19.
DOES IN VIVO DOSIMETRY IMPROVE QUALITY OF RADIOTHERAPY: EVALUATION OF 1000 PATIENT'S CHECKS

J. Malicki[1], J. Kierzkowski[1], G. Kosicka[1], M. Dymnicka[1], G. Stryczyńska[2]

1. Medical Physics, 2- Radiotherapy Departments, Greatpoland Cancer Centre, Garbary 15, 61-866 Poznań, Poland.

Radiotherapy is a part of a complex treatment administered to patients with cancer. It uses a radiation which is generated and processed by specialized and sophisticated equipment .

Since the beginning of the 20th century the main idea of radiotherapy remained unchanged. It is based on a proven interaction between radiation and human tissues resulting in their partial or total damage. Over the years more knowledge has been gained, especially on fractionation, doses and the reactions of different tissues and organs. The new sources of radiation have begun to be used, including high energy photon end electron beam accelerators. It became evident that major advance in clinical results might be achieved by limitation of the dose strictly to the target volume (tumour) and by sparing normal tissues.

The issue of critical importance was the execution of the prescribed treatment. When treatment planning with the accuracy expressed in milimmitres became possible it it had to be proved that subsequent treatments would make it possible to assure such accuracy. *In-vivo* dosimetry was believed to be of help in increasing the accuracy in radiotherapy. Since its aim was not to modify the treatment but only to execute it according to a prescribed schedule dosimetry should bring about only benefits when implemented in the routine work

However, being an extensive procedure, dosimetry consumed a lot of effort. In regular work, it is difficult to imagine that each beam could be measured *in-vivo* for each fraction. Measurements at more than one point for one beam were only considered for special and rare procedures such as mantle fields.

In the practice of radiotherapy as carried out at the Greatpoland Cancer Centre routine *in-vivo* dosimetry was started in 1999, first applied to the patient's head and neck, and then extended to all patients. At least two measurements for each patient were made during the whole treatment. Whenever discrepancy occurred, exceeding 10% between the calculated and measured dose, the search for its cause was initiated. The very first problem involving the implementation of our method to the routine, was the number of dosimeters required. Transporting the dosimeter from one unit to another when dosimetry was requested involved a larger error due to the instability of the detecting unit. Another problem was the staff required. At first, physicists took care of dosimetry, but then technologists were trained who are now making the majority of measurements. A protocol from each measurement is included in the patient's record and is shown for approval to the physician.

For the evaluation of our method a group of 1123 patients were analysed: 850 patients with head and neck cancer, 228 with breast cancer and 45 with lung cancer. The number of measurements was at least twice as large because each patient was irradiated from more than one beam.

The mean percent differences between the calculated doses and those measured in-vivo were –1.5 % (Standard Deviation, SD of 7.8) for the head and neck, +3.4% (SD=4.9) for breast, and –2.4% (4.3) for the lungs.

The estimation of the error usinf a total differential method for a single measurement gives the value of more than 10% (upper limit of error). However, the statistical analysis of the measurements on the whole group with nearly a normal distribution provided a more realistic error of about 6%.

Conclusions

In-vivo dosimetry is a standard procedure in conformal radiotherapy. It does not help to avoid casual and even large errors since it is not done for all beams every time. It makes it possible to reduce the mean error in whole group of patients, which in effect should lead to more effective radiotherapy.

20.
SETTING THE PACE FOR STRENGTHENING RADIOTHERAPY IN EUROPE: THE ESTRO ESQUIRE PROJECT.

G. Heeren, A. Barrett, M. Baumann, A. Dutreix, D. Huyskens, E. Lartgau, B. Mijnheer, J. Venselaar, H. Svensson

Estro Public Relations Officer

In most medical specialties the success rate and outcome of treatment coincide and can be