

A TomoTherapy unit was installed at our institution in 2003. The dosimetric accuracy of the doses calculated by the TomoTherapy optimizer was investigated. An elliptical acrylic phantom was used as a patient substitute. A calibrated Farmer chamber can be inserted on the central axis of this phantom. TomoTherapy plans for a range of fictitious target and organ at risk arrangements were generated such that the point of interest coincided with the Farmer chamber location.

For target doses the expected doses should be equal to the computed doses. The expected dose for the Regions-at-Risk (RAR) areas were corrected for a leakage component that is not considered in the optimizer but does exist in reality. The relative output of the TomoTherapy machine can vary by 2.5 % on a daily basis and all measurements were normalized to the nominal output assumed in the TomoTherapy optimizer.

Measurement showed that the measured target as well as the RAR doses were 5 % lower than expected. These measurements provided justification to adjust the TomoTherapy optimizer accordingly. After this modification a new set of phantom plans were generated and point doses were measured. A mean agreement between measured and expected doses of 0.992 was found.