

AbstractID: 7443 Title: Attenuation Due to Bronchial Stents in ^{192}Ir HDR
Brachytherapy

PURPOSE: Evaluate the radiation attenuation from bronchial stents during endobronchial ^{192}Ir HDR brachytherapy. **MATERIALS AND METHODS:** The radiation attenuation of several commercially available bronchial stents was analyzed with an ionization chamber. The stents were divided into three groups: Nitinol mesh (0.5 mm thickness), polyester mesh with silicone coating (1.0 mm thickness); and solid silicone (1.5 mm thickness). A solid cerrobend cube with 9 cm sides was molded into an irradiation cell to produce a collimated beam. The cube had a 4 mm diameter hollow cylindrical shaft in its center for inserting the HDR catheter. A pyramidal shaped opening perpendicular to the axis of the cylindrical shaft served as primary collimator with 1.5 x 1.5 cm aperture. A secondary collimator with 3 x 3 cm aperture was positioned 12 cm from the source. The distance from the source to the center of the ionization chamber was 20 cm. The field size at the chamber position was 5 x 5 cm. The stents were cut longitudinally so that each could be mounted flat on the secondary collimator. The field size at the SDD was verified with Gafchromic film. The attenuation of the radiation beam was evaluated by taking the ratio between the air kerma rate at the SDD with and without the stent. **RESULTS:** The Nitinol stent attenuated the beam by 0.8%, the polyester/silicone by 2.8%, and the silicone 3.3%. **CONCLUSIONS:** The attenuation due to bronchial stents has been measured and can be accounted for since it can be as high as 3.3%. Whether this correction is clinically relevant should be evaluated. Moreover the stent thickness can serve as spacer to help reduce the dose on the bronchial surface for as much as 20%, as determined by Monte Carlo calculation in previous publication.