



The Benefits and Challenges of Moving Up to Multislice CT A whitepaper for radiology professionals

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The Benefits and
Challenges of Moving
Up to Multislice CT

INTRODUCTION

High resolution images, ultra-fast scanning speed, a broad range of clinical applications, and sophisticated image postprocessing tools, unimaginable just a few years ago, have placed multislice CT into the radiology spotlight. These advances have led to important medical insights and opened up dramatic new horizons in the research, diagnosis, and treatment of disease.

Since its introduction in 1972, CT has been an important imaging modality. Recent technological advances have made CT one of the primary diagnostic imaging tools for a wide range of imaging applications. Yet many small hospital radiology departments rely on dated, single-slice scanners or do not provide CT services at all.

As the costs of CT scanners decline rapidly, making the move to multislice CT is easier than ever before. Today, an advanced multislice unit is priced less than a single-slice CT was several years ago. Moreover, with the accelerated exam throughput and a growing repertoire of procedures, many small hospitals have found that a multislice CT can pay for itself in a short time and go on to turn a significant profit, while enhancing the quality of care in the community.

Additionally, with the acquisition of multislice technology, many hospitals have enjoyed other related benefits, including the ability to attract new physicians, referring physicians, and patients.

This paper provides information on expanding your imaging services with multislice CT, including an overview of new clinical applications, how to select the CT technology to best meet your needs, and the day-to-day requirements to operate the scanner smoothly.

BENEFITS OF MULTISLICE CT

CT has been called one of the most important advances in radiology since Roentgen invented X-ray. The past decade has witnessed a constant progression of innovations in the modality, leading up to the introduction of multislice CT.

Most radiologists are familiar with the broad-based clinical benefits enabled by new multidetector technologies, from faster and higher quality exams to sophisticated 3D image processing. No longer constrained by a patient's limited breath-hold time, multislice CT has also significantly broadened the clinical applications, allowing advanced techniques such as imaging of the heart and peripheral vessels.

Small hospitals stepping up to CT can expect to enjoy many of the following benefits:

Enhanced Image Quality

With a combination of more slices and thinner slices, multislice CT captures significantly larger data sets and yields sharper, more detailed images. Small anatomical features and structures can be viewed clearly, allowing a more confident diagnosis.

Increased Scan Speed

Multislice CT equipment has stepped up CT exam time exponentially compared to single-slice equipment. For example, a scan that might have taken 30 to 40 seconds 10 years ago can now be performed in less than 10 seconds. Significantly faster scan times have minimized image artifacts due to patient movement and breathing, as well as improved the exam quality by reducing and optimizing the usage of contrast.

Exams are more comfortable for patients, who can be on and off the table again in less time. In particular, this makes exams easier for elderly, seriously injured, and young patients.

Increased Patient Volume and Throughput

The increased procedural speed also allows hospitals to handle more cases. Most exams can be completed in less than 15 minutes, allowing four to six exams to be performed per hour. This ability to handle a greater volume of patients increases profitability and allows hospitals to better accommodate emergency situations.

Broader Range of Examinations

The increased speed and spatial resolution provided by multislice CT have eliminated compromises between image quality and scanning of large anatomical areas.

As noted above, the higher image quality has enabled delineation of minute anatomical structures that could not be visualized on single-slice CT. This, combined with abbreviated scan times and minimized artifacts, has opened up a broad range of new clinical applications for the modern modality. It also has greatly facilitated scanning of critically ill and frail patients for whom short procedural time is essential. Peripheral CT angiography (studies of the blood vessels supplying the limbs), cardiac imaging, and virtual endoscopy of the colon are just a few of the multislice CT applications that have recently made their way into the mainstream. These applications are discussed in greater detail below.

Advanced Image Postprocessing and Specialized Clinical Applications

The ability to utilize sophisticated computer technology to synthesize 2D axial images into 3D and other sophisticated renderings has enabled radiologists to capture enormous value from advanced multislice images. With 3D, radiologists can review large image sets quickly and easily for important diagnostic information that might otherwise be missed.

