David Wheeler (00:04):

Hello, and welcome to today's episode of Hemorrhagic Stroke Fireside Chats, where we address unique, rural, and regional barriers to care, the hub and spoke relationships within local health systems, and best practices as patients transfer through their systems of care.

My name is Dr. David Wheeler, I'm a neurologist in private practice in Casper, Wyoming, and I'm the Director for Stroke at the Banner Wyoming Medical Center here in Casper. Today, we're joined by Dr. Madeleine Geraghty, a stroke neurologist, and Nicole West, a stroke coordinator, from MultiCare Deaconess Hospital. Good morning, and welcome to both of you. Dr. Geraghty, would you mind telling us a little bit about yourself?

Madeleine Geraghty (00:40):

Well, good morning, and thank you for having us on the program. I came here to Spokane, Washington as a dewy eyed, fresh out of fellowship, stroke neurologist, slightly more than a decade ago. And I was the first stroke neurologist into this inland Pacific Northwest region, which was a bit of a scary situation, but it was a very exciting chance to help build up stroke in this area.

They had just started a primary stroke center in the region and were looking for a stroke neurologist to take the wheel, and I got a chance to learn what it was like to interact with small hospitals, referring hospitals, throughout the area, and I took the opportunity to drive out to multiple tiny hospitals and smaller referring hospitals, sometimes four or five hours away, to get to meet referring physicians back when I was first starting.

It was quite a new experience coming straight from the ivory tower of fellowship and to see what stroke care was like at the time when the idea of not lowering blood pressure in the setting of ischemic stroke was still kind of a shocker. Things have changed a lot over the past decade, and we've seen so much evolve in the world of both ischemic and hemorrhagic stroke. It's been a wonderful ride out here in Spokane since that time. I've had a glorious time being around here and I've never once regretted my decision to move out to Spokane and get to work with so many wonderful people and hospitals.

David Wheeler (02:23):

Thank you. And Nicole, how about sharing a little bit about your background as well?

Nicole West (02:27):

Good morning. Thanks for having us join you today. I have been the stroke coordinator here at MultiCare Deaconess Hospital for a year and a half now and had worked as the coordinator for our orthopedic programs prior to that. I've been in nursing for over 25 years now and have actually worked in multiple areas, Ed, ICU, and general medical floors. So I think experience in multiple areas has been so helpful with regard to coordinating a program like stroke, which involves so many parts of the hospital and is not focused in just one department.

David Wheeler (03:20):

Wonderful. Thank you. I appreciate both of you sharing your backgrounds with us. We'd love to learn more about the communities that you're serving as well, and so Dr. Geraghty, I wonder if you could first maybe describe the hospital that you're at, which I assume serves as a hub for a system of care for stroke patients, is that right?

Madeleine Geraghty (03:37):

Well, first of all, we're in a medium sized community and we are one of four hospitals in the region, and we have currently 288 beds in our hospital. I believe we are working on a certificate of need at the moment to try and upgrade the number of beds, so that's a bit of a work in progress. We have ICU, a step-down unit, and a shared ortho neurology floor on the ninth floor, so that's kind of a standard layout.

We're in a city of about 225,000, but we have a very large catchment area of about a little over one and a half million. The way we are laid out in Eastern Washington, we serve a large portion of Eastern Washington, and then Central Washington has very little access to stroke care and so we've been working with the state to try and improve the access to stroke care throughout this large gap in Central Washington. We also serve a large portion of Idaho and even a touch of Oregon as well.

David Wheeler (04:53):

Nicole, how many hospitals are in your direct referral network, part of your stroke system of care?

Nicole West (05:00):

Well, we officially have transfer agreements with four regional hospitals, and part of that is that we're actually the second largest hospital in Spokane. So the largest hospital has set up agreements with a larger number of the hospitals in the region, but apart from those four, we do actually get transfers in.

Madeleine Geraghty (05:30):

It's at least 13 other hospitals that we don't have direct transfer agreements with, and those other hospitals will often call and pretty much refer to whoever has bed availability at the time, since beds are often at a premium.

David Wheeler (05:47):

So within this region that you're serving, with more than one hub of care for stroke, is there some kind of overriding network control process or does it really just come down to EMS finding the beds?

Nicole West (06:01):

Washington state does have a state system of care for stroke. Washington state had been participating in the Paul Coverdell Stroke Program, and was able to set up a statewide system, and so we do have a rating system for stroke level centers. So we are a comprehensive stroke center and we are a state level one stroke center, which the other large facility in town also is. And so EMS really splits transfers between the two facilities.

