Summary and Conclusion

SUMMARY AND CONCLUSION

The introduction of multislice CT was a breakthrough with regard to increased scan speed, improved axial resolution and better utilization of the tube output. The new generation of multislice CT scanners offering simultaneous acquisition, represents an important on the way towards simultaneous acquisition, represents an important on the way towards true isotropic scanning. The main principles of multislice CT will be reviewed along with its advantages, limitations, and new applications. The multislice CT technique has enabled faster and superior evaluation of patients across a wide spectrum of clinical indications. These include CT angiography, CT cardiac imaging, evaluation of brain perfusion, virtual endoscopy as well as dental CT.

Multislice CT is superior to single-section helical CT for nearly all clinical applications. This new technique is likely to revolutionize the practice of radiology. The performances of multislice CT scanners have resulted in a regained interest for CT imaging. New applications are possible, sometimes competing with MR imaging, especially for vascular imaging. CT remains a source of exposure to ionizing radiation and often requires the use of iodinated contrast material.

Advantages of CT over MRI include, relatively less expensive, more widely available, easy to perform, better spatial resolution, and comprehensive nature of CT imaging. This will thus have an impact on the evaluation of patients. This will also have an impact on the practice of CT, especially with regards to data management. Because of the large number of reconstructed images and the dynamic nature of data analysis, new modes of interpretation and data transfer will be required.

Multislice CT is a powerful modality for evaluation of the musculoskeletal system, particularly when coupled with real-time, volume-rendering techniques. Volume-rendered Multislice CT images have become a valuable part of evaluation of musculoskeletal disease. In trauma cases, subtle fractures particularly those oriented in the axial plane are better seen on volume-rendered images. Complex injuries can be better demonstrated with volume-rendered images, and complicated spatial information about the relative positions of fracture fragments can be easily demonstrated to the orthopedic surgeons.

Evaluation of suspected infectious or neoplastic disease is also aided by inclusion of 3D imaging as pat of the musculoskeletal Multislice CT examination. Disease extent can be thoroughly evaluated with 3D images, and therapeutic planning surgical or medical is aided by the anatomic information available from 3D images.

Postoperative studies in patients with orthopedic hardware also benefit from volume-rendered imaging. In these patients, cross-sectional imaging has traditionally been a source of frustration for both the radiologist and the orthopedist because CT images are limited by streak artifact and MR images by susceptibility. However, Multislice CT with volume rendering eliminates most streak artifact and produces high-quality images on which the relationships between hardware, bones, and bone fragments are well demonstrated.

Multislice CT of human skeletal is a nondestructive method that can be used in physical anthropology, diagnostic paleoradiology and in the assessment of burial goods with diagnostic value when applied to ancient bone specimens with doubtful pathologies and those associated with metallic objects because of its ability to offer higher resolution and to minimize artifacts caused by metals.

Pediatric imaging presents many unique and difficult challenges to the radiologist. Correct and rapid diagnosis is extremely important in pediatric imaging. However, it is also main duty to provide tests that are safe and minimize exposure to ionizing radiation. In recent months there has been significant interest and concern regarding the radiation exposure to children from medical tests. MSCT is a significant contributor to pediatric radiation exposure and much attention has been focused on dose reduction in pediatric CT.

The benefits affect all areas of pediatric CT, and new applications are present in vascular, neuro, orthopedic and body imaging. Radiation dose and safety benefits an important consideration in Pediatric CT is minimization of radiation dose. Dose reduction with detector row technology is accomplished in multiple ways. An efficient detector design permits the use of lower technique. Very low mAs scans can be performed without sacrificing diagnostic accuracy.

Elimination of the need to scan in multiple planes. One high resolution isotropic acquisition provides images in any plane or 3D volume. This is very beneficial for applications such as sinuses, facial bones, and extremities. The availability of high resolution data permits the equivalent of multiple exams in one acquisition, e.g. scan the neck, chest, abdomen, pelvis in a trauma patient and also reconstruct the spine or scan the chest and obtain both conventional and high-resolution CT images at the same time. Dose modulation per slice using Real Exposure Control. This feature automatically adjusts the radiation administrated (mAs) to the thickness of the body part being scanned based on attention measurements obtained from the scout view.

This reduces radiation exposure to lesser attenuating body regions such as the thorax. Faster imaging results in fewer poor quality scans related to motion. Consequently, there is less need to repeat exams. Safety is also improved by significantly reducing the need to sedate patients. Shorter exams are better tolerated by children. Also, accurate timing of contrast bolus using acquisition coverage rates up to 90 mm/sec minimizes contrast usage.

A single isotropic axial data set acquired at 0.5 mm will yield 3-dimensional data that can be reconstructed in any plane or viewed as a volume. This improves diagnostic accuracy and can greatly aide surgical planning. Skeletal anomalies can be beautifully displayed in 3 dimensions. Trauma imaging fast, high quality diagnostic images of the head, neck, chest abdomen and pelvis can be obtained in seconds.

MSCT arthrography and virtual arthroscopy can provide sagittal and coronal images, just like MRI, through the process of multiplanar reformation (MPR) at high resolution. With high Z-axis resolution and multiplanar reformation, the diagnostic accuracy of CT arthrography for internal derangements of the joints is reported to equal that of MRI. Virtual arthroscopy can be obtained through the volume rendering of isovoxel image data sets.

MSCT also has an established role in the indications prior, during, and after minimally invasive interventions. Post-interventional follow-up of surgical / radiological procedures. It may be useful for the control of stent localization after aortic stent placement, for the visualization of the chemotherapeutic agent after transarterial chemoembolization. Combining low morbidity, minimal invasiveness, and high cost-effectiveness, in many situations interventional CT is preferable to alternative invasive procedures. With the advent of multislice-row (MSCT) technology, the spatial resolution of CT has markedly increased data sets with an almost isotropic resolution. Since high resolution is achieved during one breath hold, pre-therapeutic workup before musculoskeletal, orthopedic interventions.