With the advanced postprocessing software, radiologists can look at organs from the inside out, from the outside in, and through cuts across multiple planes. They can segment tissue types and automate accurate measurements that are helpful in the planning of complex surgical interventions. The result is a more precise, timely diagnosis, better treatment planning, and even a reduction in the amount of time a patient may have to spend in an operating room, lowering the risk of surgical complications and enhancing recovery.

Specialized applications for specific organ imaging, such as Brain Perfusion and Lung Nodule Analysis, combine many of these image processing techniques with advanced quantification and reporting tools that further enhance the radiologist's workflow. Another example is Virtual CT Colonoscopy, which provides a comprehensive assessment of the inner colon as well as the surrounding anatomy in one fast and easy exam compared to the invasive optical colonoscopy.

Ability to Attract Patients and Referring Physicians

Naturally, patients and referring physicians are attracted to facilities with advanced technologies and related equipment. These allow for a more comfortable, faster, and more accurate assessment of medical problems. Referring physicians in particular are interested in the increased range of studies that can be performed with multislice CT, which contributes to better overall patient care.

Ability to Attract and Retain Top-Quality Doctors and Clinicians

Likewise, radiologists and radiological technologists are attracted to hospitals of all sizes with advanced equipment. Today, most radiology residents become acquainted with multislice CT equipment at their teaching hospitals and often look for this equipment when considering a position. Most radiologists want to use up-to-date technology, to continue to learn new applications, and to develop professionally. Therefore, multislice CT will help hospitals attract qualified medical staff. This is particularly important for community hospitals, which may find attracting radiologists and technologists difficult, given the current shortfall.

In addition, physicians in other medical specialties also want to become associated with hospitals that provide them with state-of-the-art diagnostic tools and patient care.

Benefits for the Community

Clearly, all the advantages discussed above indicate that multislice CT will improve medical care within the community. Again, patients will benefit from a broader range of diagnostic tests, enabling their physicians to deliver more effective treatments. Your hospital also will likely be able to attract new radiologists and clinical staff as well as patients with its new ability to deliver cutting-edge diagnostic care. In short, the move to multislice CT will benefit the local community at large.

NEW CLINICAL APPLICATIONS

Advanced multislice CT applications often provide more accurate and less invasive alternatives to other diagnostic procedures. CT exams are often used for planning before surgeries and other major therapeutic procedures, thus making the treatment process safer and more effective. Most advanced exams, including cardiovascular CT angiography, can be reliably accomplished on a 6- or 16-slice unit. Advanced cardiac imaging may require cutting-edge equipment such as the new 64-slice CT.

Heart and Vascular CT Applications

One of the reasons most facilities step up to multislice CT is to offer an exclusive cardiovascular CT imaging service. CT angiography, instead of more invasive and costly conventional catheterization procedures, can be used to rule out significant disease in all major vessels and their branches. CT angiography, combined with the ability to create 3D images of the heart and the blood vessels, allows radiologists to clearly pinpoint blockages, stenoses, aneurysms, or other kinds of lesions. The cardiovascular imaging service can be offered to new medical departments such as cardiology and cardiovascular surgery and these procedures generally bring hospitals significant new revenue.

Orthopedics and Trauma Imaging

The high-resolution 3D and multiplanar visualizations possible through multislice CT are making it an increasingly useful and popular modality for examination of the musculoskeletal system. The speed of multislice exams accelerates diagnosis in trauma cases, when minutes count, leading to better outcomes. The 24/7 availability and relatively low running cost of CT service makes it the modality of choice for emergency care. The ability to get fine images of small structures makes multislice CT valuable in pinpointing minute fractures in the smaller bones and joints. The thin-slice acquisition also helps to reduce metal artifacts in postoperative evaluation of patients with prostheses. Multislice CT is increasingly replacing X-ray myelogram, which was the preferred examination of the spine and its nervous system. A CT scan of the spine can be used to assess for osteoporosis by measuring bone density and looking for bone mineral loss.

Comprehensive Brain and Stroke Assessment

From its inception, CT has been used to examine the head. Multislice CT with advanced image postprocessing offers the ability to evaluate the brain in multiple planes, thereby improving the visualization of lesions.

