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ReachMD

www.reachmd.com
info@reachmd.com
(866) 423-7849

Preventing PICC-Related Complications with Evidence-Based Recommendations

Announcer:

Welcome to Vascular Viewpoints on ReachMD, sponsored by Voices of Vascular. *Content for this series is produced and controlled by ReachMD.*

Here's your host Dr. Jennifer Caudle.

Dr. Caudle:

In medical research, meta-analyses and systematic reviews represent the gold standard for guiding evidence-based clinical recommendations. But questions arise when more than one consensus group yields different conclusions on the same subject. Within vascular access care, one such case centers on peripherally inserted central catheter-related complications. And on today's program, we'll navigate through the converging and diverging recommendations towards PICC line procedures. This is Vascular Viewpoints on ReachMD. I'm your host, Dr. Jennifer Caudle. And joining me is Nadine Nakazawa, a Vascular Access Specialist at Stanford Healthcare in California. She's been involved in the specialty of vascular access for over 37 years and is the past President of the Association for Vascular Access. Nadine, welcome to the program.

Ms. Nakazawa:

Thank you for inviting me.

Dr. Caudle:

to start, let's get a baseline on PICC-related complications, which often seem to be referenced in thrombotic versus nonthrombotic categories. So, what are the complications that are, or should be front and center on the minds of any vascular access team?

Ms. Nakazawa:

Well, this is an extremely important question that every vascular access clinician should always keep in mind when guiding their practice. Number one is to prevent catheter-associated bloodstream infections. So, adhering to those guidelines is critical. Um, but actually, since we've done such a good job over the last couple of decades in reducing central line-associated bloodstream rates, the emphasis really now is on non-infectious complications. And the most important one is catheter-related thrombosis. Uh, it's been – there has been a lot of attention on PICC-related, catheter-related thrombosis in the sense that there may be overuse of PICCs in the situations of patients with difficult access. They may be left in longer than when they're no longer needed, or there may be issues around how they're inserted, how they're maintained, that lead to this – this very serious complication.

Dr. Caudle:

Excellent. So, with this background in mind, let's turn to the literature guiding current practice recommendations to minimize PICC-related complications. One is a guide to appropriate vascular access device selection, and the other is a meta-analysis standout for review, the MAGIC criteria, which is short for the Michigan Appropriateness Guide for Intravenous Catheters. And a more recent insertion technique review published in the *Journal of Vascular Access*. So, starting with the MAGIC criteria, can you walk us through this meta-analysis and what its recommendations really boil down to regarding PICC-related complications?

Ms. Nakazawa:

So, MAGIC emerged a couple of years ago, uh, as a means by which to provide guidance to those of us who place devices to really examine, uh, the necessity of placing when PICCs are ordered in hospitalized patients, particularly those, uh, for whom, uh, what we call peripherally-compatible solutions are being used in less than a 14-day period of time. And this category, uh, is often – studies have shown perhaps there are more PICCs being placed in this population of patients and that other devices are not necessarily being considered that could provide reliable access, uh, in these situations. So they convened a number of clinical experts, uh, both within the U.S. and internationally to look at clinical scenarios and, based on whether the type of infusate, whether it's peripherally compatible or not peripherally compatible, and then looking at duration, coming up with a consensus around recommendations for devices.

Dr. Caudle:

And comparing this to the insertion technique review, what were the highlights from that meta-analysis?

Ms. Nakazawa:

So, the Balsorano meta-analysis is extremely helpful for those of us who, uh, place devices, particularly PICC lines, uh, in the sense that it, uh, the meta-analysis was limited to more recent studies published in – since about 2010. Um, and then they narrowed the criteria to ensure that the insertion technique, uh, sort of dived in with best practices; namely, use of ultrasound guidance for the insertion of these devices. That allows the inserter to place it in the middle of the upper arm. Uh, it allows the inserter to actually evaluate the quality and diameter of the vein, uh, compared to the intended insertion devices, the diameter of that particular device. And then using tip location technology so that, in procedure, you actually know that the catheter tip has landed in the appropriate spot, which is the cavoatrial junction. When they did a lit search and narrowed it down, they found over about 1,400 studies within this time period, and eliminated those studies that did not actually designate, um, any specific recommended insertion techniques. That came down to about 15 studies. And they found that looking at those populations and the outcomes with regard to looking at symptomatic deep venous thrombosis, that the rates actually were not nearly as high as previous meta-analyses seemed to indicate.

Dr. Caudle:

I see. You know, clearly just from those overviews, there are some differences in the outlooks on complications from these two reviews. Can you comment on these differences and where you think they stem from?

Ms. Nakazawa:

So, MAGIC really looked at, uh, a number of meta-analyses and they evaluated many, many studies going back probably well over 20 years. Um, so it's a very heterogeneous group of studies that may have – and very often times, use landmark approaches. So, when you're using a landmark approach and not using ultrasound guidance, meaning you're actually following the bevel of the needle into the vein, there's no ability to actually assess the diameter, size, the trajectory of the vein, uh, before placement. It also limits the insertion site to near the antecubital fossa or right in the antecubital fossa. And we know that the mechanical movement of the PICC line in the bend of the elbow leads to thrombosis. So, there are tremendous differences between, uh, the MAGIC guide and the Balsorano meta-analysis in terms of the studies that they looked at to be able to drive their recommendations.

