AbstractID: 8809 Title: An Integrated Software Platform for Treatment Documentation and Outcome Analysis for Stereotactic Radiosurgery and Hypo-fractionated Stereotactic Body Radiotherapy

Purpose: Outcome analysis is an important and challenging task in radiation oncology. We have developed an integrated software platform that facilitates evaluation of outcomes for patients treated with stereotactic radiosurgery (SRS) and hypo-fractionated stereotactic body radiotherapy (SBRT).

Method and Materials: An outcomes-study database was designed, under IRB-approval, to store medical information of patients who undergo SRS or SBRT. The outcomes-study database is integrated with a record-and-verify system (ARIA, Varian Medical Systems) and with an in-house developed hospital database. A software package with GUI was developed using Visual Studio.Net (Microsoft, USA) to evaluate treatment plans. Biological dose models including TCP, EUD (Niemierko's model), NTCP (Lyman, F_{dam}, relative seriality models, etc.) as well as biologically effective doses are determined from dose distributions and DVHs, automatically imported from the treatment planning systems. Patient clinical data (from physician on-treatment and followup visits) and image data (including planning CT scans and followup CT scans) are imported for outcomes analysis.

Results: Thus far approximately 700 SRS/SBRT patients medical records have been populated into the outcomes database. The database contains all medical information, including demographic, social, diagnostic, treatment and follow-up information. As it is linked to the hospital database, treatment information encompasses multi-disciplinary-based treatments including surgery and chemotherapy. The web-based interface enables access and information management remotely. The calculation of biological dose indices provides useful means to correlate dose distributions with clinical outcome with respect to tumor control and healthy tissue complications assessed from followup physical examinations as well as image data used to inspect possible recurrent disease or radiation-induced damage.

Conclusions: The goal of the database is to study the various factors of significance related to the outcomes of patients treated with SRS and SBRT, using non-standard, hypo-fractionated RT doses. Parameters specific to biological dose models will be updated using maximum likelihood analysis.