

At Halifax Health, SPECT/CT Protocol Helps to Improve Patient Care and Reduce Costs

More effective care—delivered faster and at a lower cost—is possible. The users of SPECT/CT at Halifax Health in Florida, USA, are proving it.

By Greg Freiherr

Diabetics who seek emergency care for painful foot infection at Halifax Health hospitals are benefiting from a streamlined protocol that has cut the time in half from “door to diagnosis” for patients suspected of having osteomyelitis, a bone infection that often requires surgery.

The protocol, which leverages the specificity and localizing capabilities of SPECT/CT, may serve as a model for future efforts to make healthcare better and less expensive. Its development illustrates how technology providers and care providers can work together to promote this.

Pioneering this technique is podiatrist and wound care expert Eric M. Goldenberg, DPM. Working with the Halifax nuclear medicine coordinator, Andrea Huffman, RT(N), Goldenberg is proving the potential of this hybrid modality in quickly and definitively diagnosing osteomyelitis.

SPECT/CT helps accelerate the diagnosis and, therefore, the treatment of patients found to have this bone infection. The sooner the diagnosis, the better the chance of reducing the spread of infection through the patient’s

body, he said. Simultaneously, it spares those without the disease from unnecessary hospitalization—or worse.

“The last thing I want to do is take a patient to the operating room and find out on the pathology report that it was negative,” Goldenberg said. “It has never happened, and I never want it to happen.”

The specificity of SPECT, achieved by visualizing the patient’s radiolabeled white blood cells, combined with CT localization allows physicians to determine—without a doubt—if there is an infection and where it is.

Goldenberg and Huffman contend that by working smarter rather than harder, their SPECT/CT protocol both improves clinical outcomes and reduces cost for diabetics suspected of osteomyelitis. Earlier diagnosis leads to faster treatment and, ultimately, quicker discharge of patients, while shifting care from the inpatient to the outpatient environment.

The conventional diagnostic process requires up to six days. Within that time, X-ray, MRI and SPECT-only scans are performed and interpreted, as listed in the American College of Radiology (ACR) appropriateness criteria. The shortened

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Eric M. Goldenberg, DPM
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protocol streamlines the process, according to Goldenberg. Now, the patient undergoes X-ray and SPECT/CT. This streamlined process can save up to three or even four days, all or several of which would be spent in the hospital.

"Halifax Health is always looking for opportunities to improve outcomes while at the same time gaining efficiencies within the healthcare system," said Matthew Petkus, MBA, RT(R)(CV), Halifax Health service line administrator for Clinical Ancillary Services. "With the new age of healthcare reform, being able to achieve the best possible outcome in a condensed time frame is very important to healthcare's future success."

Better Care at Less Cost

The significance for public health is staggering. About one in 10 people in the U.S. have diabetes.¹ More than 60 percent of non-traumatic lower leg amputations occur in diabetic patients, according to the American Diabetes Association.¹

Improving patient outcomes is the prime consideration behind using the new protocol, but cost savings are important, as well. So far, Huffman has documented only time savings

from using the protocol. The organization is now building metrics to track the monetary savings.

Getting a handle on cost has been a recent priority, as the healthcare community edges closer to value-based medicine and away from traditional fee-for-service. A new cost consciousness is pervading local and national thinking about healthcare. The U.S. annually spends more than any other developed nation, according to the Organization for Economic Co-operation and Development.² The annual cost comes out to \$8,713 USD per person.²

But value-based medicine is about more than just reducing cost. Its goal is to lower healthcare costs while improving quality and outcomes,³ delivering greater benefit to the patient for the expense of less money and time. As applied at Halifax Health, SPECT/CT achieves this.

This opportunity arose when Halifax Health purchased five Siemens Symbia™ scanners, four in 2010, at the flagship hospital in Daytona Beach, the other in 2012, at the medical center in Port Orange. Soon after these systems became operational,

the Siemens product sales executive, working with Huffman, began looking for clinical opportunities unique to the new scanners. Goldenberg was receptive to SPECT/CT and recognized early the potential to improve and shorten the diagnostic process associated with osteomyelitis.

