Multisection CT: Scanning Techniques and Clinical Applications

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Multisection computed tomography (CT) was introduced in 1992 with the advent of dual-section-capable scanners and was improved in 1998 following the development of quad-section technology. With a recent increase in gantry speed from one to two revolutions per second, multisection CT scanners are now up to eight times faster than conventional single-section helical CT scanners. The benefits of quad-section CT relative to single-section helical CT are considerable. They include improved temporal resolution, improved spatial resolution in the z axis, increased concentration of intravascular contrast material, decreased image noise, efficient x-ray tube use, and longer anatomic coverage. These factors substantially increase the diagnostic accuracy of the examination. The multisection CT technique has enabled faster and superior evaluation of patients across a wide spectrum of clinical indications. These include isotropic viewing, musculoskeletal applications, use of multiplanar reformation in special situations, CT myelography, long coverage and multiphase studies, CT angiography, cardiac scoring, evaluation of brain perfusion, imaging of large patients, evaluation of acute chest pain or dyspnea, virtual endoscopy, and thin-section scanning with retrospective image fusing. Multisection CT is superior to single-section helical CT for nearly all clinical applications.

Abbreviation: MPR = multiplanar reformation

Index terms: Computed tomography (CT), helical • Computed tomography (CT), technology • Computed tomography (CT), thin-section

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Introduction
Siemens Medical Systems introduced single-section helical computed tomography (CT) technology for clinical use in 1988. In 1992, Elscint created a dual-section helical scanner, the first and simplest multisection scanner. In the fall of 1998, several equipment manufacturers launched the next generation of multisection CT scanners. These units have four data acquisition systems connected to multidetector arrays to provide a “quad-section” CT scan, increasing the speed of data collection by a factor of four over conventional single-section helical CT scanners. In addition, some of these scanners have gantry rotation speeds of two revolutions per second, twice the speed of most conventional helical scanners. These two improvements have combined to increase the scanning speed by a factor of eight over most conventional single-section helical CT scanners (1).

The benefits of quad-section CT relative to single-section helical CT are significant. The examination can be performed with thinner sections, leading to higher spatial resolution along the longitudinal axis of the patient. Scanning can be performed much faster, resulting in improved temporal resolution and reduced motion artifacts. Intravenously administered iodinated contrast material can be delivered at a faster rate, increasing contrast enhancement in the images. These factors combine to improve the spatial, temporal, and contrast resolution of the images, significantly increasing the diagnostic accuracy of the examination.

The aim of this article is to introduce the technical principles of multisection CT and provide examples of clinical applications. The section on technical principles addresses detector rows, detector array design, selection of section thickness, and scanning speed. The section on clinical applications illustrates isotropic viewing, musculoskeletal applications, use of multiplanar reformation (MPR) in special situations, CT myelography, long coverage and multiphase studies, CT angiography, cardiac scoring, evaluation of brain perfusion, imaging of large patients, evaluation of acute chest pain or dyspnea, virtual endoscopy, and thin-section scanning with retrospective image fusing.

Technical Principles
Detector Rows
The conventional single-section helical CT scanner has one x-ray tube and a single row of detectors. This detector row contains 500–900 detector
Comparison of Existing Detector Designs

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>No. of Elements</th>
<th>Type of Array</th>
<th>Detector Widths (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE</td>
<td>16</td>
<td>Equal-width</td>
<td>16 × 1.25</td>
</tr>
<tr>
<td>Marconi†</td>
<td>8</td>
<td>Unequal-width</td>
<td>2 × 1.0, 2 × 1.5, 2 × 2.5, 2 × 5.0</td>
</tr>
<tr>
<td>Siemens‡</td>
<td>8</td>
<td>Unequal-width</td>
<td>2 × 1.0, 2 × 1.5, 2 × 2.5, 2 × 5.0</td>
</tr>
<tr>
<td>Toshiba§</td>
<td>34</td>
<td>Unequal-width</td>
<td>4 × 0.5, 30 × 1.0</td>
</tr>
</tbody>
</table>

*GE Medical Systems, Milwaukee, Wis.
†Marconi Medical Systems, Cleveland, Ohio.
‡Siemens Medical Systems, Iselin, NJ.
§Toshiba Medical Systems, Tustin, Calif.

