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Development of a database and software tools for outcome analysis of breast cancer radiotherapy

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Purpose: Dose-volume response data for breast cancer radiotherapy (RT) are generally lacking. The purpose of this work is to develop a database and software tools to facilitate the analyses of short- and long-term radiation dose-volume responses of breast cancer RT.

Method and Materials: As a part of the project aiming to develop the Research Analysis Platform and IGRT Databases (RAPID), a database, consisting of modules to enter breast cancer patient's demographic, diagnosis and staging, radiation treatment parameters, dose-volume data and follow-up information, was developed using FileMaker database software. Data is tabulated in Microsoft Excel and imported into RAPID. Treatment related toxicity definitions for the breast RT were incorporated into the database to standardize the documentation of toxicity which facilitates statistical and outcome analysis. Relevant data can be exported from the database for use with auxiliary software tools for dose-volume response analysis and outcome meta-analysis. RAPID will be integrated with other software tools such as CERR, AutoEUD, and DREES to facilitate modeling of dose-volume responses for treatment planning.

Results: A database and software tools with capabilities of searching, sorting any correlating input parameters are developed. Clinical data for breast cancer patients treated in our institution in the last 10 years with CT-based dosimetry planning are being entered into the database. A FileMaker server has been installed in our department to host RAPID and allows registered users to remotely access password-protected clinical data.

Conclusions: A database and auxiliary tools as part of a software platform, RAPID, has been developed to facilitate storing clinical data and deriving dose-volume responses for breast cancer patients treated with radiation therapy.

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