International Journal of
Radiation Oncology
biology • physics

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Clinical Investigation

Identifying Predictive Factors for Incident Reports in Patients Receiving Radiation Therapy

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Received Jun 29, 2015, and in revised form Nov 14, 2015. Accepted for publication Nov 30, 2015.

Summary

Patient safety is a vital concern in radiation therapy, but little is known about factors that predict patients at risk for safety incidents. In this study, we described cases during which voluntary incident reporting occurred, and identified patient- and treatment-specific factors that place patients at higher risk for incidents. These factors should be considered at the time of peer case review to allow for increased scrutiny of patients at risk.

Purpose: To describe radiation therapy cases during which voluntary incident reporting occurred; and identify patient- or treatment-specific factors that place patients at higher risk for incidents.

Methods and Materials: We used our institution's incident learning system to build a database of patients with incident reports filed between January 2011 and December 2013. Patient- and treatment-specific data were reviewed for all patients with reported incidents, which were classified by step in the process and root cause. A control group of patients without events was generated for comparison. Summary statistics, likelihood ratios, and mixed-effect logistic regression models were used for group comparisons.

Results: The incident and control groups comprised 794 and 499 patients, respectively. Common root causes included documentation errors (26.5%), communication (22.5%), technical treatment planning (37.5%), and technical treatment delivery (13.5%). Incidents were more frequently reported in minors (age <18 years) than in adult patients (37.7% vs 0.4%, $P<.001$). Patients with head and neck (16% vs 8%, $P<.001$) and breast (20% vs 15%, $P=.03$) primaries more frequently had incidents, whereas brain (18% vs 24%, $P=.008$) primaries were less frequent. Larger tumors (17% vs 10% had T4 lesions, $P=.02$), and cases on protocol (9% vs 5%, $P=.005$) or with intensity modulated radiation therapy/image guided intensity modulated radiation therapy (52% vs 43%, $P=.001$) were more likely to have incidents.

Conclusions: We found several treatment- and patient-specific variables associated with incidents. These factors should be considered by treatment teams at the time of peer review to identify patients at higher risk. Larger datasets are required to

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Conflict of interest: none.

Int J Radiation Oncol Biol Phys, Vol. 94, No. 5, pp. 993–999, 2016
0360-3016/$ - see front matter
http://dx.doi.org/10.1016/j.ijrobp.2015.11.041