

Frostbite: Preventive Measures, Early Interventions, and Prevention of Disability

Transcript

[Upbeat theme music plays]

Dr. Clancy

Welcome to Rounding@IOWA, a continuing medical education podcast developed by and for healthcare teams. I'm your host, Dr. Gerry Clancy, Professor of Psychiatry and Emergency Medicine and Senior Associate Dean for External Affairs here at the University of Iowa's Carver College of Medicine. As we move into the cold weather season, this episode of Rounding@IOWA will focus on frostbite prevention, early interventions out in the field, and diagnostic and treatment advances to prevent major limb disability. Our objectives include, first, as we approach the cold weather season, we hope our participants become knowledgeable in guiding patients to be on guard for frostbite and be ready and able to protect themselves if they must be outdoors. Second, we want our participants to be skilled in knowing what to do and not do out in the field to begin to treat frostbite and prevent major disability. And third, in getting frostbite patients to specialty care, we want our participants to recognize who needs frostbite assessment and treatment at a major medical center. Our guests today are University of Iowa Hospitals and Clinics Burn Treatment Center Nurse Manager, Jolyn Schneider, Assistant Nurse Manager Monica Lamb, and University of Iowa Burn Treatment Director, Dr. Lucy Wibbenmeyer. Dr. Wibbenmeyer is the medical director of the University of Iowa Burn Treatment Unit. She graduated from the University of Tennessee College of Medicine with her MD degree. She then completed her general surgery residency at St. Louis University. This was followed by a fellowship in critical care at Barnes-Jewish Hospital and the Washington University. Jo Schneider earned a Bachelor of Science in Nursing from the University of Iowa and then a Master of Science in Nursing from Western Governors University. She has worked at the University of Iowa Burn Treatment Unit for more than 30 years. She started our first support group for burn survivors and families back in 1994, which continues today. Monica Lamb earned her BSN from the University of Iowa. She has worked on the University of Iowa Burn Treatment Unit for more than 11 years. She has been the assistant nurse manager on that unit for two years. To each of you, welcome and thank you for being part of Rounding@IOWA.

Ms. Lamb

Thank you for having us. We're excited to be here.

Dr. Wibbenmeyer

Thank you, Dr. Clancy.

Ms. Schneider

Yes, thanks, Dr. Clancy.

Dr. Clancy

So Lucy and Monica, I just provided our listeners your official titles and a summary of your training. Could you give us a better idea of your daily work and what a work week might look like for each of you? Let's start with Monica.

Ms. Lamb

Great question. So a typical week for me, it looks like 20 hours of direct patient care, whether that's on our inpatient unit caring for patients that are either burn or trauma. And then another part of the time is in our burn clinic, our outpatient clinic. And then about 20 hours of my time is spent with education directed towards our patient care techs and our nursing staff.

Dr. Clancy

Great. Jo, how about you? What's a work week look like for you?

Ms. Schneider

So my work week consists of a lot of administrative duties, looking at staffing, looking at our census, follow-up in regards to patient concerns, leadership rounding, working with staff to just build them up and just trying to make sure our team is doing well with our current patient population and all the new educational things that we introduce. The burn world is ever evolving and that includes the treatment of frostbite.

Dr. Clancy

Sure, and I know you fill in on the unit from time to time as well.

Ms. Schneider

Yes, yep, I help as much as I can.

Dr. Clancy

Dr. Wibbenmeyer, probably the busiest person in the hospital. What's a work week look like for you?

Dr. Wibbenmeyer

Well, I'm not sure of that, but I do straddle a lot of different areas, I think, as burn director. So I do staff about every two weeks, probably, I'm staffing the unit. When I'm not staffing, I'm in charge of administrative duties for the physician team, but I'm also integrating with our multidisciplinary team because it really takes a multidisciplinary team to get our burn patients better and back to full recovery, as well as our frostbite patients.

Dr. Clancy

Great. And you have students and residents with you at all times as well.

Dr. Wibbenmeyer

We do. We're fortunate in that.

Dr. Clancy

So let's start with the seriousness and the word frostbite, which in a way undersells the damage and disability that can come from exposure to cold over an extended period. Dr. Wibbenmeyer, how serious and underestimated is frostbite?

Dr. Wibbenmeyer

Well, it's very serious, and it's very underestimated. Up to about 30% of patients who get frostbite will actually lose fingers, toes, or limbs, and that's if it's not treated immediately. And the problem with getting frostbite treated immediately is there's an education gap. And so that's part of what we're here today to fill that gap.

Dr. Clancy

With extreme cold temperatures, what's happening at those distal extremities and other exposed areas of skin at that cellular level as frostbite starts?

