

Single-Fraction versus Multi-Fraction Radiotherapy in Palliative Bone Metastasis Patients: Comparison of Primary Malignancy and Demographic Factors

Introduction

In 2011 the American Society for Radiation Oncology (ASTRO) released guidelines for the use of radiation therapy (RT) in the treatment of palliative bone metastases based upon current published evidence.

ASTRO concluded that for most patients 8 Gy in 1 fraction is a safe and effective treatment with shorter acute radiation side effects than multi-fraction treatment. The retreatment rate is the only negative result for single-fraction treatment (8% versus 20%) as the pain relief effect is similar.

The ASTRO authors conclude that the United States has shown a delay in utilizing the single-fraction treatment dose and suggests that a change in the dose regimen should occur.

Methods

Research Data Assistance Center (ResDAC) Outpatient Medicare billing data from 2014 was analyzed to discover the differences between patients treated with a single-fraction and those treated with a multi-fraction treatments.

Medicare Beneficiaries

Using SAS, beneficiaries were extracted from roughly 2.8 million beneficiaries by using diagnosis and RT billing codes.

1. All beneficiaries have diagnosis code 198.5: secondary malignant neoplasm of bone and bone marrow (5,987 beneficiaries).
2. RT delivery CPT code: 77401-77416 (392 beneficiaries).
3. Exclusions: complicated treatments, brachytherapy treatments, or ≥ 16 fractions.
4. CPT codes 77401-77416 were counted to determine the number of fractions delivered.

The final sample population: 303 beneficiaries that received external beam palliative radiation for bone metastasis.

Results

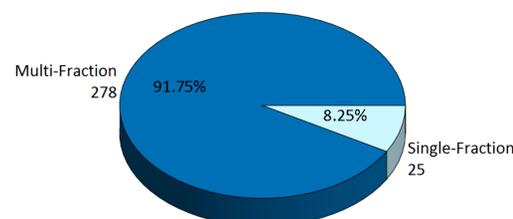


Fig. 1. Number of beneficiaries treated with single-fraction (n=25; 8.25%) and multi-fraction treatments (n=278; 91.75%). The majority of beneficiaries were treated with multi-fraction treatments.

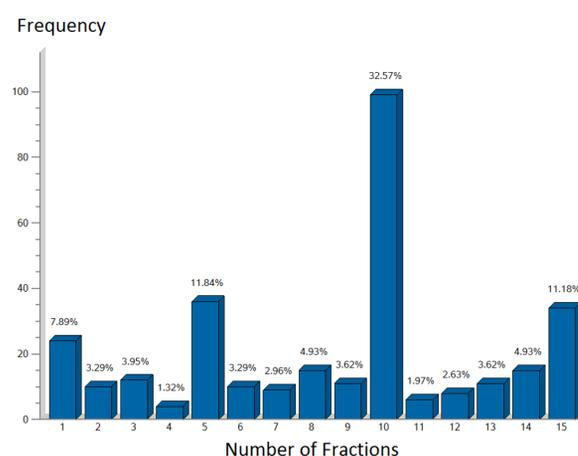


Fig 2. Distribution of fractions that beneficiaries received during their treatment. The fractions ranged from 1 to 15, with the majority receiving 10 fraction treatments (32.57%).

Variable	Test Statistic	p value
Gender	0.0141	0.9055
Primary Malignancy	n/a	0.0759
Race	n/a	0.67
Region	n/a	0.8239
Age Group	n/a	0.3688

Table 1

Chi-square analysis and Fisher's exact test was performed. The significance level was set at 0.05. No demographic data showed an association with fractionation (single-fraction vs. multi-fraction).

Conclusion

The results of this study show that while primary malignancy and demographic data was not associated with the prescribing habits of radiation oncologists, it does highlight the importance of the treatment options for palliative bone metastasis patients and the current prescribing practices.

The 8.25% single-fraction treatment rate is similar to rates found in other past studies, showing single-fraction treatments are not being utilized to their full capacity. There have not been significant changes in the prescription habits of physicians, even with the ASTRO guidelines being published in 2011.

Limitations

The most challenging aspect of this research was finding a source of data that contained fractionation details for bone metastasis patients. ResDAC was the only feasible option, but the cost and immense size of the data made it difficult to use. Also, the results are not generalizable outside of outpatient Medicare beneficiaries.

References

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