Omaha World-Herald

UNMC study finds that SteriPath device could cut down on blood contamination

By Julie Anderson World-Herald staff writer May 18, 2017

When doctors suspect a patient has a potentially serious infection like sepsis, they routinely order blood to be drawn for blood cultures.

Indeed, some 30 million blood cultures are drawn each year in the United States. However, no matter the precautions taken, a small but significant number become contaminated, due in part to bacteria on skin fragments dislodged during the needle stick.

That contamination can result in false positives, which in turn can lead doctors to prescribe antibiotics unnecessarily. Not only does that pose a risk of side effects for patients, it can lead to additional testing and longer hospital stays and contribute to higher health care costs and concerns about proper antibiotic use.

But a study at the University of Nebraska Medical Center found that a novel device, invented by a pathologist who grew up in Wahoo, Nebraska, and graduated from medical school at UNMC, reduced contamination of blood cultures by nearly 90 percent.

Dr. Mark Rupp, the study's leader and professor and chief of UNMC's infectious diseases division, said the results "demonstrate very conclusively and nicely that the use of an innovative device can dramatically decrease the risk of blood culture contamination."

The study, results of which were published online Wednesday in the journal Clinical Infectious Diseases, was conducted with more than 900 patients in the Nebraska Medical Center's emergency department. Typically, two blood samples are drawn for blood cultures, one from each arm. The second typically serves as a check in

case contamination is suspected.

For the study, one sample was drawn using the standard technique and the other using the new device — the SteriPath initial specimen diversion device, manufactured by Magnolia Medical Technologies. The device diverts and sequesters the first 1.5 to 2 milliliters of blood, the portion that often carries the contaminating skin cells and microbes. The rest flows into a sterile culture bottle.

Before the study, Rupp said, the blood culture contamination rate in the emergency room was about 2.5 percent, already in the low range. During the study, the contamination rate for the samples collected using the standard procedure was 1.8 percent. But the rate using the device was 0.2 percent, a decrease of 88 percent. And the researchers didn't see any difference in sensitivity in detecting actual infections.

Rupp said reducing already low rates of contamination might not seem important. But with 30 million blood cultures drawn each year, a 2 percent contamination rate equates to about 600,000 contamination events.

Costs associated with blood culture contamination range between about $1,000 and $8,000 per event in various studies. Even at the midpoint of that range, he said, the reduction in costs due to the 0.2 percent contamination rate seen in the study would add up to roughly $1.8 million a year at the medical center alone, or billions of dollars nationwide.

In addition, fewer patients would receive antibiotics they don't need, which occurs in 40 percent or more of contamination cases.

"Everybody's worried about the emergence of antibiotic resistance," Rupp said, "and so as we give those unnecessary antibiotics, we're just fueling that antibiotic resistance problem."

Dr. Richard Patton was trying to find a way to avoid contamination, as well as the sometimes serious complications it could cause, when he came up with the idea for the device. A native of Wahoo, he graduated from UNMC in 1969. He finished his training at the University of Washington and was on the faculty there until 2015, serving as director of the medical laboratory. He is co-founder and medical director of Magnolia Medical Technologies, a Seattle company that developed the SteriPath device.

He'd seen skin fragments in many contaminated cultures and hypothesized that they would be in the first portion of the blood draw. He tested his idea of diverting it using some off-the-shelf parts.

"To my astonishment, it worked and worked well to decrease contamination," he said.

It took lots of work to bring the SteriPath to market, he said, including obtaining approval from the Food and Drug Administration.

While the company still is in early stages of commercializing the device, it has been adopted by a diverse group of hospitals across the country, including government-operated hospital systems and academic and regional health care systems, according to company officials.

Company officials wouldn't disclose the exact price of the device, saying it varies depending on its contract

with each institution. But on average, it costs less than 15 percent of the amount a hospital would incur due to a blood culture contamination event.

The medical center has not yet adopted the device. Rupp said he'd like to study whether researchers can get the same level of detection by conducting one blood draw rather than two. That would be easier on patients and reduce care providers' risk of accidental sticks.

While the study was conducted in the emergency room, Rupp said he believes researchers would see similar results in other departments and patient groups, although they won't know for sure until they do such studies. Babies, particularly premature ones, probably would be the exception, given their lower blood volume.

Patton said he believes the device will become the standard for blood cultures.

"This is something that is good for everyone — patients, doctors, institutional payers, everybody's a winner in this," he said. "Personally, it's something I feel very good about. It's something I feel will have an impact globally. I'm surprised such a simple idea, and ultimately such a simple fix, has worked so well."

julie.anderson@owh.com, 402-444-1066

Julie Anderson