Multislice CT is increasingly being used to assess stroke patients in the early stages. A brain perfusion study, combined with CTA of the head and neck, is able to pinpoint the cause of the stroke and determine whether it is due to a blocked vessel or severe intracranial hemorrhage. Moreover, the perfusion study also provides information about the brain's blood flow and blood volume, which indicate if certain areas of the brain are viable. These values can be used to predict the prognosis after treatment.

Expanded Applications for Body Imaging

The improved speed and spatial resolution of multislice CT increases the overall quality of both new and routine body imaging applications. The main areas include:

Oncologic Evaluation and Follow-up

A long range covering the chest, abdomen, and pelvis can be scanned in a comfortable breath-hold (<20 s), which can be easily accommodated by most patients. The short scan time and thin slice acquisition, using one-millimeter or sub-millimeter resolution, allows the CT angiography protocol to be built into the routine oncologic workup with CT. This combined exam provides the usual information on the extent of the cancer and secondary spread as well as a detailed vascular mapping of the arteries and veins affected by the disease.

CT-guided intervention procedures, such as needle biopsy or drainage, can be performed quickly and safely with the optional CT Fluoroscopy package. This package provides real-time visualization during the needle insertion. Instead of relying on external landmarks and feel, the surgeon can quickly manipulate the needle to reach the target by looking at the visual display, thus reducing potential complications for the patient.

Early Detection of Lung Nodules

Small lung lesions or nodules can be visualized and followed up to measure the growth rate, which is the main determining factor of malignancy. This can indicate the need for surgical removal or treatment at an earlier stage — before the disease has spread.

Urology

Traditional X-ray exam of the urinary system, or intravenous urogram (IVU), usually took multiple films and at least an hour to perform. This exam is increasingly replaced by CT-IVU, which is more reproducible and accurate because of the cross-sectional information.

Pediatric Imaging

Because remaining still even for a short period is particularly difficult for children, they often are sedated for routine CT procedures. Today hospitals are finding that the faster speed of the multislice CT generally eliminates the need for sedation, lowering procedure costs and eliminating risks associated with anesthesia.

Emergency Room

Many of the applications mentioned above — such as evaluation of a stroke or coronary problems — take place in the emergency room. When time is critical, doctors can locate and evaluate problems and intervene as quickly as possible. Multislice CT can also be used in trauma cases, when a fast and clear image of the problem is essential to the treatment, and possibly even survival, of the patient.

3D POSTPROCESSING AND ADVANCED EVALUATION TOOLS

As discussed above, a step up to multidetector CT is often accompanied by a partial paradigm shift in image interpretation from traditional axial images to advanced computerized reformatted images, including 3D images.

While a growing number of specialized CT procedures are now being interpreted directly from 3D images, computerized image reformatting is also extremely valuable in helping radiologists streamline the reading of large, multislice data sets in 2D.

A single multislice exam might generate 1,000 to 3,000 slices. With throughput of up to four exams per hour, the data pool is immense. Reformatted images provide radiologists with summary views of all this information. These views range from cross-sections taken on longitudinal planes to 3D surface renderings of organs to virtual 3D flights through body cavities.

Although often termed “3D image review,” these postprocessing tools also include alternate 2D data reformations as well as a wide range of data measurement applications and more.

Once reformatted, radiologists may navigate quickly and easily through these new visualizations to identify areas of clinical interest, which today most radiologists continue to review as familiar axial images.

Among the exams read directly from 3D images are virtual colonoscopy and cardiac calcium scoring. Diagnosis from 3D images is expected to grow rapidly as applications become more refined and radiologists become increasingly acclimated to 3D diagnosis.

Referring physicians frequently prefer processed 3D images for review and surgical planning. Therefore, 3D processing can be an effective hospital marketing tool to build new business with referring physicians.

Generally, an advanced 3D processing workstation is required to run these applications. However, as scanner computer hardware becomes more sophisticated, a growing number of image reformations can be run on the scanner itself. This strategy can help a small hospital maximize its departmental budget.