Figure 3. Cross-sectional profile of an equal-width detector design. (a) To acquire four 5-mm-thick sections, all 16 detectors are activated. The signals from adjacent groups of four detectors are combined into one channel, creating a virtual detector with a section thickness of 5 mm. (b) To acquire four 1.25-mm-thick sections, only the central four detectors are activated.

Detector Array Design

To register four sections simultaneously, a minimum of four detectors must be placed side by side along the z axis. To offer a choice of several section thicknesses, more than four detector elements along the z axis are required. The current commercial detector array designs may be divided into two groups: those with detector elements of equal width along the z axis (also called matrix detectors) and those with detector elements of unequal width (also called adaptive array detectors) (Fig 2). GE Medical Systems offers an equal-width detector array; Marconi, Siemens, and Toshiba offer unequal-width detector arrays (Table).

Multisection CT detector geometry alters radiation dose to patients for two reasons, which have opposite effects on dose. First, with multisection technology there are thin septa between detectors along the z axis of the patient that absorb radiation and produce no data. These septa are about 0.06 mm thick. On the Marconi or Siemens scanner, the reduction in efficiency is 4.5% in 4 × 1-mm mode and 2% in 4 × 5-mm mode. With the GE Medical Systems design, the reduction in efficiency is 4.5% for all section thicknesses. Second, the umbra-to-penumbra ratio is higher in multisection systems because the ratio of beam collimation to focal spot size is four times higher (for quad-section systems). This fact means that multisection systems produce less unusable radiation (in the penumbra). In summary, multisection CT has dose efficiency about equal to that of single-section CT.

Selection of Section Thickness

Selection of a particular section thickness by the operator causes (a) movement of the pre- and postpatient (if available) collimators and (b) selection of detector rows that are combined with the four data acquisition systems to obtain the specified section thicknesses (Fig 3). Activating or deactivating the detector elements can create...
all available section thicknesses for the equal-width detector design. For unequal-width detector designs, postpatient collimation is not needed to create the wider section thicknesses (5.0 mm and 2.5 mm) (Fig 4a, 4b). However, the narrower section thicknesses (1.0 mm and 0.5 mm) require precise postpatient collimation to cover portions of the outer detectors (Fig 4c, 4d), which are exposed to radiation in the penumbra.

**Scanning Speed**

Single-section helical CT scanners have generally had a 360° gantry rotation speed of 1 second. With multisection CT, some scanners offer a gantry rotation speed of 0.5 second, twice as fast as that of single-section helical CT. Because multisection CT scanners can generate up to four sections per revolution, they are up to eight times faster than single-section helical CT scanners. For any given exposure time and identical pitch and collimation, multisection CT can cover a distance eight times longer than single-section helical CT (Fig 5a, 5b). To enable the same coverage in a given interval with single-section helical CT, the pitch must be increased. Increasing the pitch creates a “fanning out” of the spiral, and image quality will deteriorate due to increasing effective section thickness or increasing noise (Fig 5c). For single-section helical CT to cover the same distance as multisection CT in a given interval at the same pitch, an eightfold increase in section thickness would be necessary (Fig 5d). To keep the section thickness and pitch constant, the scanning time for single-section helical CT would need to be eight times longer (Fig 5e).

Helical interpolation algorithms for multisection CT are different than those for single-section CT. These new algorithms do not cause any increase in image artifacts compared with the algorithms for single-section helical CT; in fact, the helical artifacts are generally much less noticeable in multisection CT because most scanning is performed at lower pitch values than was practical with single-section systems (see the definition of pitch later in this article). With multisection CT, there is the potential for creating a new type of image distortion called a cone beam artifact. Because the x-ray beam diverges slightly along the z axis of the patient in a four-section scanner, the data from the first section are acquired at a slightly different angle than the data from the fourth section. Current reconstruction algorithms do not correct for this angulation, causing minimal errors in the reconstructed images. These cone beam artifacts in four-section systems are negligible compared with other causes of image degradation in CT and can safely be ignored.
Figure 5. Anatomic coverage. (a, b) The coverage for multisection CT (a) can be eight times longer than for single-section helical CT (b) at the same pitch and section thickness. (c, d) To scan the same volume in the same time with single-section helical CT, one must increase the pitch (c) or section thickness (d), thereby degrading image quality. (e) To achieve the same image quality with single-section helical CT, the scanning time would have to be lengthened eightfold.

