

Purpose: To develop a method for treatment planning and delivery of step-and-shoot intensity-modulated radiation therapy (IMRT) using pulsed dose-rate (PDR) for re-irradiation of recurrent disease. **Method and Materials:** A patient with metastatic pheochromocytoma in the supraclavicular region was originally treated to 48 Gy in 16 fractions. The tumor initially regressed but recurred six months later, compressing the patient's subclavian vein and brachial plexus causing extreme pain and edema in the left upper extremity. To potentially minimize toxicity to the brachial plexus, the patient was re-treated with pulsed low dose-rate IMRT. The custom treatment regimen was 0.4 Gy per pulse lasting for ~10 minutes repeated five times to provide a fractional daily dose of 2 Gy. This allowed for more efficient delivery without the use of a beam attenuator or extended treatment distance. Dose-rate of the accelerator was set to its lowest output rate of 100 monitor units (MU) per minute. Dosimetric accuracy was assessed for "end effects" with minimum allowed MU per segment set to two. Daily image guidance was used to deliver an additional 36 Gy. **Results:** The IMRT quality assurance demonstrated the delivery of each field to be within clinical tolerance. Each pulse was delivered efficiently with a total of 84 MU and 26 segments with five beams. Beams were delivered approximately every two minutes for an average treatment time of about fifty minutes and an average dose-rate of ~0.04 Gy/min. By the conclusion of treatment the patient's left arm pain and edema had significantly improved. **Conclusions:** This experience demonstrates the feasibility and possible benefit of using IMRT with a PDR fractionation schedule for re-treatments. The PDR regimen was able to provide tumor regression with potential preferential sparing of normal tissue.