Dr. Wibbenmeyer

First you have cooling of the limb. And as you have cooling, the blood slows until it stops. And then you have ice crystals that form first extravascularly and then intravascularly, and it destroys the cells. But that is recoverable, depending on what happens afterwards. Once the tissue is rapidly rewarmed, and we can go into that more, once it's rapidly rewarmed, then reperfusion happens. And that's when you can get an inflammatory cascade. You get

swelling and you get blistering. And without appropriate treatment at that phase, if it's severe enough, then you can have eventual re-clotting of the vessels and then death of the finger, the toe, the leg, or the arm, or whatever other appendage happens to be frozen.

Dr. Clancy

Sure, and so this is not just an acute event. This can take time as well. So over time, what do you see with the tissues as far as damage progression?

Dr. Wibbenmeyer

Right, so frostbite's kind of a mystery for people who aren't familiar, and it's always relatively a surprise sometimes, even for the people who are familiar. First, the patient will come with a pretty benign looking extremity or whatever appendage is frostbitten. It can just be white, pale, kind of maybe just firm. And then you warm it up, and then that's when it becomes pink, red, and then a little bit later on, you get blisters, and either those are gonna be hemorrhagic, red, or clear. And then over the ensuing days, you can either see full recovery or you can see the tissue get more and more necrotic. So it is truly a progression over several days, weeks, and then finally it declares itself. And either you go on and the tissue needs to be amputated or just you go on and just give them good wound care to help them heal.

Dr. Clancy

Sure. So looking at long-term impairment, I know, Monica, you mentioned the clinic. What kinds of limitations, physical and psychological and function, can you see when the interventions are too late?

Ms. Lamb

I would say the main thing that we see is just, not being able to use those extremities, whether that's your fingers or being able to walk normally when it's your feet or your toes. And it really limits the function that these patients have with, home life in general, whether that's work or just, doing personal care. That's the main thing I would see. And also frostbite is very painful. So, you know, that's a huge limiting factor for our patients as well.

Dr. Clancy

Great answer. What are the high-risk situations for frostbite? What kind of conditions kind of add up together to put us at the highest risk for frostbite?

Ms. Schneider

Iowa weather in general in the winter, right? I think particularly we'll see people that don't have a good shelter to stay at overnight in the cold. Another thing we'll see is like college students walking home really late at night with not the proper outerwear on. And they really don't notice how bad it is till they wake up the next morning and they are in pain. And that's kind of what, you know, we'll see people presenting the next day. Of course, things like wet, cold, wet, inappropriate footwear or outerwear. I mean, frostbite could happen in an Iowa football game, right, if you don't have enough protection?

Dr. Clancy

Sure. I spent my Air Force time in South Dakota where the wind really blows. And you could have a temperature of 20 degrees, but a 40 mile an hour wind and very high risk even with the wind as well. Are there particular occupations or social situations over the years where you seem to be seeing more frostbite cases? Are there times when you say, oh boy, we're going to be busy this week as that weather front comes in and there are certain groups of individuals that might be at higher risk?

Ms. Lamb

I think just, the folks that are out in the agricultural or farming kind of communities, we see a lot of frostbite with those folks, especially during the coldest days. I can also say during the coldest days, mechanics are also at risk, if they're not wearing the proper like gloves and that kind of a thing.

Dr. Wibbenmeyer

I'd also like to add, I mean, it's really what we do see is we see it more in the unhoused and in patients who have mental illness and patients who have limited means.

Dr. Clancy

Yep, I certainly see that too. So as far as public awareness, what prevention measures can we take for individuals to increase public awareness around frostbite?

Ms. Schneider

I would discuss the importance of just being prepared. If you have to go outside during extreme cold, make sure you're wearing layers of clothes. That will keep you the warmest. Make sure you're wearing things that are water resistant in case it is wet, proper footwear for sure. Again, warm socks. And also like even your face, I'm a runner and just being outside, all of a sudden your nose, you can't feel it. So just even making sure that you have a face covering if you have to walk outside for any distance or amount of time. For people

that have to work outside, taking breaks if you can, like I think of our construction workers that we see in Iowa City and how cold some of those days are, especially again with the wind and the rest of the environment.

Dr. Clancy

We've got this relatively new term now called polar vortex where the temperature really, really drops for quite a long time. And at the same time, we have people that have to be outdoors, like the farmers and police and fire and EMS. Do you have any specific clothing recommendations for them? What kind of specifics would you tell them as far as, okay, it's going to be really cold. You're going to be out there for a while. You've got to do this.

