Theresa Mottes, MSN, RN,CPNP-AC,CDN:

Implementing a QI Program for CRRT In Your ICU: Lessons for Pediatrics

Speaker 1 (00:00):

Thank you. It gives me great pleasure to introduce our next speaker is Theresa Mottes she is an advanced nurse practitioner from Texas Children's, she has an exceptionally strong track record for quality improvement. and I'm very much looking forward to hearing her talk about how to implement quality improvement within the ICU.

Speaker 2 (00:23):

Thank you for that great introduction and I'm truly honored to be presenting some of the work that we've been able to do in our CRRT program. At the time that I was at Cincinnati Children'. We're going to talk a little bit about why we selected what we selected, what we did with our data and some of the challenges and really some of the strategies that we sort of adopted to be able to be successful, just to highlight the fact that we already had the conversation about this can be very resource intensive. So how do we do it effectively and how do we leverage the resources that we have already. When we started thinking about this particular issue, we really wanted to look at the delivery of care. There's a lot of literature on outcomes and patient characteristics, but what we wanted to focus on was how well are we delivering CRRT care.

Speaker 2 (01:19):

And in order to do that we really had to talk up to ourselves and to our teams about what does the optimal delivery look like. what are the components of a CRRT program that allow you to deliver really safe, high quality care. And we came up with three specific areas, standard practice guidelines or clinical practice guidelines where we really outlined what were the expectations of the care that we were going to be providing. We needed to recognize that this is simultaneous and continuous coordination of care, things that this is a very dynamic process. Things are always moving and there's multiple people involved. We also wanted to acknowledge and be able to look at, provider and caregiver expertise, recognizing that in order to do this very well, we need to have people who are well trained and comfortable, providing this therapy. So the first step that we

took when we had to think about, implementation of our CRRT program was standardization.

Speaker 2 (02:16):

It's well known in the quality improvement literature that the lack of standardization is an indicator of poor quality of care. So the more practice variation that we identified, we really realized we had to come back to the table and standardize how we did all of our procedures, that does not mean that we don't ever deviate from our standard, but we have a standard and if we're going to deviate from it, we want to be able to talk about why. and that was the first step that we really looked at and that was developing standard practice guidelines which are available, there's a lot available out there, right up till 2012 when KDIGO put out their standard practice guidelines or clinical practice guidelines, providing some evidence to be able to align your practices with what the evidence is available, and so our standard practice guidelines per se are pretty detailed.

Speaker 2 (03:08):

We go down to the type of catheters that we want to put in. And what size patient, because we are dealing with a wide variety of patients. We talk about the minimum prescriptions. we talk about the maximum ultrafiltration rates, all of which can be modified and adjusted based on the patient's indications. So, but it does provide us with a step starting point and we can always come back to that starting point. It also puts us all on the same page so that we can all have the same conversation. The other thing that we really wanted to think about was how is the care coordinated? It is this constant moving parts. How does critical care interface with nephrology and dialysis? How does the lab interface with that? How the dietician, how is the patient being impacted at which times do these particular disciplines meet with each other?

Speaker 2 (03:57):

and what processes affect each and, each side of this treatment. So kind of aligning and looking at these individual processes and then trying to find quality improvement indicators that sort of help us measure that. And so I'm going to share with you some of the work that we just recently published when we looked at our measures and then created a dashboard at Cincinnati Children's and how we implemented this and why we chose what we chose. So first and foremost, when we started this process, we really had to look at what our program looks

like and we had to be very sensitive to what we do at our institution. recognizing that what's in the literature may not reflect what we do. So we were really sensitive to what processes that are in the literature can we speak to, we wanted to make sure that our quality improvement metrics reflect the delivery of care and the coordination of care.

