Purpose:

To provide a confidence level within our clinic relating to the implementation and administration of RapidArc, the AAPM TG119 has been implemented. This task group provides a sound and relatively simple methodology for determining the accuracy of the overall IMRT process administered in the day-to-day clinic.

Methods:

Six different test plans, of varying complexity, were created on mock structure sets, downloaded from AAPM, and delivered. The treatment planning system results were then compared with the delivered results.

Plans were created and delivered on a solid water phantom, using 25x25cm water equivalent slabs of varying thicknesses. Delivered point and planar dose measurements were obtained using an ionization chamber and film, respectively.

Results:

The confidence limit (CL), averaged for all test plans, was calculated for the high dose point in the PTV and for the low dose point in the avoidance structure. This was used as an indicator of the uncertainty of the average difference between measured and planned dose. Where the precision of the delivery is based on how small the CL value is.

For both the high and low dose points, the local CL's were determined to be 0.036 and 0.011, respectively. The range of results for the CL presented in TG119 varies from 0.015 to 0.098 for the high dose point, and from 0.014 to 0.086 for the low dose point.

Conclusions:

Our results indicate the accurate implementation of RapidArc within our clinic, especially when compared to the results of other institutions, published in TG119. Furthermore, the CL value for the low dose measurements is lower than any of the results published in TG119.

We recommend that any clinic conducting IMRT should implement this task group. This will not only provide a greater understanding of the delivery and its limitations, but will also give the overall accuracy and consistency of the technique as it applies to the various treatment sites.