Madeleine Geraghty (06:43):

Back in 2011, the State Department of Health put together legislation in Washington state, allowing/mandating EMS diversions to bypass lower level hospitals and get to higher stroke level hospitals of care. It was for both cardiac and stroke. That is a statewide EMS diversion system to take people to the highest levels of care.

In 2015, after the large vessel occlusion trials came out, we reworked that diversion system using the LAMS score to give us a early stroke severity scale system, and adjusted that to allow for endovascular based diversions to hospitals that had 24/7 endovascular care.

We knew that that would also be moving people who had what looked like potentially hemorrhagic strokes into higher levels of care, but we figured that would be appropriate in the catchment system as well. So there is this overall bypass system that's built into law in Washington state.

David Wheeler (07:58):

Good. Thank you, Dr. Geraghty. So as for the ongoing management of the Coverdell Stroke Project in Washington, I imagine there are a number of stakeholders involved. Do you, or members of your team, participate in any regular meetings of this organization or help to set the priorities of the organization going forward?

Nicole West (08:16):

Yes, we are actually both very involved in the state system with the Department of Health and with the EMS systems. We have, from the State Department of Health and then we've got a regional systems that we're involved in as well. So yes, and it's so important to have that connection statewide and for those in the larger facilities that have the ability to care for patients at the highest acuity, to reach out and participate and support.

Madeleine Geraghty (08:56):

Pretty much when I first came here to Spokane, I was befriended by the local MPD, medical program director, for Spokane EMS, who taught me a lot about getting involved with EMS services way back in the beginning, and I began sitting on the local EMS council to learn what happened at the paramedic level, and invited me to go out on a lot of EMS rides and see what happened there.

From there, it became part of sitting on the policy and procedure rules making committees at EMS and learning about how to blur the distinctions between EMS prehospital, hospital, and post-hospital, which is exactly what Coverdell was interested in when, years later, we got the Coverdell grant, is blurring that distinction for both hemorrhagic and ischemic stroke, is taking away the siloing of care between different areas and bringing the first responders fully integrated into that whole care team process.

When I have the time, I still go sit on EMS meetings, and Nicole is very involved in giving EMS feedback. Our QI team presents the key performance indicators once a year at the EMS council, so that we can feedback on how they're doing and they give us feedback on how we're doing. So at a local level, we kind of have that level of connection with EMS.

Then that follows through at all of the different levels, all the way up to the state. So there's different regions in Washington state where we have that level of feedback. We're in the east region and all of the different counties for the east region have their levels of participation with their local EMS. And then as a group, we have that comparison and benchmarking, and then that all gets reported up at the state level, where we all see how we're doing as a state, and there's EMS representation, and all of the medical program directors for the state are giving that level of feedback.

When we changed the legislation, all of the medical program directors were involved with that as well, so there is a strong interdisciplinary connection with all of our feedback and our work together. And that really kind of stems from, I think, even though it's a big state, all of the stakeholders keeping in close connection with each other at all different levels, from the county level, the region level, the state level, everyone knows everybody, which, even through the pandemic, the ability to meet regularly virtually has maintained that tight connection.

David Wheeler (12:05):

Fantastic. I wonder now if we could turn our attention to a more granular level, how that care is delivered within your system of care. And I want you specifically talking about acute hemorrhagic stroke, and we're interested in learning more about barriers that you've identified or overcome for delivering such care in the more rural parts of your state. And so I wonder if you could tell us what kind of activation processes happen. So I'm assuming that through your work with EMS, that you've developed some prehospital notification processes. Dr. Geraghty, would you mind describing those processes to us?

Madeleine Geraghty (12:38):

The pre-notification processes are exactly the same for both, because at the EMS level, obviously we don't know whether we're dealing with an ischemic or a hemorrhagic event when the EMS providers are on scene, so when they identify an acute neurologic change, the first responders are gathering the initial information and rating the neurologic changes with the use of the LAMS score for a stroke severity score, and they patch in with the initial information, giving the LAMS score and the time of onset, basic information, if they have the ability to call in later with a landline, then they can give us more personal information.

Some parts of the state have started using Pulsara to allow giving more HIPAA protected information. We have discussed doing that in Spokane, but we haven't reached that part yet, although some other areas of our MultiCare health system have begun piloting Pulsara and I look forward to when we can do that locally, but at the moment, since we don't have a protected radio channel or Pulsara, we're still relying on the use of a landline. If EMS can give us a landline and additional information, then that comes through.