Multiplanar Reformatting (MPR)

While CT exams traditionally scan axial images on a transverse plane, using MPR, these images can be reformatted into other 2D views, which include straight planar sagittal, coronal, and oblique projections. Curved reformats can also be generated by drawing a line along a tortuous vessel or irregular anatomical contours. MPR images are generally fewer in number and much faster to review than axial images, making them an extremely useful and popular format for reading large data sets.

MPR is a basic, cost-effective software application that comes standard on most multislice CT scanners. It can easily run on the scanner computer hardware itself. On some scanners, these visualizations can even be created immediately from the acquisition raw data following a scan without going through the middle step of postprocessing.

Maximum Intensity Projection (MIP)

MIP creates a 3D visualization by combining axial slices and displaying the pixels with highest density. This method is commonly used for displaying vessels and bony structures.

MIP images can be created from multiple viewing angles in small increments to generate a rotating display of the anatomy. A defined thickness or slab of image data can be merged together to form a thin-slab MIP display that eliminates most of the surrounding structures; for example, depiction of the vessels without the bone in the background.

Volume Rendering Technique (VRT)

VRT reconstructs a 3D model from a 2D image stack and is a far more sophisticated transformation than MIP, yielding far greater image detail. The technique can simultaneously display a wide variety of tissue structures of various grayscales, opacity levels, or colors in a single volume data set. VRT images can be manipulated interactively to present the best viewing point.

Virtual Endoscopy (VE) and CT Colonoscopy

VE takes advantage of a special type of VRT to create inner views of anatomical cavities, such as large vessels, the bronchial tree, and the colon, as seen in conventional endoscopy. The most popular application is CT Virtual Colonoscopy or CT Colonography for early visualization of colorectal polyps. With this software, a user can view the inner wall of the colon from various angles by manipulating an electronic endoscope and can navigate a flight path through the entire colon despite potential blockages upstream. CT Virtual Colonoscopy offers a less invasive and more comfortable alternative to the conventional optical colonoscopy.

Quantitative Analysis and Related Tools

These include advanced software applications that visualize and automate precise measurements of diameters and lengths of tortuous vessels, tissue perfusion and volumes calculation, and coronary plaques characterization.

SELECTING MULTISLICE TECHNOLOGY TO MEET YOUR NEEDS

The decision to move to multislice CT involves numerous practical considerations — whether your hospital can afford CT, what type of equipment best meets your needs, how you would manage the new capabilities. The following sections cover these points.

Equipment Cost

Not surprisingly, the most basic consideration is whether your hospital can afford multislice CT. Actually, the price of multislice CT equipment has been dropping, so that now the direct acquisition and imaging costs of, for example, a 16-slice machine are not significantly different from those of a single-slice machine a few years ago. However, associated costs may be higher, given the greater complexity of the multislice machines.

These higher costs typically are counterbalanced by the greater profitability of the machines. With exams being performed more quickly, you can perform more procedures in a day, while maintaining the same level of staffing and other fixed costs. Similarly, your hospital will be able to perform a broader range of examinations with multislice CT equipment, enabling you to attract more patients to keep your equipment in full use. The additional volume and breadth of exams mean greater revenue growth through the use of multislice CT. Essentially, the increase in patient volume pays for the new equipment.

Increases in reimbursement for the advanced exams also bring in more revenue.

Equipment Features

Your next step will be selecting the equipment you need — the number of slices as well as clinical and workflow features. Making site visits to other small hospitals using multislice CT will help you make an educated decision. Evaluate the image quality, usage, and practical aspects of their equipment. Equipment vendors will also be able to help you review the capabilities of different machines in light of your needs.

Number of slices. Multislice CT comes in 4-, 6-, 8-, 16-, 32-, 40-, and now 64-slice configurations. How many slices you choose may depend on the types of services or exams you wish to provide, which is typically based on the demographics of your target patient population.

Many community hospitals consider 6-, 8-, or 16-slice CT to be appropriate. The technologies built into these scanners permit high-speed image acquisition, while producing sub-millimeter slices that create top-quality images. The excellent image quality and speed also support the use of cutting-edge applications.

