



## Hybrid Imaging Gains Momentum

With more than 500 installations, Siemens SPECT·CT technology shows that hybrid imaging – providing increased diagnostic accuracy and clarity – is here to stay. Four professionals describe their experiences with the imaging modality.

By Amy K. Erickson



**Symbia**  
TruePoint SPECT-CT

Imagine being able to peer inside the body with perfect 3D clarity to identify disease with remarkable accuracy. Symbia® TruePoint™ SPECT-CT (single photon emission computed tomography/computed tomography) from Siemens makes it possible for physicians to do just that. With a single scan, this hybrid technology fuses images captured on both a molecular and structural level, giving doctors a powerful tool for the diagnosis of disease and trauma. Launched in 2005, Symbia is the first system to combine the functional sensitivity of SPECT with the detailed anatomical information provided by a diagnostic CT. The unit can perform three different scans (SPECT, diagnostic CT, and

SPECT/CT) in a single, automated procedure. Combining these technologies brings together the benefits of both procedures to enhance therapy planning, speed exam time, and increase comfort and convenience for the patient. "The SPECT-CT from Siemens is revolutionary," says Jerry W. Froelich, MD, Director of Nuclear Medicine and Molecular Imaging at the University of Minnesota in the USA. "With a very high degree of accuracy, it gives a physician the 'GPS coordinates' of the problem. With this technology, we can get immediate answers to direct questions. Only SPECT/CT can offer this kind of accuracy." From cancer to heart disease, the incorporation of the two imaging scans offers

several critical advantages over separate CT and SPECT studies. Because Symbia SPECT-CT can detect the early faint indicators of disease on a molecular level in addition to providing detailed structural information about a tumor, diagnosis can be earlier and more precise, which leads to more effective treatments. "The SPECT/CT shows precisely where the tumor is in the bone or soft tissue," says Froelich. "Once treatment begins, we can follow the patient's progress using this technology."

### **The Symbia SPECT-CT Experience**

In cardiac applications, SPECT/CT can present valuable information about cardiac function and overall health. "One of



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the consistent problems in cardiac imaging is that you have patients with different body types who have different degrees of attenuation in the heart," explains William F. Pavlosky, MD, Radiologist and Nuclear Physician with the Department of Diagnostic Imaging at St. Joseph's Health Care in London, Ontario, Canada. "The SPECT combined with the CT technology gives physicians the confidence to determine whether they are looking at a real finding or an abnormality caused by motion or attenuation," he says. Pediatric Radiologist and Nuclear Medicine Physician Helen R. Nadel, MD, is the Head of the Division of Nuclear Medicine at British Columbia Children's Hospital in Vancouver, Canada. She routinely uses the complementary images to diagnose health problems in babies and children who are nonverbal or are unable to communicate. "Using SPECT/CT," Nadel says, "we are often able to find unanticipated fractures, infections, and tumor-like structures." For example, she recently treated a child who appeared to be in pain. "When we did a bone scan using SPECT/CT, we were expecting to find a hip fracture, but instead we found an abnormality in the soft tissue around the hip," explains Nadel. The treatment of this condition is very different from the treatment of a fracture. "Being able to see the anatomy of the abnormality is invaluable to accurate diagnosis and treatment," she says.

### **Saving Time, Increasing Diagnostic Precision**

One of the most noteworthy benefits of the Symbia SPECT·CT system is the improvement in diagnostic accuracy because of the vast amount of information gathered during a single scanning session. Additionally, by providing faster SPECT studies and CT studies in less than 30 seconds, the exams are easier on patients. Patients also appreciate the fact that SPECT/CT eliminates days or weeks of uncertainty while waiting for test results. "SPECT/CT can allow in many circumstances one sitting, one test, and an available answer at the end of the test. This reduces the time to diagnosis because there is no need for the patient

to have further tests," says Pavlosky. "In my experience, the higher quality of the CT allows you to see ancillary things like small tumors, fractures in the spine, and other disease processes. The image quality is phenomenal, and this is an extreme benefit to me from the standpoint of diagnosis. You serendipitously find things that you might not otherwise have found, and that leads to better patient care."

