

AbstractID: 10986 Title: Implementation of the TG-128 Recommendations for Quality Assurance of Prostate Brachytherapy Ultrasound Systems

Purpose:

The purpose of this work is to assess several aspects of the implementation of the recommended TG-128 quality assurance tests, including the time to perform the tests, the general range of parameters for several ultrasound systems, and correlation of QA components with treatment technique.

Method and Materials:

The TG-128 tests were performed on a selection of ultrasound units and biplane transducers commonly used in prostate brachytherapy. The author used the following ancillary equipment to conduct the tests: the CIRS Model-45 Prostate Brachytherapy Phantom, a container of distilled water, brachytherapy needles, a needle template, a stepper/stabilizer for the probe, and a computerized treatment planning system. Each test was independently timed and notes were made of any deviations in terms of equipment limitations and expected results.

Results:

The typical time to complete all required tests was approximately ninety minutes. Once the user establishes baseline data and develops a system for conducting the tests, this duration can readily be shortened to one hour. The measurements generally fell well within the tolerances recommended in TG-128 with the exception of needle template/electronic grid alignment (Test 7), where discrepancies approached the action level of 3 mm and the tissue/water correction factor was important. Care must be exercised in performing the volume measurements, as it can be difficult (a) to get acoustic coupling across the angle subtended by the target to be measured, and (b) to move the probe longitudinally without losing coupling. Based on the experience gained performing these tests, a standard form has been developed for recording the results.

Conclusion:

The quality assurance tests recommended by TG-128 for prostate brachytherapy ultrasound systems can be completed in a reasonable amount of time. Consideration must be given by the user as to how these tests relate to the overall quality assurance of the prostate brachytherapy program.