The increase in scanning speed can be used exclusively to reduce the scanning time, or the faster scanning capability can be exchanged for thinner collimation, yielding higher spatial resolution. Changes in these two parameters are not mutually exclusive. Often, a combination of reduced scanning time and increased spatial resolution is advantageous. The advantages of multisection scanning are as follows:

**Increased Concentration of Intravascular Contrast Material.**—Because scanning is done more quickly, contrast material can be administered at a faster rate, improving the conspicuity of arteries, veins, and pathologic conditions rich in blood flow (e.g., aneurysms, hypervascular tumors, active bleeding). The separation between arterial and venous phases is improved.

**Decreased Image Noise.**—For multisection systems, more patient length is scanned per rotation; thus, for extended-length studies, the x-ray tube current can be higher than for single-section units. The higher current reduces image noise and improves image quality, which is critical for thin-section extended-length studies, especially of large patients.
**Efficient X-ray Tube Use.**—A shorter scanning time leads to diminished x-ray tube heating, decreasing or eliminating delays for x-ray tube cooling between scans; reducing such delays is critical in multiphase examinations. More images are produced during the lifetime of a tube, decreasing operating costs.

**Longer Anatomic Coverage.**—A great advantage of multisection CT over single-section helical CT is the opportunity for longer anatomic coverage. The longer coverage is due to the simultaneous registration of four sections during each rotation and the increased gantry rotation speed. The coverage can be up to eight times longer than that of single-section helical CT with the same scanning time. For multisection CT, the coverage in the z axis depends on the number of data channels, pitch, section thickness, scanning time, and gantry rotation time. The coverage in millimeters is calculated as follows:

\[
C = \frac{N \times P \times S \times T}{R},
\]

where \(N\) = number of data channels, \(P\) = pitch (see Eq [2]), \(S\) = section thickness (nominal) of each channel in millimeters, \(T\) = time of entire scan in seconds, and \(R\) = rotation time (for 360°) in seconds.

Pitch is a parameter without units that provides information about table travel relative to beam collimation. Pitch is defined as the ratio of table travel per gantry rotation to beam collimation:

\[
\text{pitch} = \frac{\text{table travel (mm) per gantry rotation}}{\text{beam collimation (mm)}},
\]

If the pitch is increased while kilovolt peak, milliamperage, and beam collimation are held constant, then the table speed increases, the milliamper-second value decreases, the patient dose decreases, and either the effective section thickness increases or the image noise increases (depending on the section interpolation algorithm used).

For multisection CT, two definitions of pitch are currently in use, the one in Equation (2) and a new one, which we call pitch'. Pitch' is the ratio of table travel per gantry rotation to nominal section thickness:

\[
\text{pitch}' = \frac{\text{table travel (mm) per gantry rotation}}{\text{nominal section thickness (mm)}},
\]

Confusion is caused because some manufacturers of multisection CT scanners are using the original definition of pitch (Eq [2]), and some are using pitch'. For quad-section CT, pitch' = pitch × 4. McCollough and Zink (2) state that use of pitch' is undesirable because it alters the basic relationship between radiation dose, x-ray beam overlap, and pitch already established in single-section helical CT. The original definition of pitch is preferred because it can be unambiguously applied to both single-section and multisection scanning (two channels, four channels, eight channels, etc). With the original definition of pitch, values less than 1 alert the user that radiation overlap is occurring and values greater than 2 alert the user that image quality may be degraded severely. For these reasons, we recommend use of the original definition of pitch and encourage manufacturers to adhere to this convention.

**Clinical Applications**

Multisection CT requires changes in the planning and staging of patient examinations. The scanning time is reduced for most examinations, requiring adjustments in the administration of intravenous contrast material. The amount of contrast material can be reduced, and different vascular phases can be better visualized. Thin-section scanning allows production of high-quality MPR images. In the remainder of this article, several aspects of the
improved imaging and diagnostic capabilities arising from multisection CT are presented. All of the images presented in the article were generated with an Mx8000 scanner and an MxView workstation (Marconi Medical Systems).

