

AbstractID: 1838 Title: Helical Tomotherapy Quality Assurance using Sinogram Analysis

Current trends in image-guided radiation therapy include the use of on-board CT imaging on treatment systems such as the TomoTherapy Hi-ART2 helical tomotherapy system. The helical delivery of radiation is relatively new and offers several benefits over traditional IMRT. However, these benefits are only as good as our confidence in the accurate delivery of modulated radiation. Modulated delivery is achieved by a sequence of air-actuated binary MLC leaves on the Hi-ART2 system. The verification of the actual delivered treatment can be accomplished using detector data stored by the xenon filled detector array in the TomoTherapy imaging chain. Software was developed that extracts detector data from the delivery sinogram for each fraction. The software will detect and report error if one or more leaves is out of position during treatment delivery. The program compares planned and delivered sinogram data to verify that the proper leaf sequence occurred during the quality assurance and patient treatment deliveries. The program also provides additional features such as machine output reports, MVCT image extraction, the ability to compare measured versus calculated sinograms, and a comparison of two measured or two computed sinograms. Results will be shown for patient and quality assurance delivery sequences.

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