D2: Assessing the Spatial Dose Correlates for Acute Dysuria following Prostate Radiotherapy using Dose-surface Maps of the Bladder

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ABSTRACT

Introduction: Dose-surface histograms have an obvious limitation; it has no spatial information. One alternative is the dose-surface maps which visualise the spatial dose distribution. In this study, we assessed the spatial dose correlates using dose-surface maps with the risk of acute dysuria. **Methods:** The bladder dose-surface maps of 754 participants from the RADAR prostate radiotherapy trial generated from the volumetric data by virtually cutting the bladder at the sagittal slice intersecting the bladder centre-of-mass through to bladder posterior and projecting the dose information on a two-dimensional plane. Acute dysuria was assessed at the end of treatment. Pixel-wise dose comparisons between patients with and without acute dysuria were performed adjusting for baseline dysuria. **Results:** 391 patients had at least Grade 1 dysuria. Fig. 1 shows the dose for patients without (A) and with (B) acute dysuria with markedly larger 70 Gy line for patients with dysuria. The associations of the spatially-specific dose measures to dysuria were found to be inhomogeneous across bladder surface (Fig 2). Posterior-inferior surface of the bladder were found to have the strongest relationship to the incidence of acute dysuria with the strongest relationship at 11mm from the base of the bladder (odds ratio of 1.32/10 Gy increase of dose, p=0.002). **Conclusions:** Spatially variable response of bladder surface to dose was found for acute dysuria. Pathophysiology of treatment-related dysfunctions can be potentially studied with the aid of the spatially-specific dose-surface map of the bladder.

KEY WORDS:

Radiotherapy; bladder toxicity; dose-surface maps; toxicity prediction