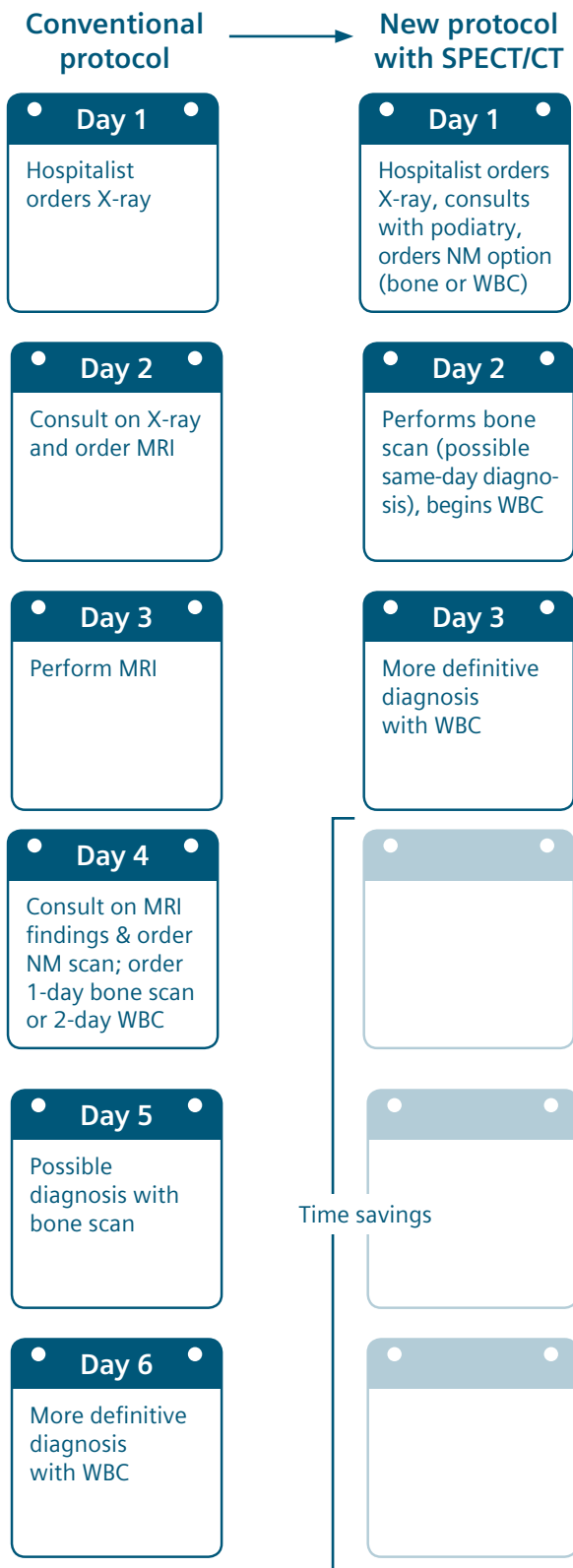
Before the Symbia SPECT/CTs arrived, emergency physicians followed the ACR protocol under which X-rays of the foot were ordered, followed by MRI, and then a nuclear medicine scan, usually involving white blood cells (WBC), drawn from the patient, labeled with radioisotopes and injected back into the patient.

Increasingly, over the past six months, Halifax emergency physicians have gone straight from doing X-rays to nuclear scans. WBC SPECT/CT, performed on their Siemens scanners, determines whether infection is present, if it is in the bone and, if so, exactly where.

MRI was removed from the protocol because it is not as specific, which can lead to inconclusive results, according to Goldenberg. For example, MRI has been inconclusive in cases when SPECT/CT definitively showed

Impact of SPECT/CT

On diagnosis of osteomyelitis at Halifax Health



its presence. Conversely, MRI has been positive for osteomyelitis, only to be contradicted by SPECT/CT.

This is illustrated by a recent case in which MRI demonstrated “extensive destruction of the first metatarsophalangeal joint... and basically all of the proximal phalanx consistent with osteomyelitis and septic arthritis,” according to the radiology report. The SPECT/CT study, however, identified only soft tissue swelling “that does not involve any of the adjacent bones,” the nuclear medicine report stated.

Rather than taking the patient to the operating room, as would have happened if the MRI were the only modality used, “we sent the patient home with visits to our outpatient clinic for wound care,” Goldenberg said. “With antibiotics, the patient did very well—and we saved a tremendous amount of healthcare dollars.”

