STUDY CASE N° 23: RADIOLOGICAL INCIDENT DURING TREATMENT OF A BREAST CANCER IN GERMANY

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❑ Legal provisions

General provisions for the exposure of patients to radiation are laid down in the Radiation Protection and the X-Ray Ordinances. Detailed requirements are given in the Guideline Radiation Protection in Medicine. Here the responsibilities of the medical practitioner, the medical physics expert and paramedical personnel are specified, in particular concerning dose prescription, therapy planning and application of radiation to the patient. In case of any unusual event, the radiation protection officer has to immediately inform the competent authority.

❑ Incident summary

In 2004, a patient was overexposed during treatment for breast cancer. The incident was discovered two weeks after the end of the radiation treatment, when the patient experienced severe skin reactions.

Three medical practitioners were involved in the treatment of this patient and some of the changes in the treatment were not coordinated within the medical team. The patient received a complex treatment at an electron linear accelerator that covered seven fields and intended a total energy dose of 50 Gy in the target volume. A proper field simulation took place on two days before the therapy began. Due to lack of information, the team from the second day did a wrong field simulation, which was erroneously verified by a medical practitioner. Consequently, the patient received a dose significantly higher than intended.

After the patient worried about difficulties in breathing and skin burns on her back, fibrotic changes of the lung were found it was discovered that she had been overexposed. The wound on the back disappeared some months later.

The authority was immediately informed about the incident. As a result of several examinations, the medical practitioners were instructed:

- To improve internal communication and documentation of the treatment planning; and
- To verify treatment parameters more often during the different stages of treatment.

❑ Dose to the patient

The overexposure of the patient could not be investigated precisely afterwards. The additional dose in a worst-case scenario was estimated to be about 90 Gy, but the observed injuries indicated, that the real overexposure was significantly lower. It was assumed, that the patient received about double the intended dose.

❑ **Lessons learned**

Precise documentation, measures for training of personnel, and an overall quality assurance system have to be implemented in the working practice of radiotherapy. Additional control steps to verify the treatment procedure should be established on a random basis, accompanying the course of the therapy. In order to enforce these requirements, every state authority, that issues licenses for radiotherapy, has to prove, that the licensee complies with these requirements.

Finally, every person involved in radiotherapy procedures should be aware of the responsibility that is necessary for a proper treatment of patients.