Speaker 2 (04:51):

So we wanted to be able to highlight our weaknesses and some of that coordination of care. and we want to make sure that we're talking about how we delivered the care. Did we do what we said we were going to do? Also looking at adherence to our standard practice guidelines, we put a lot of time and effort in the standard practice guidelines. So we wanted to see how well we are adhering to it, and so we created some process measures around that as well. Again, we focused on the process very, very little on the outcome of the patient, mostly looking at how we delivered the care, if we could find benchmark, but then we used that quality indicator as well. So we searched the literature to really see what was out there and are there things that we can benchmark against.

Speaker 2 (05:38):

We took this approach kind of looking at the patient's course of illness, from the time they come in to the ICU to where that, relationship between critical care and nephrology takes place. And then looking at, the course, along the course we really figured that we could make an impact with quality improvement when that relationship starts between critical care in nephrology. And then while we're on CRRT that procedures from getting started to when they come off. And so this is where we focused our quality improvement strategies and methodologies, sort of specifically looking at, that relationship to credit with critical care and nephrology. When that partnership happened, we picked two quality indicators that we really were looking at. Are we adhering to the standard practice guidelines that we outlined for ourselves? The first one was fluid status at initiation within our standard practice guidelines.

Speaker 2 (06:35):

Our goal is to put everybody on before they're more than 20% fluid overloaded. So we looked at the deviations when we were greater than 20% fluid overload at initiation. We don't believe that we'll ever be 100%, and that will always be under 20%. But we wanted to be able to understand what was going on with that

particular patient population when they went on. Did we have a late consult? Did we have problems getting access? did we have problems getting the patient on? Were there other things that impacted that? And so while we know that this isn't going to be perfect, it did just open the window and opened the door to our processes and gave us an opportunity to look and see where we could make a way we could improve the process. The other thing that we sort of aligned with adherence is our CRRT activity mostly looking at if our CRRT activity is getting higher, does it affect how we're delivering the care?

Speaker 2 (07:31):

So are our processes being stretched and our capacity being stretched as our activity changes?,and vice versa if our activity gets lower, are we better at adhering to our standard practice guidelines and the processes that we have put forward, and we don't believe that activity is all about adherence, but we just really wanted to be able to align these two processes together. We looked at these process measures, quality improvement measures from both a categorical view, so just kind of categorizing groups of process measures and then also looked at them from a temporal view, recognizing that this is over time and then sort of dove in and tried to find some quality improvement measures that we could easily measure that reflected each one of these phases. And so for the initiation that comes back to that fluid, at fluid status, at initiation for the maintenance, we look at filter life, but we look at it three different ways and I'll talk about that.

Speaker 2 (08:35):

We also look at efficiency. How well are we doing, what we said we were going to do , and one of the quality improvement measures that we picked for that was achievement of our fluid balance goals. how well were we able to achieve our fluid balance goals on an individual day? So looking at this just a little bit further, when we looked at filter survival, we wanted to be able to look at this a little bit more broad than just filter life. So we decided to look at it three different ways, just quantifying the hours that the patient is on the filter. Then we looked at the actual filter live. So this is just the difference between when the filter started, when the filter ended. But diving in just a little bit further, we wanted to know how many of the filters were still, on the patient

Speaker 2 (09:22):

at 60 hours. So how many survived more than 60 hours. and the reason we chose that is because it's published in the literature and pediatric literature. So it provided us a benchmark. We had an opportunity to compare ourselves to what we could find in the literature. And then we also looked at our unintended filter changes. So those filter changes that didn't last 60 hours that went down and we were not planning on it. And again, just being able to take the opportunity to find out what was going on with that particular filter, and being able to do a little bit more of a deep dive into that data. We looked at volume control when we talked about how well are we doing what we have prescribed. We really wanted to find out how well we were removing fluid.