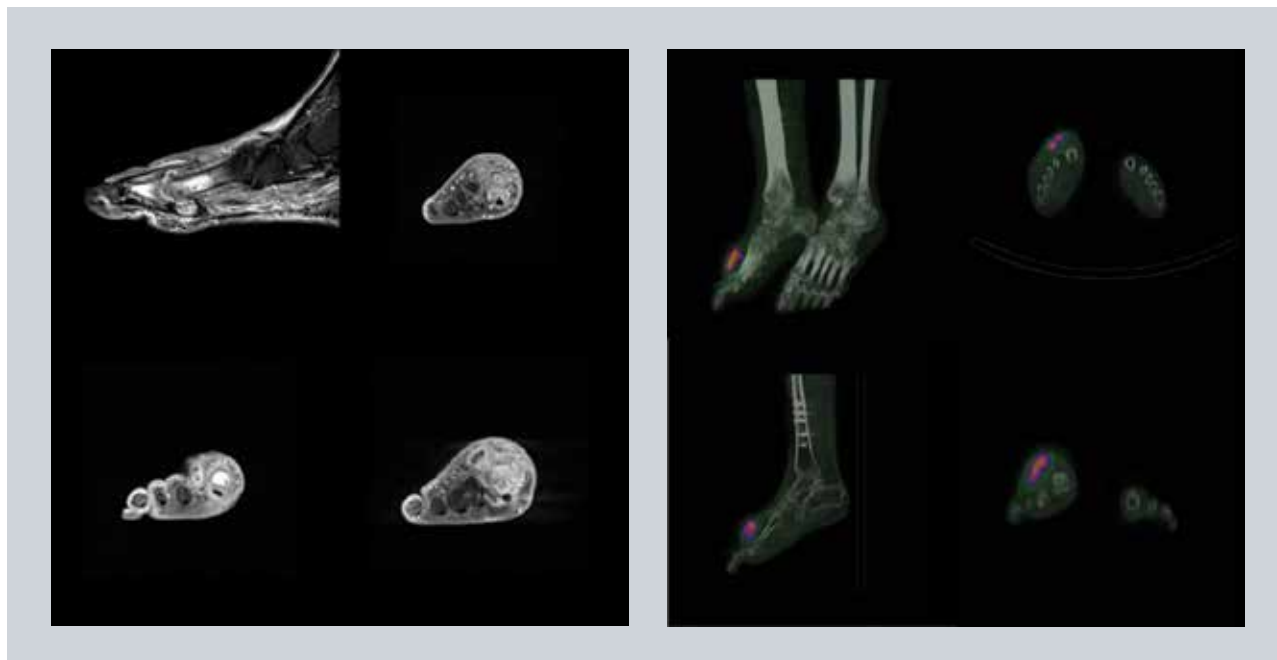
A New Workflow

Under the revised protocol, on the first day, the hospitalist orders the X-ray, consulting on the results with a specialist of podiatry or infectious disease. The decision is then made whether to order a two-day WBC scan. If ordered before 3:00 pm, SPECT/CT results can be in hand before close of the second day. If ordered after 3:00 pm, the process takes an additional day, bringing the total to three days—half the norm.

“The radiology department’s initiative with SPECT/CT for osteomyelitis was unique in that it considered an inefficient process for the diagnosis and management of a condition and proactively sought how to improve the time from diagnosis to treatment of a patient,” Petkus said. “This ultimately leads to better patient care, improved clinician satisfaction, reduced length of stay and overall a more efficient episode of care. Instead of being just diagnosticians, it turns the nuclear medicine department into the driver of an advanced care pathway.”

Goldenberg has personally championed this change, rallying colleagues to the cause with clinical presentations, one delivered to emergency room doctors and staff at 7:00 am. Working in concert with Goldenberg, Huffman—with assistance from Siemens—has spread the word about the benefits of the new protocol among ordering physicians. Huffman’s efforts have also led to administrative approval to alter radiopharmacy hours to accommodate weekend and late orders for radiolabeled WBCs, so the SPECT/CT protocol could be used throughout the week.

With faster diagnosis and more effective treatment has come increased patient satisfaction, according to Huffman. This translates into better HCAHP (Hospital Con-



A comparison between MRI (left) and SPECT/CT (right) imaging demonstrates that, in the same patient, the MRI is positive for osteomyelitis, but the SPECT/CT WBC imaging came back negative. As such, the patient's care pathway was adjusted according to the diagnosis obtained from SPECT/CT, which avoided sending the patient to the operating room and the associated healthcare dollars. Data courtesy of Halifax Health, Florida, USA.

sumer Assessment of Healthcare Providers and Systems) scores, she said. These scores, obtained from patient surveys about the care they receive, are becoming increasingly important.

"HCAHP factors heavily into how we get reimbursed in today's value-driven healthcare," Huffman said.

The increased profile of nuclear medicine in the management of patients suspected of osteomyelitis validates efforts by Halifax Health to acquire the SPECT/CT scanners. The recent success with the systems may prompt the development of other cost-saving protocols involving bone disease, according to Huffman. In the immediate future, however, she and her colleagues are focusing on the formalization of the protocol for osteomyelitis.

Although this shortened protocol has not been formalized, more and more physicians at Halifax are using SPECT/CT to more quickly assess patients suspected of the bone infection. ■

"Finding clinical pathways to decrease length of stay and readmissions is the focus of our organization," said Alberto Tineo, Halifax vice president of operations. "In the long run, it is better patient care to have patients in their correct setting. And [it] is more cost effective."

Tineo has requested a detailed accounting of how exactly the revised protocol affects healthcare costs. A key element of that assessment will likely address whether and to what extent the use of SPECT/CT to diagnose osteomyelitis impacts patient length of stay in the hospital. Huffman and her staff are now gathering the data.

The need for cost-effective healthcare will grow in the coming years with the rise of value-based medicine. The extended reliance on SPECT/CT to evaluate osteomyelitis patients may help illuminate the road to meeting that need. ■

References:

- ¹ "Statistic About Diabetes." American Diabetes Association. Accessed on April 18, 2016.
- ² "OECD Health Statistics 2015." Organization for Economic Co-operation and Development. Accessed on April 18, 2016.
- ³ Cosgrove T. "Value-Based Health Care Is Inevitable and That's Good." Harvard Business Review. September 24, 2013.

The statements by Siemens customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical hospital and many variable exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.