Additional slices enhance diagnostic capabilities and broaden the range of applications, particularly for cardiac studies. A 64-slice CT scanner, for example, may produce exceptionally sharp images with significant visualization of the finest details. It may greatly reduce the time required for a scan; routinely, to less than 5 seconds.

A scanner with more slices allows faster acquisition and makes it easier to examine uncooperative children and frailer older patients. If your hospital specializes in pediatrics or if it is in an area with a substantial proportion of elderly patients, you may find a strong demand for top-level cardiac, stroke, and oncology studies. Therefore, you may decide that more slices would give you the additional ability to better serve this population.

Clinical Applications. Different multislice CT scanners offer different postprocessing and specialized clinical applications as part of the package or as options. Access to a wide range of clinically proven applications to meet the changing needs of radiologists and referring physicians and to grow your department is important. Careful review of which packages come standard on a particular scanner is important because add-on software can significantly increase costs. Today, some manufacturers offer packages such as MPR and CT-Angiography as standard. Equipment vendors can help you review CT equipment and applications to determine what is best for your needs.

User Interface. New technologies are available that automate significant portions of CT imaging workflow and ensure efficient data handling. When assessing the capabilities of scanners, you should carefully review interfaces and the automated workflow as well as how various types of information are presented on the scanner.

Scanning protocols. Some multislice CT manufacturers offer highly efficient automated scanning protocol selection features. Often these automate protocols across a range of parameters to ensure fast, high quality exams. Typically, users will select several initial settings, such as scan volume, mAs, or slice width, and all others will be automatically calculated for maximum results.

Image postprocessing protocols. Similarly, easy-to-use, automated features on 3D and other image processing applications available for your scanner are extremely important. Easy-to-use image processing protocols that can be linked to a particular study or presents in an exam will also ensure fast, accurate results and streamline workflow. Manufacturers differ significantly on the features offered. In addition to user-friendly operation, look for the ability to customize preferences and preset protocols based on criteria such as exam type and user.

Global user interface. If your department is using a range of advanced imaging equipment in addition to CT, a common user interface across all modalities offers significant benefits. A few manufacturers offer this feature. A shared interface will streamline learning curves and deliver everyday workflow efficiencies. Some manufacturers also extend this interface to picture archiving communications systems (PACS) and radiology information systems (RIS), as well as into scheduling and practice management, which will integrate these systems fully into radiology workflow. A global interface provides a comprehensive, time-saving, and efficient way to connect and organize technology.

Console configuration. While CT consoles were traditionally used primarily for setting up scans and running quality checks (Q/C), today some manufacturers are building hardware into scanners that is powerful enough to run some postprocessing programs. This allows technicians to perform advanced image postprocessing right on the scanner, possibly eliminating the need to purchase a dedicated 3D workstation.

In addition to the built-in console, a limited number of manufacturers also offer the option to hardwire a second workstation directly to the CT unit itself. For a small hospital, this second station may provide the best and most cost-

effective method for 3D processing or image interpretation by the radiologist. This second unit typically directly accesses information from the scanner database, eliminating time-consuming data transfer from the acquisition device to the workstation.

Speed of data reconstruction and data transfer. Given today's sizable data pool, how quickly a multislice scanner reconstructs raw data significantly affects throughput, making fast reconstruction time essential. Additionally, today some units automatically reconstruct images on the fly for Q/C, enabling the technologist to rapidly move on to the next exam.

Additionally, when a remote workstation is being used or if the scanner is hooked up to the main archive, the transfer speed of processed data from the scanner to that workstation or archiving system has a major impact on workflow. This should be considered carefully in the purchase decision.

Radiation Dose. Today, CT scanners are available with technology that automatically manages and reduces patient X-ray dose, while allowing for the production of top-quality images. In part, these technologies reduce the tube current — and therefore the radiation dose — for low-attenuation body views and automatically adapt it upward for high-attenuation views. Dose reduction features may be reassuring to both patients and referring physicians, who may incorrectly believe that multislice scanners deliver higher radiation doses compared to single-slice.

On some machines, automatic pediatric protocols with lower voltage and a wide range of mA settings adapt X-ray exposure based on a child's weight and age. Today, advanced CT units even provide automated dose modulation during CT-guided procedures to protect the physician's hands from X-ray exposure.

