through in the one 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, but that the utilization of these organs is not robust when compared to 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 DCD donors and TA NRP donors were considered, how many you utilized and then actually even before this six-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, CO):
So, for your first question regarding how many other DCD donors were considered so all the 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 DCD lung program historically and we have use that 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 and so in those situations we have tended to join with them and procure thoracoabdominal NRP so that their grafts can be helpful. In this series specifically five of the six lung, five of the six donors also had the heart taken as well and so they were getting thoracoabdominal NRP for heart and lung, primarily the line was a by standard for the other more sensitive organs. To your, 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 DCD, you do not have a preference for TA NRP, but all of your donors and is that since your study period or do you do some standard or are they all TA NRP just because of your local OP O?

Dr. Cain:

So, in this series they have all been thoracoabdominal NRP for DCD lungs in this period and since that is not a preference 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 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 OP O strategy for you using TA NRP so are you only considering local DCD’s for you 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 only restricted ourselves to local donors meaning from Fort Collins up to Colorado Springs at this point, but our national program is ongoing next week, it is going to start next week so that is part of the 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 four 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 regress and we had high organ recovery reflects I think what we have seen in other organ meaning about a 15% nonprocurement rate with DCD donors NRP and that is sometimes related to failure to 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 kind of favorable patients that we have been able to select.

**Dr. Bush:**

Thank you, congratulations again.

**Unidentified 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 re-intubate after we have had flow NRP and when the lungs are being taken.

**Unidentified Speaker 1:**

So immediately after?

**Dr. Cain:**

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

**Unidentified 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 re-intubating and maintaining that pressure is really important in avoiding edema. Also the increased Heparin dose that you give for NRP donors does that effect the contusion and all of your trauma patients or their primary donors?

**Dr. Cain:**

I’m sorry I missed the first part?

**Unidentified 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.

**Unidentified Speaker 1:**

Thank you.

**Unidentified 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 six 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.

**Unidentified 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 five double and one single lung transplant could the risk be different in those two 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 perfusionist who can help with the system on a national level.