AbstractID: 9646 Title: Verification of Mammosite Radiation Source Position

Purpose: To develop and verify a method for determining source dwell position for implementing a MammoSite® treatment procedure with a Nucletron remote after-loader. **Method and Materials:** When delivering partial breast brachytherapy using an implanted balloon device, a 2 mm error in source dwell position produces a 15% error in dose delivered to the prescription point. Therefore, the procedure for determining a Reference Length entered into the after-loading device produced by one vendor (Nucletron Corporation, Veenendaall, The Netherlands) for the dwell position at the geometric center position of a MammoSite ® balloon provided by another vendor (Hologic, Marlborough, MA) must be determined and verified.. Devices with scales and indicators, connecter between the two systems, dummy wires, transfer tube and software provided by both vendors need to be used together to plan and deliver the treatment. A planning and delivery procedure was developed and tested by means of: 1). phantom measurements using images of a dummy source to compare with film dosimetry of the dose pattern produced by the active source. These measurements established and verified the procedure, and 2). a patient planning and treatment procedure with appropriate imaging QA steps. **Results:** The interpretation and accurate use of the scales and indicators and dummy wires was established. A 2mm offset was confirmed for determining the source Reference Length. It was found to be important to verify the Reference Length value using fluoroscopic and radiographic images acquired with the patient at a conventional simulator. For approximate 10% of the tested cases, adjustments on the order of 1mm were needed based on the simulation procedure. **Conclusion:** The method of determining the Reference Length for Mammosite® treatment planning should be established with images and a phantom. The Reference Length measured for each patient should be verified with an imaging procedure using a conventional simulator.