Patient handling features. Of significant value to radiology departments are patient handling features that enhance patient comfort and streamline workflow. These features include a wide open, easily accessible gantry — which is important for image-guided interventions — automated patient positioning features and laser light markers for accurate patient positioning, indicators to track breath-hold times, and more. A wider gantry also offers better compliance with the needs of claustrophobic and obese patients and allows easier access to patients in distress.

Obsolescence. Given the rapid pace of development in CT technology, even the most advanced scanner will need to be upgraded in the future to accommodate new applications and refinements. Make sure that your CT manufacturer is committed to the product long-term and offers a proven upgrade path.

MANIPULATING, INTERPRETING, AND MANAGING IMAGES

To take full advantage of multislice CT, hospitals of all sizes frequently elect to utilize the advanced 3D CT computer applications discussed earlier. This requires allocating budget for the software and also often for the advanced stand-alone 3D workstations to run them.

For this reason, some small hospitals choose to enter the 3D world gradually and continue with hard copy reading, adding new technology over time. By purchasing a CT unit that offers the dual-console option discussed above, hospitals also may strike a balance between these two alternatives and enjoy advanced image review with a limited budget.

In addition to an image manipulation and interpretation strategy, radiologists must also decide on a method of storage for large data sets. However images are read, a hospital may continue with hard copy archiving, may implement an intermediate electronic data storage solution, or may, with sufficient budget, move to full PACS electronic workflow.

3D Reading on the Scanner Console

As discussed above, some scanners have Q/C consoles powerful enough to run a range of advanced postprocessing applications. This may represent a good strategy for a small hospital just starting out with multislice CT. However, if a scanner is in constant use, throughput will be slow because the unit cannot be used for scanning while the radiologist is using the unit for diagnosis.

For many small hospitals, a better strategy may be to purchase a CT scanner with the dual-console configuration discussed above. The radiologist can read from a separate console directly connected to the scanner, while the technologist works on the built-in scanner console.

Digital Image Review Stations

With a relatively modest increase in budget, a small hospital can invest in a stand-alone digital 3D image review station. When purchased through your CT vendor, these are often within a small hospital's financial reach.

Supported by a broad range of software, today's 3D stations bring the full power of the digital age to the radiologist's fingertips. Multiple stations will allow multiple radiologists to interpret patient images simultaneously. Positioned throughout the hospital, they will allow 3D image access wherever it may be needed.

Hard Copy Archiving

Whatever your image review method, studies may be archived in hard copy, if desired. Because of study size, radiologists should print and store key images only; axial as well as sagittal and coronal slices, if available. Any important 3D processed images also can be archived in print.

Generally, film printing and storage costs will increase by 10 to 15 percent when stepping up to a multislice machine and continuing to read and archive in hard copy. However, the increase in throughput and greater variety of exams generally boosts the number of patients seen, more than covering these costs. Moving to RIS/PACS will, of course, help to reduce storage costs in the long term.

Digital Archiving without a PACS

With appropriate software and hardware, studies may be burned to CDs or other higher capacity spinning media. Many hospitals have found this to be a useful tactic. Note, however, that because the shelf life of a CD is three to four years, studies must be backed up, possibly to tape or other more stable media.

Finally, storage on RAID or a small archive can be accomplished with a mini-PACS, which is a scaled down, more local archiving system.

Full Digital PACS Workflow

To maximize the diagnostic benefits of multislice CT and significantly streamline workflow, many hospitals move into seamless digital image review, management, and archiving with a PACS. This eliminates the need to print any hard copy images except for use by referring physicians and eliminates expensive and time-consuming hard copy filing.

Typically the 3D digital workstation will be connected directly to the PACS to enable seamless workflow. In fact, today many 3D workstations are actually just thin-client software applications fully integrated into the PACS and computer network, bringing the power of 3D processing to ordinary PCs in select locations.

Communication with Referring Physicians

Whether or not digital images are available, most referring clinicians continue to prefer hard copy CT images. Therefore, the move to multislice will not significantly alter your communications with clinicians. However, along with the key 2D images typically provided, many physicians will request select 3D renderings to help them better understand the diagnosis and plan surgeries if appropriate. In fact, many hospitals and stand-alone facilities find offering 3D images to be an excellent marketing tool to increase their referral base.

