

Swab Story – Getting the Most from Wound Cultures



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Feature Story

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Nancy Cornish, MD, director of microbiology, Methodist Hospital and Children's Hospital, Omaha, got her first lesson in correct wound specimen collection during her surgical intern days. "I was working with a senior resident who was collecting a [surgical] wound culture with a swab," she says. The wound showed no redness, swelling, or other sign of infection, but because it was oozing a little bit, the resident thought a culture was necessary—what Dr. Cornish calls the "Well, it was draining, so I thought I'd swab it" mindset.

"The surgeon came in and said, 'What the heck are you doing?'" she remembers. Actually, "he used stronger language than that. His explanation to my resident was, 'This is not an infected wound; you should not culture it, and if you *were* going to culture it, you would decontaminate the surface, and you would use a needle and syringe and aspirate it.' If the surgeon hadn't come in at that time, I would have thought using a swab was OK."

As Dr. Cornish has learned since then, plenty of health care professionals still believe a swab suffices when collecting wound specimens for culture, despite the Infectious Diseases Society of America's guidelines to the contrary. "The guidelines are very clear that you should not be swabbing the surface of the wound and sending that to the laboratory, because less than 50 percent of the time will those results predict what's causing the deep infection," she says. But the physicians who order wound culture tests "don't really get the training in residency or medical school in appropriate test ordering. And they don't have training in when to order it or how to collect it. They basically learn it from fellow residents. The misinformation gets passed along."

J. Michael Miller, PhD, D(ABBM), laboratory response branch chief of the Centers for Disease Control and Prevention's Bioterrorism Preparedness and Response Program and author of the widely used textbook *A Guide to Specimen Management in Clinical Microbiology*, 2nd edition (ASM Press), emphasizes just how inadequate swabs are as a wound specimen collection device. "The surface of most wounds is going to virtually always contain organisms that are commensals, in other words, normal flora," he says. He thinks of those normal flora as "background noise" that must be filtered out. "The specimen of choice for any wound is at the advancing margin of that wound, where the actual infection activity is going on."

Then, too, swabs are suboptimal because, as Benjamin A. Lipsky, MD—the lead author of the IDSA guidelines on diagnosing and treating diabetic foot infections—points out, "Cotton and Dacron have air in the interstices, which inhibits the growth of anaerobes and also some fastidious aerobic organisms, so using a swab is not an optimal way of collecting a specimen." Moreover, "when you get the culture results back from the microbiology lab, it will often just say something like 'mixed cutaneous flora' as opposed to actually identifying what was found. So it's really a matter of garbage in and garbage out."

Unfortunately, he adds, oftentimes "what clinicians wind up concluding is that it's not worth sending specimens for culture in a diabetic foot infection because all they ever tell us is that it's got mixed flora. The correct conclusion is actually that it's worth sending them a good specimen so they can tell you exactly what

pathogens are present, so you can treat appropriately.” A good specimen means tissue, Dr. Lipsky notes, whether curetted from the base of a cleansed and debrided ulcer or biopsied from deeper in the wound, or an aspirate of purulent secretions. “Results from these specimens often allow the clinician to use narrow-spectrum, specifically targeted therapy, rather than empiric broad-spectrum agents.” Dr. Lipsky is professor of medicine at the University of Washington and director of the VA Puget Sound’s General Internal Medicine Clinic and Seattle Antibiotic Research Clinic.

In an attempt to end the misinformation cycle, Dr. Cornish has launched a campaign within her hospital to educate the hospitalists, surgeons, infectious disease department, emergency medicine department, and nursing staff about correct wound specimen collection. Her efforts are part of a larger initiative—ongoing for about eight years—to ensure that test ordering reflects recommendations in the current literature. To that end, she’s issued a series of microbiology clinical briefs. Most recently, she launched a specimen collection campaign in 2004 that entailed, in part, eye-catching posters announcing “Swabs don’t do the job” displayed in the surgeons’ bathroom stalls and elsewhere. “That really got people’s attention, and they started to send us the right tissue that we needed to make the diagnosis,” she says. What’s more, the posters’ effects soon spread to other hospitals as well, as people heard about them and asked Dr. Cornish for copies or downloaded them from www.thepathologycenter.org. “I have lots of people using my posters,” she says. “It’s a couple years later, and I’m still getting requests, so I think it’s really hit a need.”

But her work was far from done. “What I needed then to do was fix our collection problems on the floor, because often our specimens from the floor are just swab specimens,” she says. “And our biggest problem seemed to be postsurgical wound infections and decubitus ulcers and abscesses,” along with diabetic foot wounds. Another campaign was in order.

Her wound culture battle had many fronts, Dr. Cornish soon discovered. First, she found that specimens were often being collected from wounds that, though chronic, weren’t actually acutely infected. Second, the wrong people—namely, the floor nurses—were being asked to collect the wound specimens. “All they can really do is swab the surface. They’re not licensed to collect wound specimens using scalpels, syringes, punch biopsies, or curettes,” she says. And finally, she realized that sharps had been removed from the floors because of safety concerns. “So when I started telling people, ‘You have to collect tissue or fluid,’ they said, ‘We can’t get instruments on the floor to collect these specimens.’”

If Dr. Cornish had learned one thing from her previous educational efforts, it was the importance of teamwork, which she calls “the new paradigm for clinical care.”

“What works is a team and a coordinated effort,” she says. “It’s not something that I can actually do all by myself.”

So she went about enlisting the help of others on staff, such as the chief of nursing, who promised to establish a policy that prevents nurses from collecting these specimens, unless they have been trained to do so.

