

OPTIMIZING MULTISLICE CT – USING 1 MM DETECTOR WIDTH

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With the introduction of multislice CT technology, the trauma imaging possibilities benefited greatly. With the increasing amount of detector rows it has become feasible to use a detector width of around 1 mm. With a four detector row scanner, it is barely possible to scan all regions i.e. head, cervical spine and thorax-abdomen with 1 mm detector width, due to x-ray tube overload/heat. With 16+ channel this is not only possible, but should be of regular use.

Even if the detector width is (sub-) mm thick, the first reconstruction series is to be made with thicker slices, i.e. around 5 mm to give a fast overview of possible life threatening injuries. A second set of thin slices is then reconstructed with approximately 25 % overlap.

The primary purpose of reconstruction thin slice image sets is to make it possible to reconstruct angiographic images, multiplanar reformats and volume rendering images. The multiplanar imaging adds both to the diagnostic information and to the presentation of the case to the clinicians involved. The main drawbacks of 1 mm slices is the increased reconstruction time. Reviewing the set of 1 mm slices is sometimes crucial for the diagnosis, especially in the (cervical) spine, but is also of use for the T&L- spine and in thoraco-abdominal diagnostics. The presentation will show the benefits of the use of 1 mm detector width in all body regions with focus on head, spine and angiographic evaluation as part in a whole body trauma CT.

Head: The 1 mm head scan makes multiplanar presentation possible (with 4 mm brain imaging in coronal and sagittal planes) facilitating the detection and understanding of small subdural hematomas including tentorial SDH. The detection of intraparenchymal blood close to bone is well visualised. The post reconstruction with bone algorithm of 1 mm multiplanar images of the face and skull base makes any rescanning of the face unnecessary. Volume rendered images enhances facial fractures to the surgeons.

Neck & Cervical spine: The standard for c-spine imaging is 1 mm due to the difficulty to detect fractures in the scan plane with thicker images. Soft tissue reformats in the sagittal plan will may show spinal canal haematomas and traumatic disc herniation and partly demonstrate the ligaments. Suspicion of cerebrovascular injury mandates the additional use of iv contrast media when scanning the neck, producing an angiography capable of detecting grade 2-5 carotid/vertebral artery injuries.

T&L-spine: Even if it is possible to confidently identify fractures with thicker slices than 1-3 mm, the thin imaging is soon requested by orthopaedic surgeons accustomed to the higher quality.

Thorax: Detection and delineation of multiple rib fractures and flail chest is enhanced by 1 mm scanning and volume rendering. Angiographic presentation of thoracic aortic injuries is well suited to understand vessel anomalies and the injury itself.

Abdomen/kidneys: The enhanced understanding of liver, splenic, pancreatic and bowel injuries is presented as well as road mapping angiographic presentation to renal bleeds.

Skeletal injury presentation with volume rendering is shown inclusive of peripheral angio.