Variation in the Length of Radiation Therapy among Men Diagnosed with Incident Metastatic Prostate Cancer

E Onukwugha, Y Kwok, C Yong, CD Mullins, B Sea, A Hussain

1 University of Maryland School of Pharmacy, Baltimore, MD; 2 University of Maryland School of Medicine, Baltimore, MD; 3 Bayer Healthcare Pharmaceuticals Inc., Wayne, NJ; 4 Veterans Affairs Medical Center, Baltimore, MD

ABSTRACT

Purpose/Objectives: Skeletal-related events (SREs) among prostate cancer (PCa) patients with bone metastases (BM) have a significant impact on quality of life and costs. BM patients with stage 4 disease are usually managed with systemic therapy and radiation therapies such as external beam radiation therapy (EBRT) and radiosurgery (SBRT) to reduce SREs. We studied the length of EBRT episodes among stage 4 PCa patients and the timing of the EBRT episode relative to a diagnosis of bone metastasis. We also assessed the effect of BM on the duration of radiation treatment among patients receiving radiation therapy. Methods: Methods: We analyzed data from 1,364 EBRT episodes among 2,525 patients with stage 4 M0 and 7,301 patients with stage 4 M1 from 2000 to 2007. We identified EBRT episodes and SREs using healthcare claims data. The algorithm for identifying radiation to the bone from healthcare claims data is shown in Figure 1. RESULTS: Among stage 4 M0 patients, 8 out of 10 EBRT episodes were of short duration (<4 weeks). In the majority of M0 patients, the initial EBRT episodes followed diagnostic PCs of were of longer duration (>6 weeks). SREs occurred sooner after PCa diagnosis among M1 patients compared to M0 patients. Among M1 patients, EBRT episodes of shorter duration were more commonly seen following an SRE compared with EBRT episodes that did not follow a SCC, BS, or PF. The majority of EBRT episodes among M1 patients were of short duration (<6 weeks). In the majority of M0 patients, the initial EBRT episodes following diagnostic PCs were of longer duration (>6 weeks). SREs occurred sooner after PCa diagnosis among M1 patients compared to M0 patients. Among M1 patients, EBRT episodes of shorter duration were more commonly seen following an SRE compared with EBRT episodes that did not follow a SCC, BS, or PF. **CONCLUSIONS:** The algorithm can be expanded to include other treatments for delivering palliative radiation to the bone, e.g., radiopharmaceutical therapies.

LIMITATIONS OF ALGORITHM: The algorithm is based on billing codes available in claims data and has not been validated against chart review. The algorithm does not consider the timing of the EBRT episode relative to a diagnosis of bone metastasis and can be further refined to incorporate this information. The algorithm does not include other treatments for delivering palliative radiation to the bone. The algorithm can be expanded to include other treatments for delivering palliative radiation to the bone, e.g., radiopharmaceutical therapies.

METHODS

EventFlow (University of Maryland College Park, Human-Computer Interaction Lab) was used to explore patterns of EBRT episodes and other events including: diag Prostate cancer diagnosis date trntltd Treatment initiation: Androgen deprivation therapy trntrtm Treatment initiation: Radiation therapy trntchemo Treatment initiation: Chemotherapy trntradio Treatment initiation: Radiopharmaceutical therapy tntsbisp Treatment initiation: Bisphosphonate SRE Skeletal related event (PF, SCC, BS)

RESULTS

Table 1. Distribution of EBRT episode lengths among stage 4 M0 and M1 patients

<table>
<thead>
<tr>
<th>EBRT episode length</th>
<th>Proportion among M0 patients</th>
<th>Proportion among M1 patients</th>
</tr>
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<tbody>
<tr>
<td>Less than 4 weeks</td>
<td>2,607 (79.0%)</td>
<td>520 (8.8%)</td>
</tr>
<tr>
<td>4-6 weeks</td>
<td>132 (4.5%)</td>
<td>320 (5.2%)</td>
</tr>
<tr>
<td>Greater than 6 weeks</td>
<td>284 (8.4%)</td>
<td>454 (7.5%)</td>
</tr>
</tbody>
</table>

RESULTS: Application of inclusion criteria resulted in 9,826 PCa cases: 3,363 EBRT episodes among 7,301 patients with stage 4 M1 PCa, and 1,364 EBRT episodes among 2,525 patients with stage 4 M0 PCa. The distribution of EBRT episode lengths varied between M0 and M1 patients. The timing of EBRT episode lengths relative to PCa diagnosis was investigated among M0 and M1 patients (Figures 1 & 2). In addition, we reported the timing of EBRT episodes relative to PF, SCC, or BS as well as treatment initiation.

CONCLUSIONS

- The length of the EBRT episode varied among stage 4 M0 and M1 patients: among M1 patients, 8 out of 10 EBRT episodes were less than 4 weeks long; whereas among M0 patients, 4 out of 10 EBRT episodes were < 4 weeks long. The length and timing of shorter duration EBRT episodes in M1 and M0 patients was consistent with real-world expectations regarding radiation to the bone, with a similar result concerning longer duration EBRT episodes and radiation to the prostate gland.
- Claims-based algorithm should consider the duration of the EBRT episode as well as the timing of the EBRT episode relative to pathological fracture, spinal cord compression, and bone surgery.

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CONTACT INFORMATION
Eberechukwu Onukwugha, PhD eonukwug@rx.umaryland.edu