Targeted Temperature Management in Nursing Care

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The use of therapeutic hypothermia and targeted temperature management protocols in patients with severe brain or spinal cord injury necessitates the involvement of a large group of care givers, including doctors, nurses, and other medical staff. Unlike a pharmacological treatment where a single drug may be administered, temperature management necessitates a coordinated program that includes multiple phases of the injury and recovery processes. This series of state-of-the-art lectures presented at the 2015 Therapeutic Hypothermia and Temperature Management Meeting in Miami brought together therapeutic teams, including nurses who play a critical role in providing the care to these severely injured patients. David Hildebrandt, Minneapolis Heart Institute at Abbott Northwestern Hospital, provided an informative lecture on building a successful outreach program from a nursing perspective. He and his colleagues have developed a successful program that individuals can learn from as they themselves attempt to initiate a therapeutic hypothermia unit in their own institution or hospital. Eric Reyer, Duke Raleigh Hospital, discussed the feasibility of therapeutic hypothermia in post-cardiac arrest patients in a small community hospital. Specifically discussed was what strategies could be used when certain procedures, including percutaneous transluminal coronary angioplasty, to open up blocked coronary arteries is not available. Finally, Mary Kay Bader, Neurocritical Care Unit Mission Hospital, California, discussed targeted temperature management as a “team sport.” Challenges, including coordination of medical care and guidelines for hypothermia and approaches to limit periods of hyperthermia, were summarized. Together, these presentations provided the audience with essential information regarding how best to incorporate various team members in the development of a successful temperature management program.

Question: *Mary Kay, do you think the administration of systemic hypothermia protected the lungs as well in the case study you presented?*

Mary Kay Bader: Yes, but the scientist might say that this is just one case and she might have survived anyway. I think that cooling had a lot to do with decreasing that immune

response. Her brain suffered, and she had seizures for quite a long time and was on anticonvulsants after she went home. It was an interesting story because this hospital had never implemented hypothermia before, but they were determined as a team to make it happen. The physicians and the nurses at this smaller hospital had critical administrative support.

Question: *We see examples of things going the right way and things going the wrong way sometimes, and we have to sometimes take it easy and wait, be with the family and support them through that horrible time. The question goes to David: I think you talked a little bit about a pamphlet that you have to support families in terms of what are the next steps, etc. Do you have also similar material for when things don't go right, for example, the patient waking up and not getting better?*

David A. Hildebrandt: The booklet that I showed you the picture of is given to family members after the patient wakes up. Initially, they are just given a one-page sheet that explains to them the hypothermia process, and what the patient is undergoing. If the patient wakes up, they get that full book. We wouldn't want them to have that full book explaining to them how wonderful everything is going to be for them in 6 months. We are pretty blunt with them up front and give them the statistics. I tell them I'd rather have a family that is jumping for joy and telling me we were wrong than having a family that is all of a sudden looking at us going what were you talking about, we weren't prepared for it to be this bad. Almost everybody on our team and the intensivist are really good about providing family members the statistics right from the get go, and then when they wake up you are the heroes.

Question: *Eric, how difficult was it to be able to start putting in lines yourself as a nurse when the doctor gives up that power?*

Dr. Eric Reyer: Some advance practice nurses are trained in acute care during their schooling. Prior to that, as an RN I placed the PIC lines and applaud registered nurses that are placing PIC lines, because it is actually much more difficult

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than placing a femoral line. There are actually a lot of states where RNs are actually licensed to place femoral lines. I get that argument back that no we are not, but when you actually look at their bylaws they can place them, but it is usually facility dependent. Most of them do allow it due to transport. It is another research area that could be tapped into as well as looking at your PIC team to place those lines.

