End-of-Life Costs and Hospice Utilization in Patients with Head and Neck Cancer

Michelle M. Chen, MD¹, Eben L. Rosenthal, MD¹, and Vasu Divi, MD¹

Abstract

The Quality Oncology Practice Initiative has several metrics related to end-of-life (EOL) care, including hospice enrollment ≤ 3 days, with lower scores signaling better performance. Of privately insured patients with head and neck cancer, 3.5% were enrolled in hospice prior to death and 21.3% spent ≤ 3 days in hospice, indicating aggressive EOL care. Patients with late hospice enrollment had higher spending in the last 30 days of life (DOL). Patients in hospice ≤ 3 days spent $37,426, while those in hospice > 3 days spent $24,418 (P = .002). The largest portion of this difference was attributable to inpatient services. Patients in hospice ≤ 3 days spent $22,089 on inpatient services in the last 30 DOL, while those in hospice > 3 days spent $8361 (P < .001). Further research is needed to determine if more high-value care can be provided with earlier hospice enrollment and to ensure that goal concordance is included in defining high-value care.

Keywords

head and neck cancer, end of life, hospice, costs

Methods

Data from the Optum database from 2003 to 2016 were used to identify 88,834 patients with HNC (oral cavity, oropharynx, larynx, and hypopharynx) based on International Classification of Diseases, Tenth Revision (ICD-10) diagnosis codes, and 16,114 died during this period. Of these, 560 patients had hospice costs with a diagnosis of HNC. We excluded patients lacking continuous insurance enrollment for 1 year prior to hospice start. Revenue and place of service codes were used to identify hospice care, emergency department (ED) visits, and inpatient admissions. Date of death was calculated using the provided death month and the last day of hospice care. Our main outcome was total cost, which was standardized to 2014 to 2015 dollars. Differences were identified with t tests and P < .05 was statistically significant. Our study was granted an exemption from the Stanford Institutional Review Board.

Results

Of the 16,114 patients with HNC who died, 3.5% (n = 560) had costs for hospice care prior to death. After our exclusion criteria, we had a final cohort of 314 hospice patients with a median age of 58 years (interquartile range [IQR], 53-63 years) (Table 1). During the last 30 DOL, the median cost per patient was $13,220 (IQR, $1384-$29,825) (Figure 1), with the majority of costs related to inpatient hospitalizations. In this time period, 18.5% of patients had an ED visit and 38.5% had an inpatient admission.

The median length of stay in hospice was 16 days (IQR, 5-39 days). While in hospice, 7.6% of patients had ≥ 1 ED visit and 7.0% had an inpatient admission. Of the patients, 21.3% were enrolled in hospice ≤ 3 days and 31.2% were enrolled ≤ 7 days prior to death.

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Patients enrolled for $\leq 3$ days had significantly higher mean spending in the last 30 DOL than those enrolled $\geq 3$ days ($\$37,426$ vs $\$24,418$, $P = .002$) (Table 2). The largest portion of this difference was attributable to inpatient hospitalizations. Patients in hospice $\leq 3$ days spent $\$22,089$ in the last 30 DOL, while those enrolled $\geq 3$ days spent $\$8361$ ($P < .001$). Nearly a fifth (18.9%) of the difference in EOL spending was attributable to differences in utilization of radiation therapy ($\$2907$ for hospice $\leq 3$ days vs $\$444$ for hospice $\geq 3$ days, $P = .002$).

**Discussion**

The Quality Oncology Practice Initiative measures EOL care using several metrics related to hospice, including hospice enrollment $\leq 3$ days and $\leq 7$ days, with lower scores signaling better performance. The purpose of these metrics is to maximize benefits accrued in hospice rather than using it for last-minute near-death palliation or to avoid classifying a death as an inpatient mortality. Our study demonstrates that 3.5% of privately insured patients with HNC were enrolled in hospice and 21.3% of patients spent minimal time in hospice prior to death, indicating aggressive EOL care.