Dr. Caudle:

Understood. So, Nadine, you know, coming back again to these studies, I'd like to better understand their respective strengths and limitations. You know, what do we need to keep in mind when critically reviewing these reports, uh, starting with the MAGIC criteria again?

Ms. Nakazawa:

So, I think MAGIC is extremely useful in the situations where clinicians simply got an order and their pressure is simply how quickly can they place it. Because what is being left out is looking at alternatives. And MAGIC has highlighted the idea, the concept, that there are other devices that may be as or more appropriate to reduce PICC-related, uh, complications. So, in that sense, it's been rather useful. What the limitations with MAGIC, from my perspective are, is that it – it sort of categorizes infusates between peripherally compatible versus not – non-peripherally compatible, to initially drive whether a PICC or other centra line should be initially selected. Um, and in my clinical experience – and I've been doing this for a very long time, is that the category of peripherally-compatible infusates is really, really, uh, heterogeneous and complex. So, what MAGIC has recommended in terms of we should push for more peripheral access is that there are limited peripheral veins in that they're all connected. Uh, blood is circulating through these and if you have an infiltration or phlebitis in one vein pathway that has been used, you can't certainly place it – the next peripheral I.V. in the same vein below that site. And above that site, there may already be some exposure of that vein to those drugs that led to that phlebitis. So, uh, there are not an unlimited number of deep peripheral veins or superficial peripheral veins for which in these more complicated kind of I.V. scenarios, which are actually pretty common in hospitalized patients, to be able to actually, uh, accurately deliver in a timely manner all of the

infusions that are required. So, uh, that category of peripherally compatible infusate is really, really much more complex and requires a lot more thinking on the part of the clinician who's trying to select the appropriate devices.

Dr. Caudle:

So, what about the insertion technique review, in turn, are there any upsides and downsides that we should be aware of here?

Ms. Nakazawa:

Uh, I think they clearly state what the recommended insertion techniques should be for anyone who's inserting, particularly PICCs, to minimize risk of PICC-related thromboses. That is, use of ultrasound guidance, meaning you actually follow the bevel of the needle into the vein. Uh, assessment of the – both diameter and quality of vein using ultrasound. And using a tip location system to minimize post insertion manipulation of the catheter that can lead to thrombosis. So, if you read their article and adhere to their practices, you should be able to minimize risk. But the number one, uh, takeaway point from both studies is really evaluate what the patient needs, and only place appropriate devices if the patient needs it.

Dr. Caudle:

that makes a lot of sense. You know, now what impacts have you seen from these reports, respectively or together, on standards of practice for vascular access teams?

Ms. Nakazawa:

So, I think it's generating a lot of discussion amongst teams. And there's push and pull about whether to place more midlines to avoid CLABSI penalties, to place more midlines to avoid PICC-related thromboses. But as studies are coming out, and there are studies now that are showing failure of midlines and failure of peripheral I.V.s, uh, the push now is – are – have we gone too far in one direction, and should we go into the other direction? I think it behooves all of us to look at and examine our patients carefully, careful device selection, and track our outcomes.

Dr. Caudle:

Absolutely. Now, given the renewed focus both on who is inserting these catheters, as well as how they're doing it, what takeaways do you draw from to guide vascular access teams towards better reductions of complication rates?

Ms. Nakazawa:

Well, this is a really, really touchy and complex question because most hospitals may or may not have the ability to train large numbers of personnel to actually accurately and successfully place ultrasound guided peripheral I.V.s. It's actually a challenging and difficult skill to learn, and it's not easy to actually teach it. It takes a lot of resources to teach proctor and ensure competency. So, unless you have that in place, it's really hard for teams to expand, uh, utilization of ultrasound guided peripheral I.V.s, uh, as MAGIC is recommending. So that's something that every hospital has to look at carefully.

Dr. Caudle:

and if we look beyond these studies to future investigations that might potentially answer ongoing questions, where do you see that research going, and how might standards of practice evolve over the next several years?

Ms. Nakazawa:

Well, in my opinion, and in my setting with my staff, it's really teaching the vascular access clinicians to take time to appropriately evaluate the patient. Because in many of these guidelines, they don't really elaborate on all of the various, uh, components and aspects of the variability, um, with our patients to actually then select the appropriate device. So, I think it's going to initiate a very robust discussion. There are emerging catheter technologies that will help us in terms of reducing these complications. And it behooves all of us to attend national conferences, regional conferences, read journal articles, and open up robust discussion amongst our colleagues.

Dr. Caudle:

Well, with those closing thoughts, I'd like to thank Nadine Nakazawa for joining me to share insights on PICC-related complications and the evidence supporting current practices. Nadine, it was wonderful having you on the program.

Ms. Nakazawa:

Thank you for this opportunity.

Announcer:

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