Speaker 2 (10:11):

Most patients on CRRT have some degree of fluid removal requirements. And so we started looking at how well did we prescribe fluid removal as well as how well did we do. we looked at the prescribed fluid removal. So on a 24 hour basis, we would identify a goal. That goal were communicated to our ICU teams. Usually it was done in a collaboration rounding that we would determine what it was and then we would come back the next day and evaluate how well we were. we did a 10% plus or minus 10% of the achieved goal the biggest challenge that we had with this was sort of identifying how do we measure this? One of the challenges that we had, and I'm going to put the formula at the bottom for anybody that would like to use it was that when we were running even, that's actually a net fluid goal of zero and that makes the denominator of zero.

Speaker 2 (11:07):

And so we were really challenged with how do we actually measure this? but when we talked about it and started having more conversations about it, we realized that if we're running, even our ends should equal our outs. So our intake fluid goal became our denominator and it was much easier to measure through time. You can see that we did actually,, make some significant improvements, some of this through education, some of this through some of our process changes. But, at the time that this was published, almost 85% of our patients were within 10% of their fluid goals every single day. We looked at prescribed dose because that again is in the literature. So it's that we have the ability to measure it. We quantify it for overall how we prescribed as well as individual prescriptions we always order in pediatrics, we order per body surface area. So we established a 2 liters goal for ourselves, a 2 liters per hour per 1.73 meters

square. And then we evaluated the delivered dose using the affluent, volume to be able to calculate that. We also looked at this from not only a group or an overall perspective programmatic, but we looked at individual patients, how many of the individual patients or what percent of the individual patients actually achieved 95% of their goal. And so that allowed us to be able to look at individual patients as well as our overarching program.

Speaker 2 (12:41):

Prescribed time was one of the other ones that we started looking at because we realized that if we have downtime that's going to impact all the other measures. So we started looking at prescribed time and again it's very similar to dose. It's the time that the patient was on the therapy. We looked at actual prescribed time, which is defined as the time that the CRRT was started to when the CRRT was discontinued for the final time. We also broke it down into two total hours of filters that were running. So the time that the patient actually had filters on therapy and then we went even further looking at the total hours of treatment time. So the actual time that all the therapy pumps are being actually delivered at that time. And of course we know because of the way CRRT is designed, filter changes are a part of our World. Downtime is always going to be something that we have to manage. We never believe that will be equal. Our goal is to decrease that gap, to be able to efficiently change filters, efficiently manage alarms. And so that more treatment time, is being achieved while the patient's receiving CRRT.

Speaker 2 (13:54):

After we got all that data, we started looking at it, trying to figure out what we needed to do with it. And this was something that we sort of decided to kind of put in this figure is that when we recognized the deviation, so we had patients that did not achieve 95% of their prescribed time. We wanted to start analyzing the factors. So how do we do a deep dive? So we started diving into that data. Was it unplanned? Was it related to procedures? Was it related to a machine? Was it a catheter issue? And further diving further into that, looking at if it was a procedure, was it predicted, was it something that we could manage it differently? could we have managed the patient on CRRT for that procedure? If it was a machine issue, it gets a little bit more complicated.

Speaker 2 (14:39):

But was it proficiency? Were we able to manage the alarms accurately? Were we able to, clear the alarms and keep things running? was this a catheter that became a big problem that was causing more and more alarms? While these all kind of go down as we do a deep dive, we recognize that they also crosstalk a catheter. It's going to trigger a machine alarm which made them trigger a procedure. So we really had to think about how we did this, but this allowed us to be able to start diving into the processes that we have. How can we make those better? Are there things that we can do better? some of this data we were able to, identify educational gaps and work on that particular piece. So just using the data alone allows us to be able to improve our program.

Speaker 2 (15:27):

Certainly this did not come without challenges, our first challenge as I talked about was defining what is our standard practice, second challenge was really how do we find the, the right number of metrics. There's a thousand things that you can measure when you start talking about CRRT especially in a process. So really trying to hone that down to what works for us right now. But I would say the biggest challenge that we have, and it was just highlighted as well, is who's gathering this data, the resources available to be able to do this collection and be able to analyze the data, publish the data and get it out to the people who are doing the work. I was probably the biggest challenge that we faced, and probably at this time, one of the most, important strategies that we have done as well at Cincinnati Children's as well as at Texas Children's is we're leveraging the EMR.

