

AbstractID: 7511 Title: Defining Picture Archiving and Communication System – Radiation Therapy Extension (PACS-RT) for Progressive Needs for IGRT, 4D CT/PET, TPS and the RT Workflow Management

Purpose: IGRT has become an essential modality to accurately setup patients for radiation treatment. 4D/CT/PET systems generating multiple phases of respiration image-sets have greatly helped clinicians contour integrated target volumes. However, IGRT creates 30-40-times more image data. PACS become important in modern Radiotherapy for massive storage needs. In this study, we defined a new system by expanding PACS into RT extension to cover additional non-DICOM, RT-specified data and intra-departmental communications.

Method and Materials: PACS-RT was designed with two essential core architectures: data storage (archiving) and quality tracking (communications). The RT data stored includes DICOM/RT and non-DICOM-objects: TPS, R&V/HIS data/files. Data are stored in a Terabyte RAID5 server, also hosting a relational database system to manage data/query and archive logs. Siemens RT Archive was implemented as PACS-RT central server. Our dosimetry workflow covering patient procedures from simulation, treatment planning to daily IGRT has been configured. Workflow Manager Software was selected for quality tracking and staff communication. User applications interfacing with PACS-RT include Siemens Syngo workstations and IKOEtech contouring systems. We also developed some software such as IGRT reporting and unattended backup/restore for Pinnacle to fulfill design requirements.

Results: PACS-RT achieves an environment for patient image/data integrity without any “single point of failure”: no more losing patient data. PACS-RT also provides convenient access for staff to check their to-do-lists and patient progress for scheduling. Although there are still functions and interfacing under refinement, our results demonstrate improved efficiency and quality, as proof of concept for this new hybrid PACS-RT system.

Conclusion: Radiotherapy has known complicated workflow with multidisciplinary staff involved. PACS-RT was defined to improve management of data/images and communications; it safeguards patient information and tracks quality in each step we perform. In a high-volume cancer center with advanced treatments, this type of PACS-RT system is proving essential.

Conflict of Interest:

N/A