Isotropic Viewing
Isotropic viewing refers to the situation in which MPR images can be created in any plane with the same spatial resolution as the original sections. For scanning of small body parts, isotropic viewing is achieved by using the small focal spot on the anode and scanning with ultrathin sections (0.5 mm), resulting in a longitudinal resolution nearly identical to the in-plane resolution. Reformations images (coronal, sagittal, and axial) can be created from one helical acquisition and will have the same spatial resolution as sections from the original acquisition (3). For example, in imaging of the temporal bone, the need for direct coronal scanning is avoided because the reformations images have the same spatial resolution as the images obtained with direct coronal scanning (Fig 6). The examination can be done faster, with improved patient comfort, and with less radiation. More information is derived from MPR images created from one multisection acquisition collimated to 0.5 mm than from two conventional acquisitions (direct axial and direct coronal) collimated to 1 mm (3).

Musculoskeletal Applications
Narrow-collimation (0.5-mm or 1-mm) axial acquisitions yield a volume that allows creation of MPR images with very high spatial resolution. Sections can be obtained in any plane. Positioning of the body part in the gantry becomes less critical because any plane can be reformatted from the acquired volume (Fig 7). This capability simplifies examination of acutely traumatized patients. Imaging data from joints within casts can be reformatted retrospectively into orthogonal planes.

Three-dimensional reconstruction with shaded-surface display or volume rendering can be performed to visualize metal, bone, and joints, but coronal MPR and sagittal MPR images remain the most valuable tools for routine diagnostic work. Narrow collimation, low pitch, and a high milliampere-second value result in detailed MPR images as well as high-quality three-dimensional images (Fig 8). Curved reformation images can be created that emphasize anatomic features (Fig 9), and CT arthrography can include MPR images with high detail (Fig 10).
Figure 8. Thin-section CT of the hip (1.0-mm section thickness, 0.5-mm longitudinal reconstruction interval). (a, b) Coronal (a) and curved oblique sagittal (b) reformation images show fine detail. (c) Lateral surface-rendered image shows the acetabulum and femur together. Surface rendering also can be used to show these structures separately.
Figure 9. Postoperative evaluation of left sacroiliac arthrodesis with multissection CT (2.0-mm section thickness, 1.0-mm longitudinal reconstruction interval). (a) Coronal maximum-intensity projection image shows the sacrum with metal appliances. (b) Curved reformation image shows the sacroiliac joint surfaces and bone grafts (arrow).

Figure 10. Decreased range of motion of the right elbow in a 10-year-old boy after trauma. Sagittal reformation image from double-contrast multissection CT arthrography (1.0-mm section thickness, 0.5-mm longitudinal reconstruction interval) shows deformities of the proximal radial epiphysis and distal humerus and radial subluxation. A 5-mm defect (arrow) in the articular cartilage of the radial head is seen.
Use of MPR in Special Situations

Conventional CT of the paranasal sinuses often includes both axial and coronal projections. Coronal images are often degraded because of artifacts from dental amalgams. These artifacts can be avoided with multisection CT and MPR. At multisection CT, only an axial thin-section acquisition is performed. The coronal images are the result of reformating the acquired volume. When the volume of imaging data used for the reformation images is defined, the regions containing dental amalgams are not included (Fig 11).

Body scanning is preferably performed with the patient’s arms above the head to avoid beam-hardening artifacts. Thin-section multisection CT allows severely ill patients to be imaged with their arms along their sides without major sacrifice of image quality. MPR images of the head and skull base are helpful in trauma patients, patients with respiratory distress, children, and sedated patients, for whom neck extension may be difficult or dangerous.

CT Myelography

Multisection CT performed after myelography yields higher spatial resolution than single-section helical CT performed after myelography. Evaluation can be performed of the disks and
Figure 12. Postfusion degenerative disease imaged with CT myelography (1.0-mm section thickness). (a) Sagittal reformation image shows excellent bone detail and the outline of the subarachnoid space. (b, c) Corrected-axis MPR image (b), which was obtained along the dashed line in a, has the same spatial resolution as an original axial image (c), which was obtained along the black line in a.

nerve roots, as well as the intervertebral foramina. Scanning is performed from the occiput to T2 with 1-mm-thick sections in 40 seconds or less. From the acquired volume, axial sections are reformatted perpendicular to the disk spaces. Sagittal reformation images provide an excellent overview of the relationship between the spinal cord, the subarachnoid space, and the osseous canal (Fig 12).