Speaker 2 (16:25):

We have massive amounts of data in our EMR. And so what's being documented in the EMR can be pulled out and then created into the dashboard that we use to publish this data. Key pieces of that is that we have to make sure that the data fields that we need are being documented on and that can be a real challenge. integrating the CRRT machines with your EMR makes things a lot easier, but it is also comes with its own challenge, the nursing staff need to understand why we're documenting, what certain things were documenting so that we can be able to look at our data differently. One of the challenges that we recently had was all filters are documented, when they're discontinued as clotted, and it could have been an access pressure, it could have been a return pressure, it could have been an anticoagulation issue, but we had to really work with our nursing staff to be able to document that appropriately so we can target the right interventions. and

at this time, our EMR, we actually have a report that comes out of our EMR that then goes into our quality improvement data. So the ease of it has decreased quite a bit so that we are no longer spending 10 hours, 12 hours a month trying to get this data.

Speaker 2 (17:43):

So just to summarize, quality improvement metrics, we really did on the demographics of our program because we did think that was important too. If we're doing more small children, does that influence how we're adhering to certain things focused solely on the delivery of care? completely independent of patient outcomes. We report that and we certainly track that. But the focus of this work, the body of this work was how well are we doing what we say we're going to be doing, extracting the data from the EMR is the most important and the most challenging information and being able to get that in a reportable, system so that when you send it out to people that makes sense to people. the dashboard was really well received because it's very easy to look at. You can quickly see how well we're doing, especially comparing, quarters to quarters and then being able to analyze your data, being able to really deep dive into your data so that you can modify the processes that are affecting your particular patient population. And so with that, I will wrap it up.

Speaker 1 (18:55):

thank you, that's truly fantastic work. I think we've got time for one or two questions if there are any. Okay. So while we're, waiting guess one of the key challenges always for quality improvement is sustainability. So how would you keep things going and, what's happened since you've changed organizations and one of the leaders for the quality improvement programs has changed?

Speaker 2 (19:18):

So, at the institution at Cincinnati Children's, that work continues. and they've been very instrumental in getting that streamlined so that you can sustain that effort because that is one of the biggest challenges, at my new institution that was getting the EMR ready to go so that we can start making reports as well. I think most people come back with, when we talk about this, we don't have the resources, but I think we have to look back to the days that when we were first challenged with presenting our CLABSI data, and none of us can imagine now not

having to report our CLABSI data, but, you know, leveraging that same resources that we did back then would probably be very helful.

Speaker 1 (20:01):

And I think you partly answered that question by automating the data collection and getting people used to looking at the reports. That's such a major thing, isn't it? Okay. Any other questions?

Speaker 2 (20:19):

Remember you're being recorded for life. My question actually goes back to gathering data around percentage of fluid overloaded initiation. Was that data that you were already gathering and so therefore it was easy to access or did you have to implement that as a part of this process? That was data that we had to implement that so leveraged our EMR because it's all about eyes and nose for us. we use the intake output, a formula that's been published. And so leveraging your EMR and getting a report of your daily intake and output on your patients on CRRT and then it's an easy Excel calculation.

Speaker 4 (21:00):

Okay. One last question. It was a little bit taken aback by the fact that you chose to look at the quality of the process independent of patient outcomes. So how did you plan because eventually I'm sure that you will try to put them together. So how in the future or when do you think, there will be indicators that tell you now I can begin to relate outcomes to process?

Speaker 2 (21:30):

So I think the first step for us was to be able to sustain the process, and make it very standard. so that we are always looking at the same things the same time. I think we probably have 4 years of data now that we can be able to say that we have a standard stable process that we can start looking to see at the outcome. So I think this would be the right time for us to start looking at how this has impacted our outcomes.. A stable process. .