AbstractID: 9654 Title: Automatic Metal Artifact Reduction from Reformatted Projections in Multi-slice Helical CT

Purpose: Artifacts produced by implanted metal can significantly degrade the diagnostic value of CT examinations. The purpose of this work was to develop a projection-based method for reducing metal artifacts in multi-slice helical CT and to evaluate it using clinical data. **Method and Materials:** The proposed method uses reformatted projections created from helical projection data by combining data at the same angle view over the full longitudinal scan range. After pitch correction, automatic segmentation and removal of the metal were performed on each reformatted projection using edge detection, morphological dilation, and boundary tracing algorithms. 2D interpolation was used to fill remnant voids. The main advantage of this method is that both the segmentation of the metal projections and the interpolations are performed on complete projections with the entire metal present, which is more accurate than those based upon narrow-beam projections in multi-slice CT. **Results:** The method was evaluated using three separate clinical datasets acquired from a 64-slice CT scanner (Siemens Sensation 64). One case was a quantitative CT study for measuring bone mineral density, in which a calibration phantom with five attenuation standards was placed under the patient. The other two cases were typical abdomen/pelvis exams. In all cases the patient had a dense metal hip implant. For the quantitative CT case, the CT number and standard deviation within the bladder and the five calibration inserts were measured. The metal artifacts were reduced substantially and more accurate CT numbers were obtained after the correction. **Conclusion:** A projection-based method for metal artifact reduction in multi-slice helical CT was developed and evaluated using patient cases. The results demonstrated that the proposed method can effectively reduce the artifacts caused by dense metal implants.
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