IMRT DosiMetriC VeriFiCation Procedure

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Purpose:
In 2009 our centre has introduced clinically treatments with intensity modulated radiation therapy (IMRT), in complex RT techniques, such as IMRT, it is recommended pre-treatment patient-specific quality assurance (QA). Ibbot (2009) reported that agreement between calculation and measurement is often not reached for many centres using IMRT, and strongly recommends that patient specific QA be performed for all patients having IMRT. It is recommended that patient specific QA not rely on a single method exclusively for all patients. We have developed a patient specific QA program for IMRT patient pre-treatment verification.

Material and methods:

Results of the verification of IMRT treatment of 184 patients of the Hospital de Navarra, from September 2009 until November 2010 are showed. Measurements were made on a Varian Trilogy LINAC (Varian Inc. Palo Alto USA). In the testing of each patient was measured:

1) Measurements of absorbed dose in phantom (IBA and PTW IMRT verification phantom) and ionization chamber PTW 125 cm3 and pinpoint chamber. Measuring doses (high and low) in low gradient areas. The percentages are referred to the prescribed dose. Analyzed with gamma analysis (Low et al 1998).

2) 2D dose distributions for each individual beam, at 5 cm depth of PTW RW3 by PTW seven29 2D array comparing the distribution of Eclipse through Verisoft (PTW) software.

3) Portal dosimetry (Eclipse) . Analyzed with gamma analysis (Low et al 1998).

Results:
Measurements of absorbed dose in phantom are inside acceptability criterion (2%). 2D measurements with ionization array chamber also (3% 3mm gamma analysis) and so Portal Dosimetry.

Conclusions:
Quantitative parameters calculated for a given criterion of acceptability should be adopted in conjunction with displays that show where discrepancies occur. nnPlang and delivery systems which cannot meet the required standards of accuracy, reproducibility and stability to reduce verification will not be accepted by the radiotherapy community.