

Clots and Kids: An Increasing Problem

Venous thromboembolism in children is becoming a more common problem, particularly in the hospitalized population.

A retrospective study of patients between 2001 and 2007 found VTE increase 70% during the period of study, from 34 to 58 cases per 100,000 admissions.

The complications of VTE are serious, with 16-20% resulting in pulmonary embolus and 1-4% leading to death.

Prevention where possible is always best, but current strategies are frequently inadequate or unevenly applied.

Children's Mercy has implemented measures to identify patients at risk and institute measures to prevent hospital-acquired VTE.

Shannon Carpenter, MD is here to discuss Venous thromboembolism.



Featured Speaker:

Shannon Carpenter, MD

Dr. Carpenter is Associate Division Director, Section of Hematology at Children's Mercy Kansas City, where she also serves as director of the Hemophilia Treatment Center. Dr. Carpenter holds the academic title of professor of pediatrics at the University of Missouri-Kansas City. Dr. Carpenter received her medical degree from Virginia Commonwealth University. She completed her residency in pediatrics at Children's Hospital Medical Center, Cincinnati, Ohio and a fellowship in pediatric hematology/oncology at Duke University.

[Learn more about Dr. Carpenter](#)

http://www.childrensmercy.org/Clinics_and_Services/Clinics_and_Departments/doc=9982

Transcription:

Dr. Michael Smith (Host): Welcome to *Transformational Pediatrics*. I'm Dr. Michael Smith and our topic is "Clots and Kids: An Increasing Problem." My guest is Dr. Shannon Carpenter. Dr. Carpenter is Associate Professor of Pediatrics at the University of Missouri, Kansas City and is the Associate Division Director, Section of Hematology at Children's Mercy Kansas City where she also serves as the Director of the Hemophilia Treatment Center. Dr. Carpenter, welcome to the show.

Dr. Shannon Carpenter (Guest): Thank you for having me.

Dr. Smith: So, right in the title we have "Clots and Kids: An Increasing Problem." How big of a problem is this? How common, really, is clots in kids?

Dr. Carpenter: So, it is a rising problem particularly in hospitalized children. There was a study that was done and that was published in 2009 from the Children's Hospital of Philadelphia that showed that in hospitalized children, the rate of clot or, in this case, termed venous thromboembolism or VTE, increased 70 percent during the period of the study. Now, I should say that while it is an increasing problem in children, we're still talking about a rare event that went, in this particular case, from 34 cases per 100,000 admissions to 58 cases per 100,000 admissions. So, it's still fairly rare. But, in hospitalized children, we see it pretty frequently. In Children's Mercy we have a dedicated in-patient coagulation consult service that sees patients with bleeding and clotting problems within the hospital. We're on pace to see over 200 new consults this year of children with bleeding and clotting problems. About 80% of those are kids with clots. So, you can see that in a big hospital like Children's Mercy, it's a problem seeing kids with clots.

Dr. Smith: Why do you think we're seeing the increase? You're on pace right now for about 200 cases. How does that compare to previous years and, if it is a significant increase, what do you think is going on?

Dr. Carpenter: So, we saw 146 distinct, new consults last year. So, we are seeing an increase in our number of people who we are seeing. I think there's a couple of different reasons for that. One is I think we're doing a better job of identifying kids with clots. I think that we've recognized it as a significant problem that is something that we have to pay attention to. Previously, some clots were either not ever identified or when they were identified, people didn't recognize that was a significant problem. We are also better at treating complex diseases. So, kids who are hospitalized are hospitalized for a number of different reasons but we're better at treating complex congenital heart disease; we're better at treating certain cancers; we're better at treating certain other congenital disorders; we're much better at treating neonates. Younger and younger children are surviving after being born prematurely and all of those kids are at higher risks for clotting compared to a healthy child on the street. So, that, combined with medical instrumentation such as lines, all combine to create a higher risk of clots in certain populations.

Dr. Smith: What are the short-term and long-term implications for children who have had a clot?

Dr. Carpenter: The most significant short-term complication is death. About 1-4% of children who develop a clot, a venous thromboembolism, will die. About 20% will get a pulmonary embolism clot to the vessels that lead to the heart and then escaping to the lungs – from the heart to the lungs. So, all of those are pretty major problems, as you can see. Depending upon where the clot is, you can have an effect to that organ, for a particular acute time period. So, if the clot is in the vessels leading to or from the kidney, you can have problems with acute renal insufficiency. Clots are a great place for bacteria to grow, so you can have sepsis. You can develop chylothorax or lymphatic fluid around the lungs due to clots. I've had a patient lose an arm related to a clot. He developed a very aggressive venous clot and developed venous gangrene. In the smaller portion, you can just have catheters that won't work anymore, which doesn't seem like such a big deal when you think about the rest of what I've just talked about but if you have a patient who really needs their line, that could be a major issue if they've run out of other sites for it. Chronic issues, the main one that we worry about is post-thrombotic syndrome. Patients who have a venous thromboembolism in a limb can develop damage to the veins in that limb and they can have chronic swelling, skin changes, temperature changes, pain, cramping, tingling

sensations, even ulcers and dilated vessels, depending on how severe that post-thrombotic syndrome is. There's a lot of things that can occur and patients who have had a clot are at risk for another clot. About 20% of patients with a limb clot will develop that post-thrombotic syndrome I was referring to.