Question: *David, your numbers were impressive, and we have been doing this for about 3 years total. Sean rewrote our protocol this year. I think one of our biggest struggles is we get all the way through the rewarming and then maybe they have seizures and we are not seeing a lot of improvement. We have physicians that want to stop treatments. How many days do you keep doing this before you start thinking that it is not going to get better? I think I need some clues on how we can get our team to buy into doing this a little longer.*

David A. Hildebrandt: I think unless the EEG is completely flat and they are declared brain dead, you have to give them at least, in our protocols, 3 days after the rewarming. We have had a couple of cases, and I specifically remember an 82-year-old gentleman who essentially had a nearly flat EEG and on day number six his wife went home to prepare for his celebration of life. She came in the next morning to take him off everything and about an hour before she arrived he started moving his arm, within 8 hours he was extubated, and within a week he was home speaking all 11 languages that he spoke before his arrest. I think in our standard, and I think you guys may agree, at least a minimum of 3 days after.

Mary Kay Bader: There has been a lot of articles on prognostication and when that decision should occur. The neurointensivist in the room would tell you it is at least 72 hours. Hypothermia has sort of changed the game a bit, even in Dr. Wijdicks' guidelines of declaration of brain death there are more considerations now if they've had hypothermia on what truly you can or should or shouldn't use in your prognostication. Most neurointensivists stay away from prognosticating early on and give them that 3 days or 5 days or whatever they think they need.

Dr. Eric Reyer: It is actually in the traumatic brain injury guidelines to look at 72 hours, and there is a line at the very end except in the case of induced hypothermia. That actually is in those guidelines.

Question: *Thank you for all those very excellent presentations. I had a couple of questions; one for you, David, regarding your feedback to EMS. I saw the report you send to other hospitals, but do you also send that report to the EMS, or how do you provide feedback? Do you think telemedicine will play a role and will it be beneficial in the use of hypothermia?*

David A. Hildebrandt: We do send them an initial follow-up letter with outcomes and along with their STEMI data get a quarterly report on their outcomes and EMSs.

Dr. Eric Reyer: We have actually talked about doing that at Duke. In rural areas, telemedicine is looking at trying to decrease transfers into these large tertiary facilities because they are getting so full. Most certainly, this can be done easily

because if you need to deviate from protocol, telemedicine will definitely be the way to get more expert advice in a timely fashion.

Question: *I am interested in the experience with the Buffalo Bill's player who had gotten cooled for spinal cord injury. Good story spreads like wild fire. In your case it was more of a local phenomenon, but what did you see happen after that case? Did it make a difference? Did the hospitals in your region take that story as a positive-enough scenario to consider adopting it more forcefully? Was one good story enough to make them change?*

Mary Kay Bader: What actually happened was our first spinal cord hypothermia case occurred after the Buffalo Bill's player Kevin Everett.

Comment: So after that story, did the other hospitals start to use hypothermia for that particular case?

Mary Kay Bader: It is interesting because that Kevin Everett story was actually the first time we used hypothermia in spinal cord injury. When I got called by the neurosurgeon, I thought he was crazy. There was no evidence to do it in spinal cord injury. The father was an ER physician, and he was insisting that we do it. In the first three patients we treated with hypothermia after spinal cord injury, it was the family members who were physicians who insisted on using hypothermia. In those cases, we started seeing some pretty amazing recoveries that prompted the team to use it more frequently.

Dr. W. Dalton Dietrich: The Kevin Everett story really made a difference in our hypothermia programs. We had cooled a lot of rats and cooled a couple of subjects, and it looked like it was relatively safe. Dr. Andrew Cappuccino was the attending physician for the Buffalo Bills. He had heard me give a presentation at the Cervical Spine Conference, where I talked about cooling. The procedure looked like it was safe and we had seen some encouraging results in the preclinical SCI models. When he made the decision to cool Kevin Everett, it was a big, big deal. I understand he received a lot of negative comments. How could you ever do something as aggressive as this to these very critically ill individuals? We made a decision at that point at Miami to initiate a more controlled study. Today we have cooled over 40 SCI subjects with no serious risk factors. Importantly, we have a positive conversion from ASIA A's to ASIA B's and C's in one year. These results are encouraging and hopefully NIH will fund a multicenter trial to support a 17-center randomized trial. That one incident, Kevin Everett actually initiated a lot of activity in the spinal cord injury field.

Mary Kay Bader: I have a question about your 40-plus patients who have undergone hypothermia. Even the most profound they seem to be able to acquire more function even 9 months, a year, a year and a half out, because we are seeing continuing improvements in motor function.

