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Trajectory of HRQoL scores in pediatric patients receiving proton therapy: results from the Pediatric Proton Consortium Registry

Purpose/Objectives: Health-related quality of life (HRQoL) outcomes are an important metric in understanding the perceived health and emotional well-being of pediatric proton radiotherapy (RT) patients. Here we compare reported HRQoL outcomes at two time points during radiotherapy to determine the effect RT has on the holistic health of a patient.

Materials/Methods: Pediatric patients (<22 years) treated with RT across multiple institutions were prospectively enrolled on an optional HRQoL study through the Pediatric Proton Consortium Registry (PPCR). Child and proxy (parent) answers to the PedsQL version 4.0 instrument are evaluated to generate a total core score (QoL score) ranging from 0 (worst)-100 (best). Associations between clinical characteristics and QoL scores captured during the first (early) and last (late) week of RT were evaluated. Paired t-tests and Wilcoxon sign-ranked tests were used to assess differences in early-RT and late-RT QoL score within groups, independent t-tests and the Kruskal-Wallis test were used to assess differences between groups.

Results: 120 patients (n=69 (57.5%) CNS, n= 51(42.5%) non-CNS) enrolled between 9/2015 and 1/2018 comprised the study cohort. Among non-CNS patients, 22 (43.1%) had a head/neck primary tumor. Median age was 10.5 years (<1 to 21.8). Median RT total dose was 54 Gy (21.0-76.0). Mean early-RT HRQoL score was 74.6 (sd=16.3), while mean late-RT HRQoL score was 74.8 (sd=16.5), and not different (p=0.87). Children with CNS tumors noted a 3-point increase in QoL scores during RT (p=0.03), whereas children with non-CNS tumors noted a 3.6 decrease in the QoL scores over the course of RT that was not significant (p=0.13). Non-CNS primary tumor site had no significant effect on change in QoL score (p=0.31). Patients with Lansky/KPS of 100 at the beginning of treatment showed a non-significant decline of 5.0-points, but started higher than patients with a KPS of <100 who remained stable (to slightly increased) during the course of RT. HRQoL scores did not differ by anesthesia use for RT (p=0.85), by age ≤10.5 or >10.5 years (p=0.09), or by exposure to concurrent chemotherapy (p=0.34).

Conclusion: Over the course of RT, children with CNS tumors reported an increase in the QoL score which differed from patients with non-CNS primaries who reported a non-significant decrease in scores. Anesthesia use, age, and concurrent chemotherapy did not significantly effect HRQoL scores during radiotherapy. Those with a KPS of 100 started higher than those with a KPS of <100, and report a non-

significant decline in HRQoL score. The PedsQL can be used to monitor the quality of life status of a child receiving treatment, and such monitoring can lead to further improvements in patient's care and thus treatment experience.

Table 1. Participant Characteristics (n=120)

	N (%)	Early-RT QoL Score Mean (sd)	Late-RT QoL Score Mean (sd)	Change in scores P within groups	Change in scores between groups P
Tumor Type					
CNS	69 (57.5)	76.3 (16.1)	79.3 (13.8)	0.03	0.003
Non-CNS	51 (42.5)	72.3 (16.4)	68.7 (17.9)	0.13	
Anesthesia Use					
Yes	47(39.2)	72.7 (14.8)	72.6 (17.1)	0.86	0.85
No	70 (58.3)	76.0(17.1)	76.3 (16.2)	0.78	
Age (years)					
≤10.5	61	75.2 (14.8)	73.5 (16.1)	0.35	0.09
>10.5	59	74.0 (17.9)	76.1 (16.9)	0.11	
Chemotherapy					
Yes	79 (65.8)	72.2 (16.9)	71.3 (17.4)	0..96	0.35
No	38 (31.7)	80.7 (13.1)	82.0 (12.0)	0.51	
Lansky/KPS Score					
100	30	80.8 (15.3)	75.8 (15.4)	0.07	0.02
<100	58	70.9 (15.7)	72.7 (15.7)	0.24	