Ms. Lamb

I really think, you know, just making sure that you're wearing gloves or mittens, warm socks, and, you know, a hat, especially to cover up your ears. But the biggest thing is if those get wet, changing them out and putting something dry on, as well as being prepared, you know, in your car in case you were to have a vehicle break down, that you have those warm items that you can put on in that situation as well.

Dr. Clancy

So do each of you have an emergency kit in your car?

Ms. Lamb

Lots of blankets, absolutely, yes.

Ms. Schneider

Blankets, yes. And for sure, for driving a distance, we like would have an extra coat and food, water, like you want to, frostbite itself, you know, if you're stuck somewhere. We hear people getting stuck all the time during terrible weather. So.

Ms. Lamb

Yeah, I even have those little pocket hand warmers that you can, they kind of like crack them and then they warm up and you can get them for your feet as well. I also have like a little electric blanket that you can plug into the car adapter in case there was to be a breakdown. I fear the cold for sure.

Dr. Clancy

Good. Well, I even, my kids gave me one of these auxiliary batteries. So, you know, all those little devices can continue to run, including some of those blankets as well. So I'm pretty

well prepared as well. Do you have any advice for the news media on the best ways to alert the public during these high-risk times in winter? Because sometimes too much is not effective. Is there something that works best as far as working with the media when we are at high-risk time periods?

Ms. Schneider

I myself, when I watch, I like to watch the local news. And I know the channel I watch, they'll talk about it's going to be cold out there. Wear your, you know, wear your layers, make sure the kids are warm at the bus stop. If you're traveling, have a, you know, have a blanket with you, have your emergency gear. And I do think the areas around here, because it is Iowa, tend to focus on when they see the temperature is going to be below 0 or below 30 degrees, right? So I think that's very helpful because I do feel, especially with being a farming state and the construction that they know a lot of people, we're a very outdoorsy state too as well, just to make sure people are ready for that.

Dr. Wibbenmeyer

I also want to add that to get people who may not be watching the news, I think maybe something we can make use of is like the buses, to put signs in the buses. It's going to be a polar vortex. Seek shelter inside tonight. And then also make use of maybe the highway signs. But just hitting people with different ways to communicate this would be great.

Dr. Clancy

I couldn't agree more. So let's move on to frostbite events themselves. Before EMS arrives, what advice do you have for the public when they are concerned that they have frostbite? What does the skin look like and how does it feel and how does it progress even before they've activated EMS?

Dr. Wibbenmeyer

So I think initially it's going to feel cool, it's going to feel numb, and it's going to feel firm. And so if people have those signs, they really need to go seek medical attention.

Dr. Clancy

Okay. And what should they, the layperson, do, and specifically also not do early on before EMS arrives or before they get to the hospital?

Dr. Wibbenmeyer

So I mean, we recommend that rapid rewarming be done immediately if it has, if you have severe frostbite. So like if you have a digit that's firm past like the first line of that digit, the

first wrinkle, say. And we recommend that to happen if they're at a facility that can then either transport them to a tertiary facility like us, who can start TPA, or delay rewarming if they can't start TPA immediately themselves or transfer immediately.

Dr. Clancy

Is there any folklore or historical treatments at home that actually may be harmful for frostbite?

Dr. Wibbenmeyer

I know the military used to recommend rubbing. And so no one does that anymore. So it's really just rapid rewarming.

Dr. Clancy

And once the emergency response team arrives, what are the next steps in care while still out in the field?

Ms. Schneider

Well, I would say fast, fast transfer because within what 12 hours is when we want to be able to start the therapy that Dr. Wibbenmeyer is referring to, the TPA. And then because out of that window, it's not as beneficial.

Dr. Clancy

Sure. And, in Iowa, we have several different levels of care. Where should a patient be guided for that level of care? What is the threshold, Dr. Wibbenmeyer, as far as what they need.

Dr. Wibbenmeyer

Well, again, it depends on the extent of the frostbite. If it's just restricted to the tips of the fingers, then probably nothing except rapidly warming is going to be needed. But if it extends, if that firmness, that whiteness, that numbness extends past those tips, then you might need more aggressive of care. And so in that case, I would say go to a hospital, ED, and then from there you might be transferred to a tertiary center like the Burn Unit of Iowa.

Dr. Clancy

And from then on, now we're at the major medical center, what are some of the diagnostic testings we'll do early on to see the extent?

Dr. Wibbenmeyer

So again, the only thing they'll do is they'll provide the rapid rewarming. Because most of those centers can do TPA, secondary to what they do for stroke. So it's really just a clinical exam, rapid rewarming, and then assessment of perfusion.

Dr. Clancy

Okay, great. And with severe exposure, what are your surgical medical interventions to preserve function? Once you've got severe frostbite, what are you gonna be doing?

