

B-1016 15:21

A web-based documentation system with exchange of DICOM RT data for multicenter clinical studies in particle therapy

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Purpose: Conducting clinical studies is rather difficult because of the large variety of voluminous datasets, different documentation styles, and various information systems, especially in radiation oncology.

Methods and Materials: We developed a web-based documentation system for transnational and multicenter clinical studies in particle therapy. 550 patients

have been treated at the Heidelberg Ion Therapy (HIT) centre from November 2009 to August 2011. Protons, carbon ions or a combination of both, as well as a combination with photons were applied. To date, 12 studies have been initiated and more are in preparation.

Results: It is possible to immediately access all patient information and exchange, store, process, and visualise text data, any DICOM images and multimedia data. Accessing the system and submitting clinical data are possible for internal and external users. Security and privacy protection is ensured with the encrypted https protocol, client certificates, and an application gateway. Furthermore, all data can be pseudonymised. Integrated into the hospital environment, data are imported via interfaces over HL7-messages and DICOM. Several further features replace manual input and ensure data quality and entirety. Studies can be individually designed to fit specific needs. By including all treated patients (also non-study patients), we gain the possibility for overall large-scale, retrospective analyses.

Conclusion: Having recently begun documentation of our first 300 patients in six clinical studies, it has become apparent that the benefits lie in the simplification of research work, better study analyses quality and ultimately, the improvement of treatment concepts by evaluating the effectiveness of particle therapy.