Dr. Smith: In reference to the post-thrombotic syndrome, does the risk go up the longer it's not diagnosed and treated? I mean, if I diagnose quickly, get treatment going, does post-thrombotic syndrome risk decrease in those cases?

Dr. Carpenter: Exactly.

Dr. Smith: It does? Okay.

Dr. Carpenter: Yes. So, the things that increase the risk of post-thrombotic syndrome are a clot that fully occludes the vessel and delay in treatment. If we can treat with good anticoagulation in a timely manner, then that will reduce their risk of getting post-thrombotic syndrome.

Dr. Smith: So, let's move to the question of prevention, then. So, we know which patients are at higher risk. What can we do, then, to prevent clots in kids?

Dr. Carpenter: So, we're focusing our efforts right now on preventing hospital acquired clots. There are a small number of kids who have an increased risk of clotting that they inherit and that is something that is handed down through their family and we can do some things for them. We can be aware of certain medications that can increase their risk of clotting, like oral contraceptives in teenage girls. But, there may not be a ton that we can do for those kids outside of their genetics that have already predisposed them. But, in the hospital, we have the opportunity to prevent clots that we cause through medical procedures or clots that kids get because of infections or other illnesses that bring them to the hospital. On average at Children's Mercy, we have a hospital acquired venous thromboembolism every 13 days. Now, that's not including the NICU. We know that neonates and adolescents have the highest rates of thrombosis when you look at the ages of kids. When we look at the associated things that go along with that, central lines, so having a central line in place and, certainly, if that central line gets infected puts them at higher risk of getting a clot. Decreased mobility and certain infections can put you at higher risk: osteomyelitis and staph aureus infections can put you at higher risk for getting a clot. So, what can we do to prevent it? We don't know how to prevent all of them. We have some data on preventing, certainly lower extremity or immobility related clots, by using sequential compression devices, the squeeze boots that people get put on when they aren't moving around and those can decrease clots to a certain extent. There are certain patients who probably would benefit from an anticoagulant while they're in the hospital. As an adult, if you go in the hospital, I think even if you're visiting they give you an anticoagulant. But, you know, certainly if you're admitted, that's a very common thing to do. There's only certain populations where we have good data in pediatrics, to say that an anticoagulant really benefits and prevents a clot from forming. So, a lot more research really needs to be done and we're collaborating nationally with the Solutions for Patient's Safety Children's Hospitals, which is a large collaborative of children's hospitals looking to reduce hospital acquired conditions, but, trying to better work out prophylactic guidelines for children to prevent clots coming into the hospital.

Dr. Smith: Let me ask you, Dr. Carpenter, so even though we don't have a lot of data on the use of

anticoagulants for kids in the hospital, what's your feeling about it? Do you think it's something we should be doing more or do we just need to wait for the data to come out?

Dr. Carpenter: I think that there are certain populations where there is definitely good data. I think as kids are closer to being adult-like—so, there's a 16-year-old boy that comes in after a trauma who weighs twice what I weigh, we should treat that young man as he would be treated in an adult hospital and prophylax him as they would. We should, if a child has an overwhelming infection, say, with an osteomyelitis or something of that nature, that would be a strong consideration for me in terms of treating him with pharmacologic prophylaxis. We know that with spinal cord injuries, there's actually good data to say that once that they're out of the risk of bleeding with spinal cord injuries that prophylaxis is definitely indicated in that population. So, we're going to have to go from population to population to really identify those folks who are going to benefit. But, on a case by case basis and with evaluation of that patient's specific risk factors, we have implemented it on a number of patients within our hospital and I think it is appropriate. To implement it across a population kind of blanket, I think we should wait for more data on that.

Dr. Smith: Okay. Dr. Carpenter, I want to thank you for all the work that you are doing and I want to thank you for coming on the show. You're listening to *Transformational Pediatrics* with Children's Mercy Kansas City. For more information you can go to ChildrensMercy.org. That's ChildrensMercy.org. I'm Dr. Michael Smith. Have a great day.

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