

AbstractID: 13063 Title: Results from multiple radiations of an anthropomorphic spine phantom

**Purpose:** To credential institutions to participate in an IMRT-dose painting spine metastasis protocol.

**Method and Materials:** A mailable anthropomorphic spine phantom was developed and shipped to 21 institutions interested in participating in protocols sponsored by the National Cancer Institute (NCI). The phantom was a modification of the Radiological Physics Center's lung-thorax phantom. An insert was designed to simulate a solid water spinal cord surrounded by a high impact polystyrene bone structure. An acrylic planning target volume is adjacent to the bone structure. The insert houses radiochromic film and TLD. The phantom also contains an esophagus, a heart and two lungs. Institutions were asked to image the phantom, create an IMRT plan to deliver 6 Gy to at least 90% of the PTV, perform their normal IMRT QA, and deliver the treatment plan to the phantom. The spinal cord dose was limited to 3.75 Gy to a volume of less than 0.35 cc and 2.63 Gy to a volume of less than 1.2 cc. The following criteria were applied: PTV TLD  $\pm 7\%$ ,  $\geq 85\%$  of the pixels in regions of interest in the axial and sagittal planes must pass a gamma criteria of 5%, 3 mm, and the plan must comply with the protocol.

**Results:** 21 institutions irradiated the phantom 24 times. 8 of the irradiations failed the criteria. 4 of the failing irradiations passed the TLD criterion, but did not pass the gamma criterion. 4 irradiations failed both the TLD and gamma criteria. One of these also failed the plan criteria. The 3 institutions that irradiated the phantom twice all passed on the second irradiation.

**Conclusion:** The phantom is a useful tool in credentialing institutions to participate in protocols.

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**Conflict of Interest (only if applicable):**