Washington's Crossing

Integrating an enterprise molecular imaging PACS solution

By Xiaoyi Wang, PhD

Mary Washington Hospital in Fredericksburg, Va.

Mary Washington Hospital

THE NEED

MARY WASHINGTON HOSPITAL IN FREDERICKSBURG, VA., is a 412-bed, full-service hospital offering advanced services that are more often found in hospitals located in major cities. Together with Stafford Hospital Center in Stafford, Va., which is another state-of-the-art, full-service hospital, Mary Washington is unique in that the hospital provides comprehensive healthcare for patients who live in Northern Virginia, as well as the Richmond area, with more than 300 area physicians and health professionals who specialize in 45 areas of medical care.

Philips iSite PACS is the enterprise radiology PACS for Mary Washington Hospital, and it provides an enterprise-wide, Web-based image distribution solution that delivers the power of radiology to the point of patient care.

What was missing in the enterprise PACS solution was the ability to provide an enterprise-wide, Web-based solution for molecular imaging, which includes nuclear cardiology, PET-CT fusion, SPECT-CT fusion, and general nuclear medicine.

St. Petersburg, Fla.-based Thinking Systems Corp., a provider of comprehensive molecular imaging PACS solutions with either complete PACS platforms or solutions integrated with third-party PACS, was selected by Mary Washington Hospital to provide a complete molecular imaging PACS solution to be integrated with its Philips iSite PACS.

THE PLAN

Upon assessing the needs at Mary Washington, we first looked at what systems existed at Mary Washington Hospital and had collaborative discussions about what the growth plan was for the organization.

We found that Mary Washington Hospital had three ADAC and one Elscint gamma cameras with ADAC Pegasys nuclear medicine workstations. The ADAC Pegasys workstations only provided limited DICOM capabilities, allowing exporting of only static images and screen captures to PACS. Physicians were not able to view images in color and motion and still depended on modality workstations to do nuclear cardiac quantification analysis.

Mary Washington Hospital also had a Philips PET-CT. In order for physicians to view fused images of some sort on PACS, technologists had to generate fused images on the Philips modality workstations and save them as DICOM secondary captures to send to PACS. Physicians would then read off the saved screen captures. The issue then again was that physicians were not able to manipulate or measure on the screen captures. Therefore, they still had to depend on modality workstations to perform full diagnostic reads.

Mary Washington Hospital's plan was to purchase three new SPECT-CT systems to be installed at both Mary Washington Hospital and the new Stafford Hospital Center, and to replace the

existing ADAC Pegasys workstations with new workstations to be provided by the SPECT-CT vendor.

The ultimate goal was to allow physicians to read nuclear cardiology, PET-CT, SPECT-CT, and general nuclear medicine studies from any location on any iSite workstation with all necessary clinical tools for interpretations so they would be not tied down to any particular facility with particular equipment to read such studies.

THE IMPLEMENTATION

One of the greatest challenges in implementing PACS solutions for molecular imaging is connectivity with modality equipment. Mary Washington's implementation was no exception.

Mary Washington selected GE Infinia Hawkeye as its new SPECT-CT and GE Xeleris as its new nuclear medicine workstation. Bringing data from the legacy ADAC Pegasys workstations to GE Xeleris for post processing posed a bigger challenge than we originally anticipated.

Although Mary Washington purchased GE's connectivity software for ADAC Pegasys, it only works if the user has access to both ADAC Pegasys and GE Xeleris workstations. However, since one of the goals was to eliminate the Pegasys workstations or at least put them away in a closet somewhere, the GE connectivity software would not fulfill the hospital's needs. To address this issue, we deployed our ADAC Pegasys connectivity gateway, which automatically retrieves data from ADAC Pegasys in proprietary format, converts them into DICOM 3.0 format, and then forwards them to GE Xeleris workstations. This gateway also performs HIS/RIS validation to ensure that patient demographic information and study information is correct.

Handling GE SPECT-CT fusion also proved to be a significant challenge, due to the fact that this is the first site to handle GE SPECT-CT fusion with a third-party product in a PACS environment. Many software modifications had to be made on the Thinking Systems solution in order to fine-tune the fusion of the SPECT and CT images to ensure accuracy, and significant effort was spent to create a seamless workflow with the right hanging protocols.

Since Thinking Systems' molecular imaging solution was to be integrated with Philips iSite PACS and use iSite's archive as the central repository for all molecular imaging data, the implementation was designed in such a way that data from all sources flow from the modalities through Thinking Systems ModalityBroker™ to Philips iSite PACS seamlessly without any human intervention. Also, since data from different sources could be billed by iSite to different cost centers, different data routing rules were deployed based on the sources of the data. The ModalityBroker also provides bi-directional data flow to allow data to be pushed back to the modalities when needed, through either DICOM or proprietary formats.

In order to achieve enterprise-wide Web access, Thinking Systems' clinical applications are served by Thinking Systems' thin-client server, providing users with the complete suite of clinical applications available on any iSite workstation either through iSite Radiology (thick-client workstation) or iSite Enterprise (thin-client workstation).

THE BENEFITS

The biggest benefit that physicians reap from this implementation is that they now are free to roam from facility to facility and still are able to accomplish the work they need to do. Having to cover multiple facilities many miles apart, this means great time savings, cost savings, and much improved patient care.

Being freed from the bondage of the modality workstations and having everything they need for all modalities at their fingertips in one single environment no doubt greatly improves the physicians' productivity.

Another great benefit of such enterprise solution is that now the horizon is broadened for what physicians can do. Now they can not only compare patients' radiology images with their molecular images, but also access patients' prior reports and other medical information available on enterprise PACS related to molecular imaging studies. This translates into much better quality of patient care, great improvement in physicians' and technologists' productivity, and eventually better quality of life of these clinicians as well.

| *Xiaoyi Wang, PhD, is president and co-founder of St. Petersburg, Fla.-based Thinking Systems Corp. Direct questions and comments to editorial@rt-image.com.*