Protection of quality and innovation in radiation oncology: the prospective multicenter trial QUIRO of DEGRO: evaluation of time, attendance of medical staff, and resources during radiotherapy with tomotherapy.

Abstract:

The technical progress in radiotherapy in recent years has been tremendous. This also implies a change of human and time resources. However, there is a lack of data on this topic. Therefore, the DEGRO initiated several studies in the QUIRO project on this subject. The present publication focuses on results for tomotherapy systems and compares them with other IMRT techniques. Over a period of several months, time allocation was documented using a standard form at two university hospitals. The required time for individual steps in the treatment planning process was recorded for all involved professional groups (physicist, technician, and physician) by themselves. The time monitoring at the treatment machines was performed by auxiliary employees (student research assistants). Evaluation of the data was performed for all recorded data as well as by tumor site. A comparison was made between the two involved institutions. A total of 1,691 records were analyzed: 148 from head and neck (H&N) tumors, 460 from prostate cancer, 136 from breast cancer, and 947 from other tumor entities. The mean value of all data from both centers for the definition of the target volumes for H&N tumors took a radiation oncology specialist 75 min, while a physicist needed for the physical treatment planning 214 min.
For prostate carcinomas, the times were 60 and 147 min, respectively, and for the group of other entities 63 and 192 min, respectively. For the first radiation treatment, the occupancy time of the linear accelerator room was 31, 26, and 30 min for each entity (H&N; prostate, other entities, respectively). For routine treatments 22, 18, and 21 min were needed for the particular entities. Major differences in the time required for the individual steps were observed between the two centers. This study gives an overview of the time and personnel requirements in radiation therapy using a tomotherapy system. The most representative analysis could be done for the room occupancy times during treatment in both centers. Due to the partly small amount of data and differing planning workflows between the two centers, it is problematic to draw a firm conclusion with regard to planning times. Overall, the time required for the tomotherapy treatment and planning is slightly higher compared to other IMRT techniques.