Heterogeneity in the Treatment of Bone Metastases: A Contemporary Statewide Practice Pattern Analysis

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PURPOSE / OBJECTIVE(s)

Palliative radiotherapy for bone metastases is often viewed as a single entity, despite national guidelines providing input principally only for painful bone metastases. Data surrounding the treatment of bone metastases is often gleaned from questionnaires of what providers would theoretically do in practice or population-based data lacking critical granular information. Herein to investigate the “real-world” radiotherapeutic treatment of bone metastases, we used the statewide Michigan Radiation Oncology Quality Consortium (MROQC) to examine contemporary practice patterns among radiation oncologists across a broad range of practices in the state of Michigan.

MATERIAL & METHODS

Twenty diverse institutions from this statewide Radiation Oncology Quality Consortium had data extracted on their 10 most recent cases of radiotherapy delivered for the treatment of bone metastases at their institution between January and February of 2017 using Case Review forms. Uni- and multivariable binary logistic regression were used to assess use of single fraction (8 Gy x 1) radiotherapy.

RESULTS

• 196 cases were eligible for inclusion. 28 different fractionation schedules were identified.
• Tremendous heterogeneity of the patients and treatment seen - 28 different fractionation schedules identified across the 20 reporting centers (Fig. 1A)
  • 3 Gy x 10 fractions (n = 100; 51.0%); 4 Gy x 5 fractions (n = 32; 16.3%); 8 Gy x 1 (n = 15; 7.7%)
  • IMRT or volumetric modulated arc therapy was used in 14 cases (7.1%; Fig. 1B), in 11 cases (5.6%).
• The overall rate of single fraction use was low (7.7%), with no cases receiving 8 Gy x 1 in 13 institutions.
• On multivariable analysis (Table 2), significant variables associated with using single fraction radiotherapy were the presence of oligometastatic disease (P = .008), academic practice type (P = .039), and previous overlapping radiation therapy (P = .050)

SUMMARY / CONCLUSION

To our knowledge, this is the most granular assessment of practice patterns for bone metastases performed to date. We demonstrate that bone metastases represent a heterogeneous disease, and the radiotherapeutic treatment of bone metastases is similarly diverse. Future work is needed to understand barrier to single fraction use, and clinical trials are necessary to establish appropriate guidelines for the breadth of this complex disease. Going forward, the Michigan Radiation Oncology Quality Consortium is expanding data collection efforts to better understand the barriers to adopting single fraction radiation therapy and to better understand and study the framework for the use of alternative dose fractionation schedules and advanced treatment techniques for diverse goals of care.