Pseudoprogression After Proton Therapy of Pediatric Spinal Pilocytic Astrocytoma and Myxopapillary Ependymoma

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Introduction

• Proton therapy is increasingly used to treat spinal tumors in children.
• Pseudoprogression is a post-radiation increase in tumor size with subsequent decrease in size without additional tumor-directed therapy.
• Pseudoprogression can be clinically symptomatic and difficult to differentiate from true progression.
• The rate of pseudoprogression after proton therapy of pediatric spinal tumors is unknown.
• Pseudoprogression after proton therapy of CNS tumors is a challenging clinical situation.

Materials/Methods

• A retrospective review of demographics, treatment characteristics and occurrences of pseudoprogression was made for pediatric patients with spinal pilocytic astrocytoma (sPA; n = 11) or myxopapillary ependymoma (MPE; n = 10) with gross disease treated with proton therapy with at least 6 months of follow up from completion of proton therapy.
• Statistics: Fisher’s exact test with a 2x2 contingency table to obtain a two-tailed p-value

Results

• Twenty-one patients were treated with proton therapy. Pseudoprogression (PsP) was identified in 7/21 patients (33%): 6/11 sPA patients (55%) and 1/10 MPE patients (10%).
• Median age at RT for the cohort was 10.1y (range, 5.9 – 16.8y), 10.1y (range, 5.9 – 16.2y) for sPA patients and 10.65y (range, 7.2 – 16.8y) for MPE patients.

• Median follow up after proton therapy was 44 months (range, 9 – 99 months).

• Preliminary analysis suggests that pseudoprogression occurs frequently within 6 months after proton therapy for sPA and infrequently after proton therapy for MPE.
• Pseudoprogression rates increased above doses of 3960 cCGE.

Conclusions

• Median dose for the cohort was 50.4 GyRBE (range, 39.6 – 54 GyRBE, 45 GyRBE (range, 39.6 – 50.4 GyRBE) for sPA patients and 50.4 GyRBE (range, 45 – 54 GyRBE) for MPE patients.
• Minimum RT dose for PsP was 4140 cCGE.
• Of patients receiving at least 4140 cCGE, PsP was more common in patients with sPA (6/9 = 67%) than MPE (1/10 = 10%; p < 0.02).
• Three sPA patients with pseudoprogression were symptomatic and improved with medical therapy.