Dr. Wibbenmeyer

So, I mean, immediately, then you've gotta assess if they need thrombolytic therapy. And if it's a digit and it passes the first line or passes the tip of that finger, then they're a candidate if they have lack of perfusion for thrombolytics, as long as they meet the inclusion criteria, not the exclusion criteria.

Dr. Clancy

And with hospitalizations for burns, it can be weeks and months with multiple surgeries. Does frostbite injury compare in length and number of surgical interventions for severe frostbite? Is it like a burn?

Ms. Schneider

It is, and it would really depend on the extent of injury. Was it a whole limb? Sometimes you have people with both hands and feet because they were exposed. I'm not sure if Dr. Wibbenmeyer has anything to add to that, but it does depend if, one, if they have to have surgery, and then two, like what are the steps after that?

Dr. Wibbenmeyer

I mean, I think it's like a burn in terms of they have wounds and they have daily need for care. And so certainly the burn unit is the right place for them. Different than a burn because it has a different progression. And we usually don't operate immediately on frostbite. We used to say frostbite in January, operate in July. And that's not the case anymore because frostbite is very painful. The wounds can remain open for a while and that's very hard on patients. So it's not immediate, but it's also not six months later. I'd say most people are operating on frostbite one to two months afterwards when the patient's ready and when the wounds are ready.

Dr. Clancy

Yeah, and so they may go home for a while?

Dr. Wibbenmeyer

Yeah, some of them can, yes. And then they can come to terms with their losses.

Dr. Clancy

Yeah, come back to surgery. And the burn unit is, it's got so much team orientation to it. What type of physical therapy and rehab therapy might someone with frostbite need as well?

Ms. Lamb

Really just looking at functioning, whatever extremity is involved, good range of motion. They may need splinting that our therapists are able to make on the unit for the patient specifically. And for looking at like feet and toes, making sure they're able to get up and ambulate appropriately. Those are really the things that they're focusing on. And being able to do those things at home, if we're planning on discharging the patient to home.

Dr. Clancy

Sure. So, as you prepare for discharge, let's say we've got someone who needed to be hospitalized, how do you guide them as far as going forward? And are they at risk, again, with further exposure to cold? Are they more at risk with further exposure to cold?

Ms. Lamb

Anytime before that wound is healed, they are going to be more at risk for worsening frostbite injury. If they were to go outside and have another exposure, of course, they would be more at risk for that, yes.

Dr. Clancy

Great.

Ms. Schneider

And people often say that once they've had an injury, that it is so sensitive to the cold after that.

Dr. Clancy

Sure. You guys have been wonderful, really preparing the way as we head into the winter of 23-24. As we close, what are some of the take-home points you'd like to leave with our listeners? And Jo, let's start with you.

Ms. Schneider

I would say just, you know, when it's, as you've described, a polar vortex out there, don't go out if you don't have to. If you do, make sure you're protecting your hands or your feet, wearing layers. Be wise, you know. Wear the shoes that are protective of your feet. Don't walk any further than you have to. Stay warm as much as you can. I know, like, again, some of us don't have choices. So then make sure you're able to take breaks inside when you can and just ultimately be smart about where you're venturing out to and why.

Dr. Clancy

Great. How about you, Monica?

Ms. Lamb

I think Jolynn hit a lot of those there. But I would say, really just being prepared is so important. And if you feel like you have any frostbite from an exposure outside that you seek help, you know, right away. And I think just keeping in mind that once you've had an exposure and you've rewarmed, really trying hard not to have a second exposure after that.

Dr. Clancy

Really good. And Dr. Wibbenmeyer, how about you? You've seen so much. What's your guidance for our listeners?

Dr. Wibbenmeyer

Well, I want everyone to keep in mind that time is tissue. So just like stroke, just like myocardial infarction, frostbite needs immediate attention. So I want everyone to be familiar with the signs and the symptoms of frostbite. Know the treatment options. institute either intravenous thrombolytics at your institution in conjunction with talking to a burn center, I would say, or transfer immediately. So we can either do intravenous or intraarterial thrombolytics to save those digits.

Dr. Clancy

Yeah, it can make a huge difference, as you've said before, as far as really preventing long-term disability.

Dr. Wibbenmeyer

Right, correct.

Dr. Clancy

Yeah. Well, to our guests, thank you for joining us on Rounding@IOWA today and for the work you've done with some really important issues, particularly for our listeners out in Iowa.

[Upbeat theme music plays]

For our listeners, you can access instructions for CME and CEUs within our show notes, and we hope you join us again for another session of Rounding@IOWA.