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Palliative radiotherapy for children: Symptom response and treatment-associated toxicity according to radiation therapy dose and fractionation

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Abstract

Background/objectives: Radiotherapy is an effective palliative treatment in advanced cancer. Shorter palliative treatment courses are recommended for adults, though pediatric data addressing treatment efficacy and toxicity according to radiation therapy (RT) dose and fractionation are limited.

Design/methods: Total 213 patients aged 21 years or younger receiving 422 palliative radiotherapy treatment courses from 2003 to 2016 were included. Symptom response and treatment-associated toxicity were recorded and analyzed in relationship to demographic and treatment variables.

Results: Common diagnoses included sarcoma (32.5%), neuroblastoma (24.9%), leukemia/lymphoma (14.9%), and central nervous system tumors (10.9%). The most common indication for treatment was pain (46.7%). Patients received a median of 10 fractions, 2.5 Gy dose per fraction, and 21 Gy total dose. Number of RT fractions was five or less in 166 (39.3%), six to 10 fractions in 117 (27.2%), and 10 or more fractions in 139 (32.9%) of courses. Complete or partial pain relief was achieved in 85% (151 of 178 evaluable patients), including 77.8% receiving five or less fractions and 89.6% receiving more than five fractions. Highest toxicity was grade 1 in 159 (38.9%), grade 2 in 26 (6.4%), and grade 3 in two (0.5%) treatments. On multivariable analysis, RT delivered 30 or more days from death (OR 12.13, 95% CI: 2.13-69.2, $p = .005$) and no adjuvant chemotherapy (OR 0.14, 95% CI: 0.03-0.54, $p = .005$) were significantly associated with pain response, and five or less fractions were significantly associated with lower toxicity (OR 0.24, 95% CI: 0.06-0.97, $p = .045$).

Conclusions: Palliative RT courses of five or less fractions result in high rates of pain control and are associated with low toxicity in pediatric patients with cancer.

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