THE USE OF THE FRENCH-ITALIAN GLOSSARY IN GYNECOLOGICAL CANCERS.


The diversity and severity of early and late complications in patients with gynecological tumors have lead to the development, by an international group of experts, of a glossary, assessing these complications in terms of severity in 14 organs or normal tissues (Chassagne, 1993). The aim of this glossary was to standardize complication assessment and allow comparisons between different therapeutic strategies.

One of the major advantages of this glossary is the differentiation between minor and moderate complications which can be somewhat subjective. This glossary has been shown to be very useful in evaluating treatment protocols. With the information provided by the evaluation of mostly late complications, their occurrence has been modified by adapting brachytherapy techniques (Crook, 1987).

Despite a detailed definition of these complications however, some difficulties have been demonstrated : heterogeneity in the event progression. A prospective evaluation of complications is the best approach as it allows not only to grade them at a particular point in time, but also to record their duration and their possible reoccurrence.

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THE AADK-SYSTEM: WHY AND HOW TO USE IT?

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The AADK-system for recording morbidity after radiotherapy in carcinoma of the uterine cervix has been validated in a retrospective study of 442 patients. The system has proved its efficacy by demonstrating significant differences between complication risks after different treatment strategies in any disease stage. Significant differences have also been demonstrated between any complication grade and increasing disease stages. Results from the retrospective study concerning different normal organs damages will be presented.

The AADK-system is easy to use. The system only requires that each complication and its treatment are registered. No immediate grading of complications is necessary. Instead, grading is performed in connection with extraction and analyses of data. Such recording allows separation between early and late morbidity, comparison of results with those from other studies applying another system, as well as reporting frequencies, prevalences, actuarial estimates, complication free survival, and combined organ morbidity. The AADK-system is now being used in a prospective investigation in several Scandinavian institutions. Examples of how it is applied will be demonstrated.

3D-ELECTRON BEAM DOSE CALCULATIONS VIA THE PHASE SPACE EVOLUTION MODEL.

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The Phase Space Evolution model (PSE-model) for electron beam dose calculations has been under development since 1987, and developed from a model to calculate depth dose curves of mono-directional, mono-energetic, broad beams into a three-dimensional model to calculate dose distributions of clinical beams with high accuracy. The model was developed to overcome the limitations of pencil beam type calculation models. Regarding speed and performance the model is similar to the Macro Monte Carlo Method, but the PSE-model is a strict numerical method.

The model takes all relevant physical processes into account via pre-calculated distribution functions in the phase space of position, energy and direction. Those distribution functions are calculated from analytical equations; using EGS4 generated Monte Carlo distribution functions show only minor improvements.

The PSE-model has very significantly increased in speed and requires substantially less memory by using Phase Space Depth Evolution instead of Phase Space Time Evolution as originally envisaged.

The model requires as input the initial phase space describing the characteristics of the clinical electron beam in use. A rather simple procedure has been proposed to achieve those initial phase spaces.

The program code is available for research purposes since June 1st, 1998, via Jack Janssen, E-mail: jansson@kth.azn.nl

DOSIMETRY AND DOSE CALCULATION USING A MULTI-LEAF COLLIMATOR

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The dosimetric characteristics of a MLC-collimator depend to a great deal on the positioning and design of the collimator. In most applications the MLC is replacing the lower conventional collimators or even placed below the conventional collimators. In this geometry the MLC can, dosimetrically, be regarded very much as a replacement of cerrobend blocks resulting in similar dosimetric characteristics.

MLCs positioned higher up in the treatment head will show a more complicated dosimetric behaviour and will not at all be suitable for electron collimation. The focusing of the MLC edges can be designed either for an arc shaped motion and nearly correct focusing in two dimensions or with a linear motion with rounded leaf ends. Electron beam collimation with MLCs have been shown possible to perform using a focused device mounted on a scanning beam accelerator with a minimum of scattering in the treatment head (MM50, Scanditronix). Electron collimation with a conventional treatment unit equipped with a MLC (Clinac 2300C/D) has shown less promising characteristics for the present design of the treatment head.

These MLCs, which both primarily were designed for photon beams, have been investigated with regard to dosimetry in both electron and photon beams. This presentation will primarily deal with beam characteristics of MLC-collimated electron beams and photon beam dosimetry with special attention to electrons in MLC-collimated photon beams.