With a PACS in place, any CT images may be sent digitally to any connected workstation, if desired, while offering physicians access to an entire study.

OTHER OPERATIONAL CHALLENGES

The addition of multislice CT necessitates that a hospital look beyond the management of clinical procedures and data to make sure its entire operation supports the technology upgrade. Hospitals should evaluate all operations surrounding radiology services to make sure that space, personnel, procedures, and office equipment support the new technology.

Working with a Greater Volume of Patients

Given that faster, multislice CT exams will speed more patients through the department, all aspects of patient management must be reviewed carefully. Additional patients must be checked in promptly, be prepared for procedures, and moved in and out of exam rooms expeditiously.

While hiring additional technologists often is not necessary, more administrative personnel are typically needed for a range of responsibilities.

You should also examine the hospital's physical space to make sure that it can accommodate additional patients. Are there enough parking spaces close to the radiology department? Enough seats in the waiting room?

Analyzing and Revising Current Department Administrative Procedures

Administrative procedures must also support the new program. For example, scheduling procedures must be revised in light of the faster exam time; schedulers must be retrained to accommodate the department's increased throughput and possibly to interpose emergency exams.

Education

The main educational challenge is making sure that radiologists, technologists, and administrative personnel are trained to use the new multislice equipment and to follow all supporting procedures. Referring physicians also should be acquainted with the diagnostic possibilities of the new exams.

Many radiologists will have already used some multislice equipment, but may not have the breadth and sophistication of training needed to use today's new equipment on a day-to-day basis. Similarly, many technologists may need additional instruction to work with current CT technology; in particular, to manage Q/C and complex image processing protocols. Equipment vendors, professional associations, and local colleges may provide both the immediate and ongoing instruction in multislice CT that is needed.

Referring physicians and the community most likely will not be aware of the full range of your new multislice CT exams and their diagnostic applications. You may want to run educational programs or create communications for local physicians describing your new capabilities.

Special Workplace Considerations

Naturally, the full benefits of moving to multislice CT can best be realized with accurate image interpretation. In addition to special training, the radiology workplace must be designed to maximize the impact of the new technology. In particular, the radiologists may need more time for reading and an atmosphere and physical environment that allow them to attend to the vast number of details across multislice studies.

You can work to create an environment that supports your radiologists' performance. This might include careful scheduling and the use of technologies that enhance productivity and workflow, a carefully planned physical work environment, and development of a culture that supports commitment and superior performance.

Many hospitals train technologists to handle 3D processing and related procedures, allowing their highly trained radiologists to spend more time doing what they do best — interpreting the image — and generating revenue for the hospital.

CONCLUSION

Multislice CT technology provides significant opportunities for enhanced revenues and patient care. Specific pathways to elevated revenues include increased exam throughput compared to single-slice CT, leading to higher exam volumes. Multislice equipment also allows facilities to perform a broader range of exams, enabling them to handle procedures in-house that might otherwise be referred elsewhere and creating significant opportunities to attract new referrals. Frequently, advanced multislice procedures are reimbursed at a higher rate, adding to the revenue stream.

If a medical facility wants to position itself as a leader in a high-profile specialty, such as cardiac care, having the advanced equipment to perform all the required cutting-edge diagnostic procedures is essential. Advanced technology, such as multislice CT, enhances a facility's ability to attract talented physicians and adds luster to its overall reputation.

Clinically, multislice CT offers faster and more precise diagnoses, while enhancing patient comfort due to the abbreviated exam time. This allows physicians in all specialties to perform more effective and less invasive clinical interventions.

Once a medical facility has decided to implement multislice CT, it will need to make important decisions about the number of slices desired as well as a range of other equipment features. The facility will need to decide how best to take advantage of the increased diagnostic information and how to adapt procedures and overall operations to accommodate the new capabilities.

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The information in this document contains general technical descriptions of specifications and options as well as standard and optional features which may not always be present in individual cases.

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