

Proton beam therapy reirradiation for abdominal and pelvic cancers: Outcomes from the Proton Collaborative Group REG001-09 Trial

Michael Chuong, Jing Zeng, Jason Molitoris, Henry Tsai, John Chang, Lane Rosen, Craig Stevens, Carlos Vargas, James Urbanic, William Hartsell

Purpose/Objectives: Reirradiation (reRT) is associated with increased risk of severe toxicity. Proton beam therapy (PBT) is well-suited for reRT because of superior normal tissue sparing compared to x-ray therapy. However, there are limited published outcomes of abdominopelvic reRT.

Materials/Methods: We evaluated 83 patients enrolled on the Proton Collaborative Group REG001-09 trial (NCT01255748) who received proton reRT to the abdomen/pelvis from 2010-2020. Acute and late toxicities were assessed per CTCAE v4.0.

Results: Median age was 64 years; most had ECOG performance status 0-1 (72.3%). Primary tumor site was colorectal (71.1%), otherwise cervix/uterus/vulva (16.9%) or anal canal (10.8%). Adenocarcinoma histology was most common (80.7%). Median interval from prior RT to reRT was 38.6 months. Median total prior RT dose was 50.4 Gy in a median 28 fractions. Median reRT dose was 49.2 GyE in a median 27 fractions. Median reRT BED₁₀ was 57.5 Gy. Once daily treatment was common (77.1%). Uniform scanning (38%) and pencil beam scanning (41%) utilization was similar. Median follow-up was 12 months. Median and 1-year freedom from local failure (FFLF) were not reached and 77.7%, respectively. Median and 1-year overall survival (OS) was 21.0 months and 70.8%, respectively. Acute or late grade 3 toxicity rates were 3.6% and 1.2%, respectively.

Conclusions: To our knowledge, this is the largest analysis of PBT for abdominopelvic reRT. Severe toxicity was rare despite a median reRT BED₁₀ of nearly 60 Gy. Future studies should further explore whether PBT can achieve safe dose-escalation for reRT, which may enhance FFLF and potentially OS.