The integrated scans also reduce the number of hospital visits. When a child with cancer comes in for nuclear medicine, says Nadel, a CT scan can be performed at the same time, often sharing the same intravenous line. Nadel has been using the Symbia SPECT-CT system since April 2007. "It makes for one-stop shopping, whether we need to test for a single issue or multiple problems," she says. "It takes virtually seconds to acquire the data, and Siemens SPECT-CT has the tools to enable the lowest possible dose that still allows us to get the best information."

### Less Invasive Surgery

Precise scans from the Symbia SPECT-CT also help physicians plan more effective treatment strategies and reduce surgical risk. "Our goal is to diagnose and treat patients with minimally invasive procedures in an outpatient setting," says Homer A. Macapinlac, MD, Professor at the Department of Nuclear Medicine at the Division of Diagnostic Imaging of the University of Texas M. D. Anderson Cancer Center in the USA. "We are not only imaging for the sake of diagnosis, but the images also assist the surgeon in determining the cure." Macapinlac has been a strong proponent of hybrid imaging for many years and was one of the first physicians to use the system. "With early adoption, there is always an uncertainty in embracing advanced technology," says Macapinlac. "We quickly found that this modality allows us to identify the specific clinical need of each patient, which is a significant advantage for surgeons."

For example, notes Macapinlac, the SPECT/CT is often used to image parathyroid tumors. "The neck is a compli-

cated anatomy, and these tumors can be the size of a pencil eraser. It's best to know exactly where the tumor is," he explains. "Armed with SPECT/CT imaging data, a surgeon can be guided to perform minimally invasive surgery to remove the tumor, using a small incision and local anesthetic. Wherever possible, we avoid unnecessarily invasive surgeries."

### Becoming the Standard of Care

Since its introduction, Symbia TruePoint SPECT-CT has seen tremendous market reception and growth. In June 2009, Siemens Healthcare announced the 500<sup>th</sup> installation of its diagnostic SPECT-CT technology. Despite the poor economic market, sales of the SPECT-CT system are on the rise. Siemens reports that a full 50 percent of SPECT sales are for SPECT-CT units, illustrating a clear trend toward hybrid imaging as a standard now in traditional nuclear medicine.

"In these economic times where we are being asked to do more with less, the SPECT/CT is a great benefit," says Nadel. The ability to perform three different types of imaging studies separately or together can lead to 100 percent modality utilization and often, the SPECT/CT system serves both radiology and nuclear medicine imaging departments. Additionally, the equipment is easily adjustable, allowing for a higher patient throughput and increased workflow.

As the dominant solution for molecular imaging, the Symbia SPECT-CT system has the potential to revolutionize the overall diagnosis, treatment, and prognosis of the patient. "Once you have the SPECT/CT, there is no turning back," says Macapinlac. Combining the SPECT and CT technologies brings together the best of both procedures and significantly increases diagnostic precision. "The two together are greater than the sum of their parts," says Macapinlac. "You get a better report that's more accurate. There is less hedging. The SPECT/CT is truly indispensable."

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## Summary

### Challenge:

- Necessity for patients to undergo multiple sessions with different scanning technologies in order to identify health problems
- Problem of metabolic processes making it difficult to corroborate data from separate modalities
- Ancillary tests often needed following a CT or SPECT scan to provide additional information
- Days or weeks of waiting for test results

### Solution:

- Being able to perform three different scans (SPECT, diagnostic CT, and SPECT/CT) in a single, automated procedure with Symbia TruePoint SPECT-CT
- Comprehensive, accurate diagnostic information quickly captured, both on molecular and anatomical levels
- A system that measures attenuation correction with diagnostic multislice CT, providing the most accurate attenuation map possible

### Result:

- Pinpointing the location, size, nature, and extent of the disease in the body
- Two scans performed during a single procedure, reducing exam times and increasing workflow
- Amount of information gathered in one scanning session considerably increased, leading to improved diagnostic accuracy as compared to conventional scans
- Improvement in the overall treatment and prognosis of the patient
- CT scan data acquired in less than 30 seconds, eliminating the inconvenience of waiting for test results
- Greatly improved image clarity for physicians, leading to better treatment and improved planning for necessary surgery

### Further Information

[www.siemens.com/SPECT-CT](http://www.siemens.com/SPECT-CT)