Dr. W. Dalton Dietrich: In terms of spinal cord injury, early ASIA scores and other neurological assessments are a little problematic in terms of how you can be completely sure how severe these subjects are. Our hypothermia treatment team

actually woke them up during the cooling to conduct neurological exams. Your point is well taken. We have seen changes months after the cooling, and I think we are doing something long-term in terms of improving outcome.

Question: *Does each of your facilities do in-house cardiac arrest? Was there any magic thing you did to encourage this? Although we do return of spontaneous circulation (ROSC) prehospital, we can't seem to cross that barrier.*

Mary Kay Bader: Yes, we put a check on the code sheet that says hypothermia considered yes or no, and then we evaluate every code. If it wasn't, we have a team meeting and debriefing and talk about it.

David A. Hildebrandt: Eric, I can't argue with a lot of what you said, which were a lot of good points. Your STEMI patients are transferred for hypothermia. How about your non-STEMI patients. There is more and more data coming out that 30–40% of those patients could have occluded arteries and that they have better outcomes if they are cathed within 2 hours. Are you keeping those?

Dr. Eric Reyer: We are keeping them, because we do have an interventional cath lab.

David A. Hildebrandt: There are going to be some randomized trials coming up on that very topic; some of those non-STEMI patients will have better outcomes if they go earlier than later.

Dr. W. Dalton Dietrich: I am interested in the results of the recent targeted temperature management (TTM) trial for cardiac arrest showing a lack of significance between 33 and 36. Our colleagues from Puerto Rico last year said that they were stopping hypothermia there because of this study. However, what I am hearing from everyone at this meeting is that we remain supportive of temperature management in appropriate cases.

Mary Kay Bader: It is interesting that I probably get an e-mail a week from a center where the nurse leader has e-mailed me to say the intensivist wants to stop hypothermia and can you provide me with any information to support the continued use. I send them what I have but these centers tend to be the late adopters, the “doubting Thomases,” when starting hypothermia, and this trial result was just the fuel they needed to say it didn't work.

David A. Hildebrandt: We are experiencing the same thing, getting phone calls monthly by someone that is doing that. I know that there are some subanalysis studies coming out of TTM. What TTM proved to us, I think, in our facility is that 33 was safe.

Question: *Looking at temperature management, in these case studies you have shown amazing success when keeping them 72 hours after rewarming and potentially longer. With the economics of ObamaCare and things changing, if you are going to start or stop temperature management, is there an economics equation that starts to influence these decisions or is that not yet come to fruition?*

Mary Kay Bader: I was called into the board of directors' meeting one day because they saw that the cost had jumped significantly when we started doing these advance therapies. They asked if I could please explain why the charges were so much more. I told them that, well, dead people don't cost a lot of money. If you don't do anything and they die, the cost is much less. There are a lot of models out there that some people have written about a life saved with quality of life that doesn't include going to a nursing home. It's the tPA argument for stroke. You have less disability, and possibly they will be more independent.

David A. Hildebrandt: Furthermore, if a patient does survive coming from a referring hospital, now that patient is yours. All the visits, all the things they will have in the near future, that patient is now yours.

Comment: I think that was too easy said to your director that you decrease the amount of patients going to a nursing home. I think with our therapy we also keep patients alive, who really would have died without these treatments, but now go to a nursing home. I think you should be very careful saying that we are doing so well in preventing patients from going to nursing homes.

Mary Kay Bader: We have a 50–55% for V-fib, V-tach, CPC 1, 2—good outcomes. They don't do it on every single patient. I think there has been one study that looked at cost.

David A. Hildebrandt: The percentage of patients that survive with a CPC score of 3 is much less in the hypothermia-treated group than in the nontreated group too.

Comment: We are doing research ourselves now on our outcomes of 10 years with hypothermic treatment. I will be very curious to see what happens.

Dr. Fred Rincon: You should include nonmonetary costs also.

David A. Hildebrandt: When you look at our data, we have 50% die—50% survive. Obviously, that 50% of the deaths are a little biased because the families have made the decision for the patients comfort care. Our data show that about 50% that do survive, close to nearly 90% walk out with a CPC 1 or 2 at 6 months.

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