When they give up enough information for a pre-notification, then the charge nurse calls out a stroke alert, regardless of what it will ultimately turn out to be, and the stroke team is notified. And 24/7, the stroke team, if we are out of house, we have 20 minutes to be at the bedside. If we are in-house, we darn well better be at the bedside. We are expected to meet the ambulance upon their arrival. It is a direct to CT evaluation, so in a perfect world, when they arrive, the entire team meets EMS and they give us the history, hand over the labs that they've drawn en route, and we get the history as they roll down the hall to the CT scanner, they're weighed in the gurney with the floor scale, then the weight after the patient is removed of the floor scale is subtracted, and we're doing our evaluation while we move down the hall and as they're transferring the patient to the CT scanner.

The process is the same regardless of stroke or hemorrhage. The ER doc is coming with us, and as soon as those first images pop up on screen, then we start changing our blood pressure parameters and figuring out whether or not we're going to need neurosurgery or neuro endovascular.

David Wheeler (15:44):

You mentioned that you have explicit transfer agreements with at least four other hospitals, and then another baker's dozen hospitals that you work with on a fairly regular basis. How is neurology coverage provided in those facilities or is there a mixture of coverage availability?

Nicole West (16:00):

There's definitely a mixture of coverage availability. We have some small to medium sized hospitals that may have more of a neurosurgery available. Most probably don't have a neurology specifically, and then we've got some very small hospitals that they've got the ED provider. We've got some that don't even

have readily available CT, and so it's really an evaluation by the ED provider. And then when they call looking for transfer, it goes through our transfer center and the call is generally put out to neurology, so anything that looks like it's neurology based, the first call is to come through neurology and then if we have scans available, they'll pull in others, like neurosurgery, if needed.

But we have that so that neurology can evaluate the best place and the best next step for that patient coming from the outside facility.

David Wheeler (17:14):

For patients who are presenting with stroke-like symptoms to one of your outlying facilities, is the imaging always readily available to the neurologist who's going to be participating in the care?

Madeleine Geraghty (17:25):

Not always. Sometimes we have to rely on the verbal descriptions from the outlying hospital, but the neurologist is always going to serve as the triage person and try to help decide whether neurosurgery needs to get involved, what the next step is. So we serve as that middle layer.

David Wheeler (17:52):

Are there any facilities that you work with regularly that might keep a patient with a hemorrhagic stroke or are all of them going to be transferred to you?

Madeleine Geraghty (17:56):

I'd say about 99% of them are going to transfer. We have a lower level sister hospital in town that is starting to work on their ability to take some of the minimal traumatic ground level hemorrhages, like the two millimeter ground level fall, traumatic subdurals, traumatic subarachnoids in people with a GCS of 15 not on anticoagulation, where they just need an overnight observation.

Our sister hospital is still very nervous about this and we're walking them through the evidence-based medicine behind that. And they're only 20 minutes away from us, so if that patient were to decline, they'd be able to transfer to us very readily. But we did a careful literature search on markers for decline, and we were very comfortable with them staying at our sister hospital with close telephone followup and availability of our team should there be any decrease in the GCS, so that's going to be the one exception to our rule and we're handholding through those early steps, but pretty much every other hospital is doing a transfer.

David Wheeler (19:17):

You've told us in pretty good detail about what happens to a stroke patient when they arrive to your facility, or even an outlying facility and get transferred, and then how a diagnosis is made, of course. We'd like to learn a little bit more about how hemorrhagic stroke patients are cared for in your facility, so maybe just in broad strokes, what the treatment of hemorrhagic stroke looks like in your facility and then follow on from there, both of you, if you could, how you provide education to the clinicians within your organization about a proper care of patients with hemorrhagic stroke.

Madeleine Geraghty (19:48):

Well, I'll start off, and then I'll let Nicole take the education part, since that is her forte. The initial part is very much a team effort. It starts off with emergency room physician doing the initial evaluation in the CT scanner, once the intracerebral hemorrhage or the hemorrhagic stroke, whatever subtype it is, being

initially identified, we initially start with the blood pressure control and getting that down urgently to whichever target is appropriate for the subtype of hemorrhagic stroke and assessing whether or not there's going to be an emergent neurosurgical need.

