

Brigham and Women's Hospital: DR Meets Needs of Fast-Paced Ambulatory Center

Digital radiography enables this teaching hospital to efficiently accommodate an unpredictable workflow in the walk-in clinic.

By Judith Gunn Bronson, MD

Filmless radiography saves a hospital money on film and chemicals, and it makes implementation of picture archiving and communications system (PACS) easier. For some departments, it has an even larger benefit: it enables astonishing workloads to be handled efficiently.

Brigham and Women's Hospital, Boston, a teaching affiliate of Harvard Medical School, was an early adopter of filmless radiography. The ambulatory service of the department of radiology immediately adjoins the always-open emergency department on the first floor of the ambulatory services building, permitting a team of 20 technologists to serve either area as needed. The ambulatory service operates from 7:30 AM to 6 PM Monday through Friday, dealing almost entirely with walk-in patients who have arrived for appointments with various physicians.

As a result of this arrangement, patients do not need to make a separate appointment for imaging before seeing a physician. All that is required is that they arrive with a written order, which may be delivered electronically from their physician's office. A number of organizations, including the Commission of Massachusetts Licensing for Radiologic Technologists and the American College of Radiology, dictate the standards of care for the service.

Usually, only interventional musculoskeletal procedures are pre-scheduled, so the daily walk-in workload is erratic. "The patients come to our door in boluses," according to Angela M. McLaughlin, RT(R)(M), chief radiologic technologist in ambulatory and emergency radiology and manager of the two departments. "It can be quiet for an hour, and then overloaded for the next hour." The workload is impressive. In fiscal year '06, the ambulatory service performed 54,841 general radiography examinations, while the emergency department did another 31,834.

COPING MECHANISMS

How does the service cope with 84,564 examinations per year? It has six general radiography rooms, four equipped with state-of-the-art computed radiography (CR) units and two with digital radiography (DR) equipment, one with a C-arm and one with a U-arm. One of these rooms has the Swissray ddR system. The DR rooms can be changed quickly from acquiring chest films to doing other procedures such as orthopedic imaging, eliminating the need for a dedicated chest room, although many such studies are done in the same room.

The ddR system provides streamlined examination selection, touch screens, and point-and-click selection from modality work lists to hasten completion of examinations so that patients can be on their way to their physicians. A C-arm-equipped procedure room is available for scheduled arthrography and interventional spine procedures. The nearby emergency department has a two-room suite for general radiography, with CR and DR rooms and separate facilities for ultrasonography and CT. The emergency department is in the process of acquiring another DR system with a traditional table and a wall stand to increase its flexibility in dealing with trauma patients.

"The efficiency of DR is a lifesaver for a clinic that does as many examinations in a day as we do," McLaughlin says. "We rely on the DR equipment to move

people through quickly and would really be bogged down if we did not have it."

More than a century ago, what is now Brigham and Women's Hospital established the first hospital in the United States devoted entirely to the treatment of patients with diseases of the bones and joints. That facility, the Robert Breck Brigham Hospital, survives today as the Center of Excellence in Orthopedics and Arthritis, composed of several centers devoted to diseases of the bones and joints according to patient age, sex, body site, and disease or disorder.



The ambulatory center at Brigham and Women's Hospital in Boston did 54,841 general radiography studies last year.

The surgeons at the center of excellence are pioneers in minimally invasive joint-replacement procedures. Because of this center, half or slightly more of the radiology procedures performed by the ambulatory service are orthopedic, and radiologists specializing in musculoskeletal disease are always available. Digital imaging offers several features of particular interest in orthopedics, including the ability to stitch images together to depict a whole area of the body, such as the spine in a patient with scoliosis.

IMAGE DISTRIBUTION

The filmless environment also means that patients need not wait for images to be developed so they can carry them to their appointment.



A technologist checks a radiograph.

A new recovery room for radiology patients just opened up in several hundred square feet of space previously occupied by the film library, now that it is no longer necessary to store films onsite. Patients undergoing interventional radiology procedures by the cross-sectional interventional service will be prepared for those procedures and recover from them in a room with six bed bays

"The images are sent electronically to the physicians over an enterprise Web distribution system,"

McLaughlin explains. "The physicians pull their patients' images up on the Web on their office computers." Patients who need their images for another provider can obtain them on a CD-ROM at no charge, although there is a charge for films.

"We started employing CR equipment years ago and are quickly converting to DR now. Different sections of the department require different things, and even though there are many improvements being introduced in DR, I think there will always be a place for CR," McLaughlin says. Both modalities make the heavy workload manageable. "Filmless radiography is efficient," McLaughlin stresses. "The patients come in, they are imaged, and they go out; there are no cassettes and no waits for film development to make sure the images are satisfactory or to provide images for the clinician."

DR provides numerous benefits, in addition to this obvious one. "With the volume of examinations we perform daily and the acuity of our patients, the efficiency in positioning, and immediate image viewing for quality-assurance purposes, available from ddR is critical to productivity," McLaughlin explains. "Moreover, the rapid changes in DR technology are helping our technologists improve their skills in critical thinking, computer knowledge, and image quality through the now critical use of proper collimation to eliminate noisy images, and the use of filters and other techniques."

McLaughlin continues, "The technologists also are benefiting ergonomically from having remote controls available to operate the tube and the detector. For example, the programmed positions on our new Swissray ddR system unit can be arranged by remote control, so the technologist can focus on explaining the examination to

the patient and answering any questions the patient has. Indeed, we stress patient interaction." As she explains, "We find that our patients are benefiting from the greater attention they can receive when the technologist is using digital imaging rather than the old film-screen method."

EDUCATION AND QA

Continuing education also is facilitated by the filmless technology. Quality-assurance folders are developed on the PACS workstations and used for tube-side chats with the technologists. "These image-review sessions take place right at the computer in our work area; we simply retrieve the images from the Web site," McLaughlin says. "This improves the opportunities for teaching and learning."

The high-technology department requires strong support from the medical imaging information technology team in the BWH radiology department. Procedures have been defined for dealing with any downtime so that the patients can be moved quickly to another room. "Because of the throughput provided by filmless imaging, down periods are not as disabling as they would have been in the past," McLaughlin notes.

"The improvement in efficiency and cost from converting to CR and DR technology is finally paying off," McLaughlin reports. She offers the following advice for those considering going filmless.

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—Angela M. McLaughlin, RT



"The vendor you select and their applications support staff should be working closely with you during and after the install. Keep informed as the improvements in this DR technology continue to evolve. When selecting a vendor to purchase equipment from, use your internal PACS team in the initial negotiation stages and rely on their input prior to your final purchase decision. As we struggled through the frustrations of going filmless, I reminded my staff that this evolution in general radiography allows us as technologists to experience the pioneering feelings that Wilhelm Roentgen must have felt when x-rays were discovered in 1895.

"Make a lot of site visits to see what is available and what it can do, and work closely with your PACS team. Talk to the technologists and listen for comments such as, 'This is the only room I use now,' or, 'Everybody wants to use this room.' We are entirely filmless in our clinic now, and I look forward to installing even more DR equipment," she says. ■

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