Editorial

A quality assurance program: a clear necessity in modern oncology care

To-day, patients expect to have access to optimal medical care. This implies a global approach not only focusing on technical issues but also on the patient's individual circumstances. Taking care of a patient suffering from cancer is a complex issue requiring a multidisciplinary approach from diagnosis to an individualized treatment specific for the patient. He/she should obtain this approach regardless of the centre, the doctors and the day. To be able to perform such optimal patient care we must not only have the tools, the medical care but also a program of quality assurance to minimize errors leading to wrong or inadequate treatment approaches.

In the past, many clinical trials have highlighted the major importance of a quality assurance not only in the review of the treatment but also as a proactive radiation quality assurance. As an example, in the TROG 0202 trial treating head and neck cancer patients with chemo-radiotherapy, 12% of patients had a major protocol deviation in their radiation plans resulting in a 20% reduction in 2 years overall survival compared to the patients with a fully compliant plan (50% *vs.* 70%) (1). Sometimes, a trial may lead to poor conclusions due to its design: in lung cancer, dosimetric studies have clearly demonstrated a significant dose reduction when using proton beams compared to photons with lower doses to the heart and lungs. In a randomized trial, however, they did not find any difference in their irradiated lung volume between both modalities (2). The reason was the lack of on-board imaging in the proton facilities compared to the classical linear accelerators. Hence, the less accurate patient set-up needed to be compensated by a larger safety margin (planning target volume). Clearly, the outcome of a treatment is usually and multifactorial complex and all the processes should be taken into consideration not only a part of them.

For many years, the radiation oncology community is aware of errors happening in the complex radiation procedure (3) and this has led to a long history of quality assurance programs. At the beginning, this was mainly focused on the safety and the quality of the radiation beams delivered by the linear accelerators. However, this has progressively evolved to the control of all procedures, from the initial imaging necessary to plan our treatments to the treatment delivery and follow-up of the patients. It is clear that over the last 20 years the radiation treatment became more and more complex as it is moved from the old 3D approach to intensity modulated radiotherapy (IMRT), volumetric modulated arc therapy (VMAT), stereotactic body radiotherapy (SBRT) and adaptative radiotherapy (ART). These treatments also require more precise imaging [image guided radiotherapy (IGRT)] for the delineation of the tumor volume and organs at risk but also for the verification of the treatment delivery with the on-board imaging device on the linear accelerators. There is also a clear need to introduce a program of quality assurance for the diagnostic tools which is certainly not the case routinely in many centers (4). Computed tomography (CT), magnetic resonance (MR) and positron emission tomography-CT (PET-CT) are very useful tools but require a quality assurance program in order to obtain the different images without any distortion or artefacts.

The introduction of a quality assurance program is not only designed to avoid errors or incidents but also detect them as soon as possible. In the Epinal case, the errors in the calculation of the dynamic wedge have let to overdosage in a lot of patients which could have been detected with an *in-vivo* dosimetry (5). Building a quality assurance program also allow for the detection of some small problems in the daily practice and so avoiding them to combine to a major incident.

The quality program should be developed through the whole department, the hospital and even better at the national level. For the last 20 years, the Belgium College of Radiation Oncology has performed many site visits and studies involving the different radiation facilities not only into improving the radiation process but also in an uniformizing the treatment approach in the country. The program should also include and promote a continuous education system and an access for the patients to the up-to-date technology. By definition, this should be extended to all the disciplines involved in cancer patient care from diagnosis over treatment to follow-up and even prevention.

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