Our neurosurgeons are incredibly responsive, and I'm very proud to say that we've worked with our neurosurgery department with recurrent, casual, after hours get togethers with evidence-based medicine review, so that they have a consistent response to care, and it does not vary between neurosurgeon to neurosurgeon, so we all know what the response will be in levels of care and what to expect when we call the neurosurgeon.

David Wheeler (21:00):

I'll just interject here that any good educational plan will always take into account how your learners learn best, so congrats on that.

Madeleine Geraghty (21:08):

One of our intensivists' wives owns a absolutely delightful restaurant and part-time jazz club with an upper level that gets closed off for us every six weeks or so for us to relax as a multidisciplinary group and review the literature. That's probably helped our program more than anything. We've reviewed a fair amount and come up with consistent responses to patient care, so depending on what the subtype of hemorrhagic stroke it is, if we need to contact neurosurgery and decide as a group whether or not there's an emergent neurosurgical intervention, we know right away whether or not that's going to happen.

For example, recently we had a lovely woman with a GCS of 15, but a large right parietal intraparenchymal hemorrhage and intraventricular extension, hypertensive in nature, and she had a spot sign with contrast extravasation, so it was very clear that she was going to go downhill fast, and we contacted the neurosurgeon on call, explained the situation, and he was contacting the OR while he was on his way in, just by a sheer description of, over the telephone, what the imaging looked like.

Sure enough, half an hour later as this patient started yawning, we knew that she was going to go downhill and both the ER physician and I were able to explain to the patient and family what was coming up next, and there was a very timely neurosurgical intervention. Everyone knew what the next steps were, and there was no need to try and persuade anyone into those steps because we had all figured those out with good evidence-based medicine discussions months previously.

David Wheeler (23:05):

We all know that these lifesaving processes only happen when you have really expert nurses at the bedside, so I'm guessing you guys have really robust educational programs for keeping your stroke skills up to snuff at your facility. Could you run through those with us, please?

Nicole West (23:19):

Well, of course, we all know that COVID has brought in numerous changes with regard to things like how we do education. We used to do yearly educational seminars, and that has been put on hold. So last year, what we actually did was sat down and created some of our own informational PowerPoints, put together by one of our other neurologists, and really talked through things that the nursing staff specifically brought up as, "Hey, we'd love to know more about drains. What are your expectations for that?"

We've sat down to really create educational pieces targeting what nurses identified as areas that they want more information in. So that's one of the newest adaptations that we've made for education. As a comprehensive stroke center, our nurses are required in the intensive care and the neurology unit have eight hours of education every year, and so that's all incorporated into that as well, so really focusing on what their needs are, identifying those.

We have unit based councils put together with nurses from each unit that do sit down and evaluate the educational needs of the different departments. And apart from the initial onboarding, where we've got a nurse residency program, so when we get new nurses in, they're not only put on the unit to do the hands-on bedside precepting, but they have additional educational classes, full days worth of neurology as part of that, so we've got these added educational pieces that are really there to enhance and boost the knowledge level of the nurses, and a lot of that is really nursing based. They evaluate what the needs are, what the questions of the staff are, and we design the educational pieces to address those each year.

David Wheeler (25:46):

Fantastic. Let's turn our attention now to how the care of the patient progresses through the acute setting and into the post acute care situation. So how does your facility work with rehab facilities? And I'm especially interested when talking to folks who work in rural systems of care, what kind of efforts you can make to help facilitate transition back into their home communities.

Madeleine Geraghty (26:07):

Well, I am very sad that Ms. Carrie [Estuar 00:26:12] is not here because she has been the biggest member of our team to assist this. We were granted the joy of having a full-time stroke navigator added to our team who has helped that transition of care more than anything else we could have done. But since Ms. Estuar is not here, Nicole, can you outline that entire transition of care process since the two of you have really manged that?

David Wheeler (26:44):

For sure, and if you could highlight the role of the navigator as well, because that's something that we don't hear about at every program.

Nicole West (26:50):

Right. This was something we were blessed with being able to hire a nurse practitioner in the role, and so she really comes with a wealth of knowledge behind her and really a depth of interest and focus on education. She will work to visit the patient and family here in the hospital as an initial visit, but we've also realized that providing education in this acute phase is so difficult and how much information they retain is probably really low. And she works really closely with case management, so she follows these patients when they leave, she does calls to them on a schedule, usually within a day of discharge, and this is even when they do discharge to a rehab facility, so she'll call the rehab facility and check in with the staff there.

