

# Delivery of Re-irradiation and Complex Palliative Radiotherapy Using Proton Therapy in Pediatric Cancer Patients

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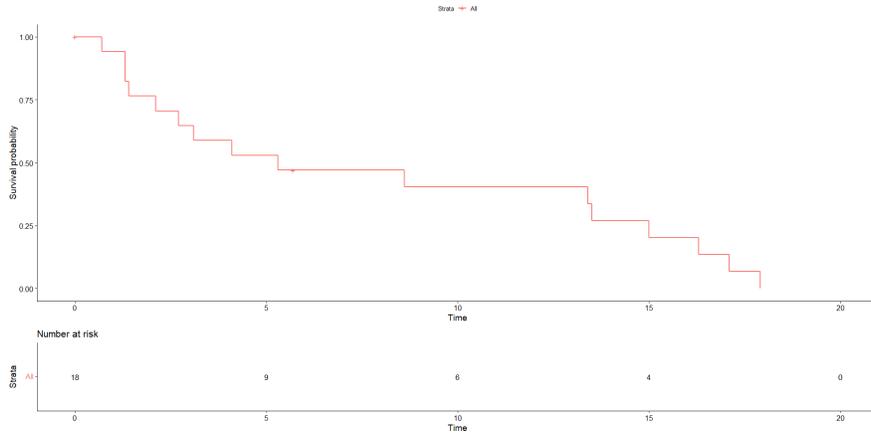
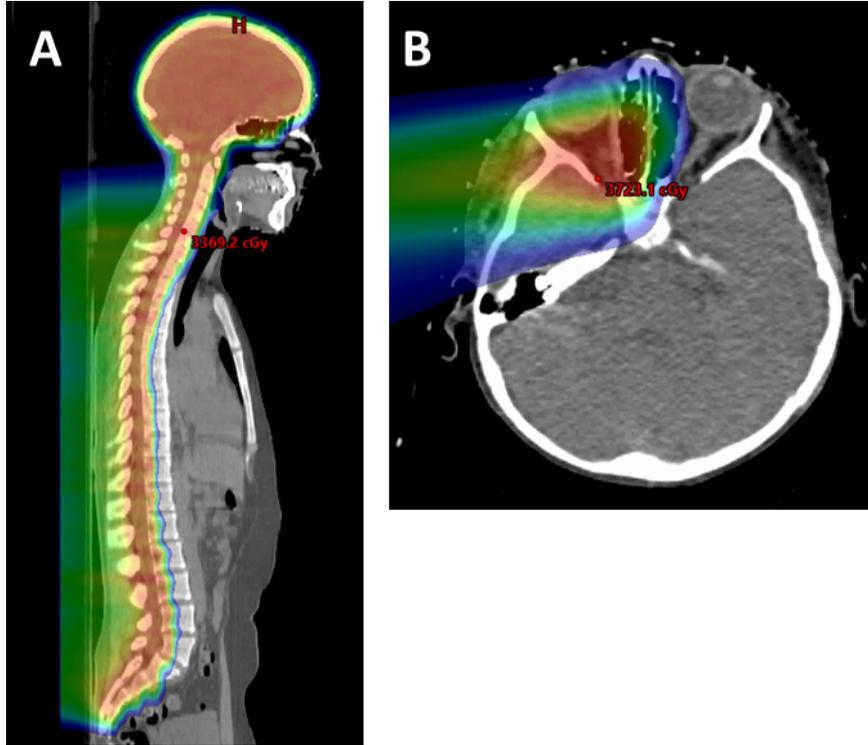
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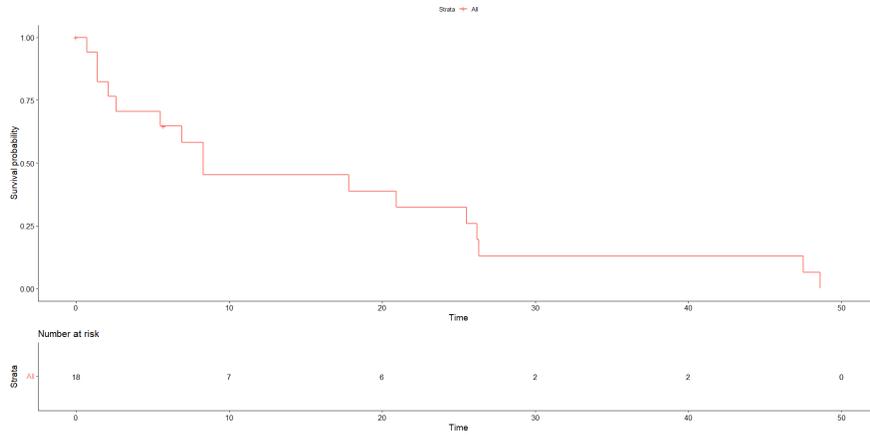
## Abstract

**Background:** Characterize indications for pediatric palliative-intent proton radiation therapy (PIPRT). **Procedure:** We retrospectively reviewed patients [?]21 years who received PIPRT. We defined PIPRT as radiotherapy (RT) aimed to improve cancer related symptoms/provide durable local control in the non-curative setting. Mixed proton/photon plans were included. Adjacent reirradiation (reRT) was defined as a reRT volume within the incidental dose cloud of a prior RT target, whereas direct reRT was defined as in-field overlap with prior RT target. Acute toxicity during RT until first inspection visit was graded according to the Common Terminology Criteria for Adverse Events. The Kaplan-Meier method, measured from last PIPRT fraction, was used to assess progression free survival (PFS) and overall survival (OS). **Results:** 18 patients underwent PIPRT between 2014-2020. Median age at treatment start was 10 years (2-21). Median follow up was 8.2 months (0-48). Treatment sites included: brain/spine (10), abdomen/pelvis (3), thorax (3) and head/neck (2). Indications for palliation included: durable tumor control (18), neurologic symptoms (4), pain (3), airway compromise (2), and great vessel compression (1). Indications for protons included: reRT (15) (4 adjacent, 11 direct), craniospinal irradiation (4), reduction of dose to normal tissues (3). 16 experienced grade (G) 1-2 toxicity; 2 G3. There were no reports of radionecrosis. Median PFS was 5.3 months (95% CI 2.7-16.3). Median OS was 8.3 months (95% CI 5.5-26.3). **Conclusions:** The most common indication for PIPRT was reRT to provide durable tumor control. PIPRT appears to be safe, with no cases of high grade toxicity.

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