Long Coverage and Multiphase Studies
Many CT examinations include the chest, abdomen, and pelvis. Narrow-collimation scanning combined with a high milliampere-second value yields high spatial and contrast resolution. With single-section helical CT, it is difficult to combine the requests for high-resolution images, long coverage, and imaging of more than one vascular phase. Multisection CT has improved resolution over single-section helical CT along the z axis. Coronal and sagittal MPR images can be used for diagnostic purposes to a greater extent than with single-section helical CT. The image stacks are preferably viewed on a workstation (soft copies). Rapid anatomic coverage improves temporal separation into arterial and venous phases (Fig 13).
Figure 13. Duodenal carcinoma. Pancreatic and portal venous-phase scans (2.5-mm section thickness, 1.3-mm longitudinal reconstruction interval) yield images with good low-contrast resolution. (a-c) Axial (a), coronal (b), and sagittal (c) images show a dilated common bile duct (✩) and a duodenal neoplasm (arrows). (d, e) Lateral arterial-phase (d) and anterior venous-phase (e) maximum-intensity projection images show normal vessels.
CT angiography performed with multisection CT allows long anatomic coverage without sacrificing spatial resolution (4). The carotid arteries can be depicted well (Fig 14). Scanning of the aorta and the iliac and femoral arteries can be performed in a single scan (Fig 15), thus making efficient use of the contrast material. Because the section thickness can be kept narrow, all parts of the vascular tree can be viewed in high resolution. With single-section helical CT, CT angiography cannot be performed with collimation narrower than 3 mm over larger anatomic volumes. Multisection CT performed with a 1-mm section thickness can cover the entire abdomen in a single scan (Fig 16). Preoperative planning as well as postoperative evaluation and controls can be performed without conventional angiography (Figs 17, 18). The contrast material protocol was similar for the cases presented herein (Figs 13–18). Nonionic contrast material (130–150 mL; iodine, 300 mg/mL) was administered at 3–4 mL/sec, and arterial-phase scanning began 20–26 seconds after the start of the injection. Venous-phase scanning (Fig 13) was started at 65 seconds.
Figure 16. Renal artery stenosis in a hypertensive patient imaged with CT angiography (1.0-mm section thickness). (a) Coronal shaded-surface display image shows a patent aortobiiliac bypass graft (arrows) and a right iliac to left renal artery bypass graft (arrowhead). (b) A 20° oblique maximum-intensity projection image shows severe renal artery stenosis (arrow), which was missed on a preoperative conventional arteriogram.

Figure 17. Preoperative imaging of a renal donor. Oblique anterior CT angiogram (1.0-mm section thickness, pitch of 1.4, 0.5-mm longitudinal reconstruction interval) shows two right renal arteries (arrows).
Figure 18. Endovascular repair of an aortic aneurysm with stent-grafts. Preoperative (a) and postoperative (b) oblique shaded-surface display images clearly show the relationship between the metallic stent and the renal arteries (arrow).
Cardiac Scoring
The presence of coronary artery calcification indicates coronary artery disease. The amount of coronary artery calcium correlates with the severity of disease. Cardiac scoring can be performed with single-section helical CT, but multisection CT allows better temporal resolution (four sections acquired simultaneously with a temporal resolution of 0.3 second). There are two ways to synchronize the CT scan to heart motion: (a) prospective electrocardiographic gating (triggering) and (b) retrospective electrocardiographic gating. The former method is used in a nonhelical mode and permits the x-ray beam to be turned on and off as the tube rotates around the patient. For calcium scoring, the x-ray beam is turned on only during late diastole, when the ventricles are relatively motionless (Fig 19). Prospective gating has a lower radiation dose to the patient than retrospective gating because the x-ray beam is turned off during systole. Multisection CT performed with retrospective gating is being investigated for several uses: (a) coronary CT angiography, (b) assessment of ejection fraction, (c) evaluation of ventricular wall motion, and (d) evaluation of ventricular perfusion. To use helical CT with retrospective gating, one must choose a pitch of less than 1, thus producing radiation overlap, to acquire sufficient data to create images throughout the cardiac cycle.

Evaluation of Brain Perfusion
Dynamic multisection CT can be used to assess cerebral ischemia in acute stroke. The full width of the detector array is used, allowing dynamic scanning of a 4 x 5-mm-thick volume. The scan lasts 40 seconds and begins 5 seconds after the start of a rapid infusion of contrast material. The postprocessing of the image data includes fusion of the four 5-mm-thick sections into one 20-mm-thick slab, thus enhancing signal-to-noise ratio in the scanned volume. Perfusion in the acquired volume can be analyzed and displayed in different ways, for example, as a perfusion map or a time-to-peak map (Fig 20).

