AbstractID:8784Title :Evalua tionofPRESAG E/optical-CT3Ddosimetryfor commissioningaL inacfor IM RT

Purpose: PRESAGE is an ovel radiochromic plast ic which, incombination with optical -CT imaging, has been shown to have outstanding potential for high-resolution three-dimensional (3D) dosimetry. Here, the first application of PRESAGE/optical-CT to commissioning a new accelerator for IMRT treatment. is presented. Commissioning was achieved using amodified Radiol ogical Physics Center (RP C)I MRT credential ingph antom that enabled 3D dosimetry.

Methods: The RPC phantom w as CT scanned twice, first with the stand ard insert and second with the modified PRESAGEinsert. A 9-fieldIM RTplanwascreate d in theEclipse plann ingsystemto me etth ecre dentialingr equirements on the standardCT -scan, and todeliver 6.6Gyto the primaryPTV. Thisp lan wasth enrecalculated on the second CT scan in corporating the PRESAGE insert. In the lat terc ase, the prescription dose was re duced to 4Gyto avoid ove recording the dosimeter. Cons istent relative fluence bet ween the plans was verified by Ma pCHECK and Dyn aLog file analysis. Af ter irradiation, evaluation of the PRESAGE/optical-CT system was performed by comparison with the independent filman dTLDmeas urementsmade at the RPC. Profilecom parisons and ga mmamapswe re generated to comparebot hse tsof measurements with the eclipse planning dose distribution.

Results: An imp roved ac quisition tech nique led to h igh qu ality lo w noise 3D data (<1%rms) achieved us ing t he PRESAGE/optical-CTs ystem.E xcellent ag reement was observed (gammacrit eriao f3%,2m m) between the PRESAGE and the Eclipse distributions. Similaragreement was observedbet weenth ecor respondingEBT and E clipsedistr ibutions.

Conclusion: Prior studies from the RP C haves hown IMRT commissioning is non-trivial and prone to error. T his work demonstrates success fulintegration of PRESA GE/optical-CT dosime tryinth eRPCIMRT cr edentialing phantoms. The high quality of the 3D dos imetry data (noise ~1 %, ac curate to with 3%) represents a significant improvement over previous workwith PRESAGE, and an ewtool for comprehensive verification of IM RT reatments.