There are limited data on the proportion of HNC decedents who were enrolled in hospice. Schwam et al. found that 14.6% of patients with HNC with distant metastases received palliative treatment. Our cohort was primarily male and younger. O’Connor et al. demonstrated that cancer patients younger than 65 years and male patients were more likely to be admitted to hospice for $\leq 3$ days. Mack et al. demonstrated that only 24% to 32% of patients with lung cancer younger than 65 years were enrolled in hospice prior to death compared with 44% to 53% of patients $\geq 65$ years.

The higher spending during the last 30 DOL for patients with shorter hospice enrollments was driven by inpatient costs. There is significant variability in the timing of hospice and palliative care referrals at the EOL. Perhaps if we can better identify patients with $<6$ months to live through algorithms that estimate 6-month mortality, then we can improve patient selection for early hospice enrollment. However, high-value EOL care must remain consistent with patients’ goals of care. Emerging data show that early provision of palliative care and information about potential care outcomes were associated with improved quality of life, survival, and less aggressive EOL care. The American Society of Clinical Oncology now recommends that all patients with advanced cancer receive concurrent palliative care.

Limitations to our analysis include lack of detailed data on patient preferences, patient goals of care, hospice resource allocation, the etiology of death, socioeconomic data, radiation dosages, or whether radiation is being delivered with palliative intent. Our low hospice enrollment numbers may be driven by the fact that we have a younger privately insured cohort. Private insurers may also have hospice enrollment restrictions that differ from Medicare’s hospice benefit.

There are higher EOL costs for patients with HNC with late hospice enrollment, primarily driven by inpatient admissions and costs. This suggests that more high-value care can be provided with earlier hospice enrollment. Further research should investigate algorithms to predict survival in patients...
with HNC, evaluate prehospice home health regimens aimed to decrease inpatient visits, and determine if earlier hospice enrollment and concurrent palliative care can avoid more intense EOL care and improve quality-of-life outcomes.

Author Contributions
Michelle M. Chen, conception and design of the work; acquisition, analysis, and interpretation of data for the work; drafting of the manuscript; final approval of the manuscript; Eben L. Rosenthal, conception and design of the work; interpretation of data for the work; critical revision of the manuscript for important intellectual content; final approval of the manuscript; Vasu Divi, conception and design of the work; acquisition, analysis, and interpretation of data for the work; critical revision of the manuscript for important intellectual content; final approval of the manuscript.

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References

Table 2. Mean Cost for Last 30 Days of Life Stratified by Those with Hospice Enrollment ≤3 Days and >3 Days.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Hospice Enrollment &gt;3 Days (n = 247)</th>
<th>Hospice Enrollment ≤3 Days (n = 67)</th>
<th>P Value</th>
<th>Δ Cost, $</th>
<th>% of Total Episode Cost Difference</th>
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<tbody>
<tr>
<td>DME</td>
<td>66</td>
<td>188</td>
<td>&lt;.001</td>
<td>122</td>
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<td>Office visits</td>
<td>115</td>
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<td>.007</td>
<td>74</td>
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<td>Pain management/anesthesia</td>
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<td>716</td>
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<td>587</td>
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<td>Labs/pathology</td>
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<td>596</td>
<td>&lt;.001</td>
<td>459</td>
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<td>Rehab/SNF</td>
<td>225</td>
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<td>.35</td>
<td>179</td>
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<td>&lt;.001</td>
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<td>.005</td>
<td>1098</td>
<td>8.4</td>
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<td>Inpatient hospitalization</td>
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<td>&lt;.001</td>
<td>13,727</td>
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<td>&lt;.001</td>
<td>–8618</td>
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<tr>
<td>Total episode</td>
<td>24,418</td>
<td>37,426</td>
<td>.002</td>
<td>13,008</td>
<td></td>
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</tbody>
</table>

Abbreviations: DME, durable medical equipment; ER, emergency room; SNF, skilled nursing facility.
*Majority of the difference is driven by inpatient costs. All cost categories are separate and nonoverlapping.