Imaging of Large Patients
Imaging of large or overweight patients has been a major problem with single-section helical CT. Owing to limitations on x-ray tube heating, scanning of large patients often results in images of poor quality. With the higher-performance x-ray tubes and wider detector array of multisection CT, large patients can be imaged with substantially better results (Figs 21, 22). The following alterations in scan parameters can be made to accommodate these patients: increased milliamperage, decreased gantry rotation speed, decreased table speed, and increased kilovolt peak. Image quality for large patients can also be enhanced by using 360° interpolation algorithms, smoother image filters, and increased section thicknesses. An increase in section thickness can be accomplished in three ways: prospectively, retrospectively from raw data, or retrospectively from section data.
Figure 20. Acute stroke. Axial color-mapped images of total perfusion (a) and time to peak perfusion (b) show decreased flow and a delayed time to peak in the right frontal and temporal lobes. The regions of interest define areas for measurements not presented herein. A nonenhanced CT scan was normal. (Courtesy of Thorsten Fleiter, MD, University of Ulm, Germany.)

Figure 21. Imaging of a large patient (290 lb [130 kg], chest circumference of 54 inches [135 cm]) with suspected pulmonary emboli. (a) Coronal image obtained with image viewing software (SurView) shows that the left arm is down (arrows). (b) Axial image (2.5-mm section thickness, pitch of 0.8, 1.2-mm longitudinal reconstruction interval) is of high quality and shows no emboli, a result confirmed at pulmonary arteriography performed 2 days later. Multissection technology allows pitch values of less than 1, increasing the effective milliampere-second value per section and thereby improving image quality.
Evaluation of Acute Chest Pain or Dyspnea

Quad-section CT is ideal for evaluation of acute chest pain or dyspnea. The underlying causes can be numerous—for example, pulmonary embolism, pneumonia, aortic dissection, traumatic aortic injury, pleuritis, pericarditis, emphysema, esophageal rupture, and cancer—all of which can be diagnosed with CT. The 10–15-second scanning time minimizes motion artifacts. High concentrations of contrast material can be achieved in the vessels, and high-resolution imaging can be performed.

Virtual Endoscopy

CT virtual endoscopy has been applied to any organ or body cavity with a lumen, including the gastrointestinal tract, the trachea and bronchi, vessels, the urinary tract, and the inner ear and paranasal sinuses (Fig 23). Multisection CT allows fast scanning of a long volume with fine image detail and reduced risk of motion artifacts (breathing and peristalsis). The development of high-performance workstations combined with easy-to-use software makes virtual endoscopy feasible on a routine basis.

Thin-Section Scanning with Retrospective Image Fusing

A feature common to multisecton CT scanners is the ability to fuse thinner sections into thicker ones, thereby reducing image noise. Thin-section scanning of the brain can be combined with retrospective reconstruction of the data set into thicker sections, thereby reducing noise and improving soft-tissue contrast. Thin-section scanning combined with overlapping reconstruction intervals also allows MPR with good spatial resolution. The thin sections of the MPR stacks are combined into thicker sections to reduce noise and improve soft-tissue detail (Fig 24).
Figure 23. Virtual endoscopy. (a) Image from CT colonography of the entire colon and rectum (2.5-mm section thickness), which is performed in 20 seconds. (b, c) Endoscopic (b) and coronal shaded-surface display (c) images show a bronchial stricture (arrow). (d, e) Images from virtual arterioscopy show the aorta before (d) and after (e) endoluminal repair with a metallic stent-graft.
Figure 24. Multisection CT of the brain (1.0-mm section thickness). The 304 source images obtained from the scan were added to form 5-mm-thick sections. (a, b) Original 1-mm-thick section (a) has more noise than a reconstructed 5-mm-thick section (b). (c, d) Coronal (c) and sagittal (d) views are created from the source images. The encephalomalacia (arrows) is a sequela of an old hemorrhage.

Conclusions

Multisection CT is superior to single-section helical CT for nearly all clinical applications. The superior speed of the former can be used to improve the temporal, spatial, and contrast resolution of the images. In addition, multisection CT shows promise for clinical applications that were limited or impossible with single-section helical CT, such as cardiac imaging, organ perfusion studies, and examinations of multiple vascular phases. It also brings isotropic imaging into the CT domain. CT has reached the brink of a new era.

References