

Challenges and Opportunities in Image-guided Era

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Intensity-modulated radiotherapy (IMRT) is evolving rapidly; the radiation therapy community has begun to regard IMRT as the future standard of care, rather than as experimental or leading-edge treatment. The effectiveness and benefit of IMRT have been confirmed in multiple cancers, specifically in head and neck and prostate cancers. However, IMRT adoption rates vary widely and are impacted primarily by the learning curve for clinic staff, capacity, and physician's practice patterns. Because physicians must participate to a much higher degree in planning and quality assurance, their learning curves to acquire necessary knowledge and skills in cross section anatomical images are also steep. Image-guided radiotherapy (IGRT) or adaptive radiotherapy is an emerging radiation therapy treatment methodology that complements IMRT. IGRT takes tumor and organ motion into consideration and monitor this motion in a near real time mode to make sure radiation is being delivered to the tumor. Furthermore incorporating functional images into management decision-making has highlighted the future perspective of IGRT. However, to radiation oncology community the explosion of overwhelming technology has created challenges which include the lack of enabling tools to facilitate bench to bedside research, bridge knowledge gap, and improve quality and operational efficiency.