And to address the sharps safety issue, Dr. Cornish solicited input from the nursing, infectious disease, pathology, and central supply departments to create special wound specimen collection kits that contain prefilled saline syringes, a safety scalpel, safety needles, biohazard bags, and other collection tools, along with an instructional booklet (that will also be available in the emergency medicine department and the doctors’ lounge). The kits can be checked out from the nurses’ stations on each floor. In addition, she got the support of hospital administrators such as the vice presidents of medical affairs and process improvement. (The instructional booklet will be available, like her other clinical briefs, at www.thepathologycenter.org.)

To anyone considering writing similar briefs, Dr. Cornish recommends getting support ahead of time from “influential physicians, the medical executive committee, the medical director of the laboratory, and other physicians who may have a special interest in the particular topic addressed.” In her experience, it’s best to

even include their names on the brief itself, because “there may be a physician who reads it who doesn’t want to call me but will call one of them. If they buy into it, then other people will be more likely to.”

In the case of wound culture collection on the floors, Dr. Cornish got the vascular surgeons involved at the suggestion of the chief of nursing.

“I gave them a copy of the IDSA guidelines on diabetic foot wounds and skin and soft tissue infections. They offered to train other doctors and the wound care nurses on how to collect wound specimens.” They are now going to open a diabetic foot wound clinic to optimize care for those with diabetes as the IDSA guidelines recommend.

Another lesson she’s learned: the value of patience and persistence. It’s not human nature to change overnight, and doctors are no exception. “It does make people kind of mad when they can’t get a specimen run,” she says. She’s prepared to continue receiving inappropriate wound specimens and placing a comment, to educate the ordering clinician, on the report: “Swabs are a suboptimal form of specimen collection and yield inaccurate or falsely negative results. Aspirates and sample are preferred.” When they call her or request a phone call, she can tell them “it’s not a good specimen and this is why,” and then follow that up by sending them the clinical brief and posters.

She recalls getting a call from an annoyed doctor who was insisting that the laboratory run antibiotic susceptibilities on an inadequate specimen. “We told him we could do it but that it wasn’t appropriate,” Dr. Cornish says. “He worked his way through a couple of the medical technologists and finally wound up talking to me. Once he got on the phone with me, he was fine, and I explained why he did not need the susceptibilities and then he apologized for making us go through the chain of command.”

She’s careful to avoid the word “reject,” as in “rejected specimen.”

“Rejection is a hard word for people to hear,” she says. In a previous educational effort, “when we started ‘rejecting’ sputums that were not worth culturing because they had lots of squamous cells in them, the respiratory therapists who had collected them thought they had done a terrible job. Well, it wasn’t their fault—the patient was unable to produce the sputum and even a well-trained respiratory therapist wasn’t going to change that, and that happens quite a bit of the time.”

In addition to phone calls, she recommends another way to drive the message home: putting an automated computer message on lab reports saying the specimen is not optimal. Physicians “may not remember a phone call, but they do see it on the patient report,” she says. “Now, I have had people tell me that their hospital lawyer or administrator-type people don’t want them to do that” because of litigation fears. “There’s an interesting twist. My opinion is we have to tell people when we don’t get good specimens in order to provide good patient care. I don’t think that fear of litigation should prevent us from providing good patient care.” After all, she says, treating a patient with antibiotics based on the results of a poorly collected specimen could also result in a lawsuit, if the patient becomes severely ill or dies due to a bad reaction to the antibiotics or develops antibiotic-associated *Clostridium difficile* pseudomembranous colitis.

With an eye to helping future physicians understand the importance of following the guidelines, she has started setting aside teaching cases in which the laboratory received first an inadequate specimen and then an adequate specimen from the same wound. “We get the wrong thing first, and you can see there’s five different organisms, and [then] they get the right specimen from surgery, and you can see that there’s one or two organisms, or no organisms,” she says.

To emphasize how great the potential health care implications of proper wound specimen collection can be, Dr. Cornish is also using posters from the CDC that detail the 12 steps hospitals can take to prevent

antimicrobial resistance, which include “Target the pathogen” and “Treat infection, not colonization.”

“It’s about getting the right specimen at the right time and treating them with the right antibiotics—or not treating them, as the case may be,” she says. “That way you don’t develop antibiotic resistance, you don’t give them an antibiotic-related illness like *C. difficile* or an allergic reaction, and you treat the bug that’s there instead of a bunch of bugs that aren’t there.”

Another, particularly persuasive aspect of her campaign, Dr. Cornish adds, is her discovery that collecting the specimen correctly is a procedure that doctors can charge for, “a billable procedure.” “People will often pay attention if you can mention money to them,” she points out. “Better specimens mean better directed care, and that means fewer therapy-related problems—and it also reduces the cost so you’re doing less costly, more direct workup.

“So hey, we collect the specimens correctly, we do more relevant work in the laboratory, and you can charge for it and provide better patient care. What could be better than that?”

So with all these advantages, why haven’t hospitals everywhere already embraced the Infectious Diseases Society of America’s recommendations? Dr. Lipsky isn’t aware of any outright resistance to the guidelines, though, he says, “I certainly know that many places have not specifically said, ‘This is our standard of care and the way we expect you to deal with these foot infections.’” He says the guidelines have been the focus of much attention and received many “positive reviews.” But “making them useful requires getting buy-in from the many clinical and laboratory services that are involved in caring for diabetic patients with wound infections.”

Dr. Cornish says, “I think a lot of times the guidelines are kind of complicated, and there are a lot of pages to read, and doctors are very, very busy, and it takes a team approach to it, and so there’s got to be a champion for it who’s willing to put the time into bringing the whole team together and developing a process in the hospital that works.” It seems to be the laboratory that needs to do that, she says. “Because we’re the ones who are aware of the literature, and we need to effectively communicate that to our clinicians.”

Anne Ford is a writer in Chicago.