Westfälische Wilhelms-Universität Münster

UKM Universitätsklinikum Münster

Klinik für Strahlentherapie – Radioonkologie

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About the Department of Radiation Oncology of the University of Münster

At the Department of Radiation Oncology of the University of Münster, patients are treated with the entire spectrum of radiation oncology, as well as malignant lymphoma, hypo-fractionated radiotherapy, high-precision radiation therapy and re-irradiation therapy.
The Department of Radiation Oncology aims to provide the patients with a range of the newest possible treatment. Therefore state-of –the –arts devices have been acquired annually since 2010. Starting with the TomoTherapy® System, followed by the installation of three TrueBeam™ devices during 2011-2013 and the renewal of the afterloading device in 2014. Since November 2014, the clinic is also responsible for managing the German Cyberknife center. The clinic's headquarters are located in the University Hospital in Münster, there is also an office in Münster and in the German Cyberknifecenter in Soest which is around 90 kilometer away from Münster. All locations are connected via Telemedicine devices and thus jointly conduct morning and mid-day discussions. Hence it is ensured that all patients are offered the same high standards of medical care. This also applies to tumor boards and interdisciplinary expertise of the university hospital, which benefits all patients. Moreover, we also have the possibility to provide all our patients with the most suitable environment due to our different locations.
Through the range of our spectrum, we are able to form a team of specialists where each member has in-depth knowledge in all areas of radiation oncology. Decisions are formed multidisciplinary through the participation of radiation oncologists, radiation biologists, and medical physicists. The decisions are made at the basis of international guidelines and are personalized according to the need of each patient. At the same time there is of course scientific monitoring as well as personal follow-ups. Follow-up procedure takes place at the premises of the university hospital in order to ensure the highest standards, and to be able to adequately respond to questions.
Special attention is placed on the integration of imaging, both in the planning process and throughout the radiation itself. The planning images include computed tomography (CT), magnetic resonance imaging (MRI) and positron emission tomography (PET). The hybrid imaging plays a special role; as (PET-CT) and (PET-MRI). The planning images aims to determine the planning target volume (PTV), and to define the organs at risk. This creates a challenge for mobile PTVs and requires a time-dependent (4D) imaging. Examples include lung metastasis and liver metastasis. This imaging is performed at the University of Münster as a 4D-CT and as List Mode PET-CT. That way it's possible to obtain information about tumor movement and adjust the radiation mode. This is done either through the selection of suitable volume to be irradiated or via corresponding control of the irradiation dence. The aim is always to achieve a sufficient dose to the tumor, while optimally keeping healthy tissues safe. These methods par-

ticularly allow shortening the duration of treatment, through the provision of daily high single-doses (hypo-fractionated irradiation).
In order to be able to implement this, it's also necessary to have the appropriate capacities in medical and physical planning. This applies both to the competence of employees as well as the technical and the scientific basis. Therefore it is possible to include all imaging procedure, and to calculate special techniques as Tomotherapy and Cyberknife, as well as the dose distribution of brachytherapy for the common IMRT techniques (step and shoot, sliding window, IMAT).

Furthermore, calculations are also possible for procedures which are not held, such as proton therapy, so the patient could be advised accordingly. The core process of the treatment is the "image guided adaptive radiotherapy", where physiological and tumor related changes are detected through regular imaging, and dose distributions can be adjusted accordingly.
The assessment of dose distribution is done within medical criteria, radiation biology criteria, and medical physics criteria, and thus leads to multidisciplinary decision. Special calculations are performed for the radiobiological aspects, in which the likelihoods of side effects are included. So, the optimal dose and minimal side effects is calculated at basis of facts and data. A special index system has been developed to assess for medical physical criteria, it guarantees the desired dose distribution to the tumor and warns about overdose in healthy tissues. The focus is on personalized treatments that address patients individually, and find the optimal treatment for each.
The handling of patients during and after therapy is a particular concern. Therefore the success of therapy and possible side effects should be observed and documented. This is done not only to help the individual patient, but also to further optimize the therapy procedure. The data runs in international scientific exchanges and thus contribute in developing new concepts. For example, the clinic can provide significant contribution on the treatment of Hodgkin's disease.

The processes and procedures of the Radiation Oncology clinic are integrated in a quality management system that has been constructed at basis of ISO 9000. Additionally, the clinic is also involved in the regulation of the Comprehensive Cancer Center Münster (CCCM). The requirements are formulated by the German Cancer Society and compliance is regularly monitored by audits. In addition, the clinic is controlled by a German Medical Board (Ärztlichen Stelle), which works in accordance with appropriate EU standards.