Has really, in the just over a year since she started, built really good relationships with our rehab facilities. Actually, this Friday, we're going out there where we can finally meet in person with these people that we have built these strong connections with virtually this last year, and just work closely with them as far as the education that we're providing, where the patients are at, what kind of support that they need.

She'll often speak with the families, with the patient's support, will follow them when they go home, will do a two week, 30 day, and 90 day call. She has made connections with primary care providers to provide information and forward information with regard to anything needed after discharge, so follow up testing that, sort of thing, encouragement as far as managing risk factors or where they're at, clarification about medication. Medication clarification is a really big one.

Madeleine Geraghty (29:04):

And finding out when something has gone wrong and they weren't discharged with the right medications.

Nicole West (29:09):

Yep. And then we connect with the outpatient office as well as stroke followup as well, so whether or not they followup in our stroke clinic, again, our nurse navigator has connected with the other neurology and post stroke providers in the area, and she'll even make connections with them, so whether or not they are going to follow with the MultiCare system long-term, we keep that connection with our patient.

She'll tell you she has over 700 patients on her list because once you make it on her list, you are part of her list forever. So that includes any patient that she connected with last year, and if they come back, she'll connect with them again. So it doesn't end once they leave. If they are in neighboring communities, she makes sure that they have what they need, and talking the patient and the family through. Is that what they need? Is that the best place for them to follow? Do they need to come back here for followup here? So it's not just, is it available in their community, but what is best for what their needs are?

That nurse navigator has been a huge benefit to us and to our patients in keeping them on track with all that follow through once they leave.

Madeleine Geraghty (30:38):

She has patients all over the country because many people come here from other states to visit grandchildren and then return to Arizona or New York or wherever, and she maintains those connections. There's also a navigator that the internal medicine doctors have, and sometimes she'll work with that navigator if it's a shared patient, so occasionally we are blessed with double navigators.

David Wheeler (31:06):

Having a talented clinician in these roles is really the most efficient way to overcome barriers to excellent care, so kudos to you and your program for seeing that for the benefit that it is.

I'd like to close the loop, if you will, by learning more about how you guys close the loop with your referring facilities. What kind of processes do you have in place for providing feedback to the referring facilities on the stroke care that they're delivering?

Nicole West (31:29):

That is a great question, and it's something that it actually brought up an issue that we have not addressed as well as we would like to yet.

Madeleine Geraghty (31:42):

It's an area that we need work on. Definitely.

Nicole West (31:46):

We do have that feedback where we close the loop with our EMS systems, but the referring facilities, that is going to be a work in progress. So it is still a need, because we do understand that feedback really supports the place where these patients are coming from.

We have built up our feedback system internally in the hospital to the different departments, like the ED staff with regard to patients come through. And so the next step is going back that step further in creating a better feedback to the referring facilities.

Madeleine Geraghty (32:30):

From the initial part of our discussion, we almost broke our hands patting ourselves on the back for our feedback with EMS and some of the other work that we've done, so we feel like we've done a great job with that. In the hour after this podcast, Nicole and I are going to be working on doing some more education with our internal medicine colleagues and how to improve that level. Feedback to referring physicians and primary care providers who are on Epic, our EHR, that part is not so bad, but it's a small ER physician at another hospital, who might not be on Epic, who sends us a patient, and then trying to figure out how to let them know what happened, and they're off shift the next time I'm around and I don't know how to get ahold of them other than maybe writing a letter or something else that is not systematized and labor intensive and a one off that doesn't seem to be easy to put together into a well-oiled machine and different for each system.

That's the part that we haven't figured out a really good way to address yet, and it does seem to be very important, especially for a patient who has either a very good or a very bad outcome, because we know those ER doctors who are sending us the patients in an ER to ER transfer, they very much want to know. We don't have a good solution as of yet.

David Wheeler (34:22):

Well, it's actually good to hear that you still have some work to do.

Madeleine Geraghty (34:26):

Heck, yeah.

David Wheeler (34:27):

I'm really inspired by your passion and the talent and love to hear how well things are going in the [inaudible 00:34:33] up there in Spokane. My thanks to Dr. Madeleine Geraghty and Ms. Nicole West from MultiCare Deaconess Hospital in Spokane. Thank you for sharing your best practices and your insights on rural hemorrhagic stroke care with us.

Madeleine Geraghty (34:47):

Thank you for having us.

Nicole West (34:48):

Thank you.