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Assessing the Impact of a Novel Integrated Palliative Care and Medical Oncology Inpatient Service on Health Care Utilization before Hospice Enrollment

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Abstract

Background: Evidence increasingly supports the integration of specialist palliative care (PC) into routine cancer care. A novel, fully integrated PC and medical oncology inpatient service was developed at Duke University Hospital in 2011.

Objective: To assess the impact of PC integration on health care utilization among hospitalized cancer patients before hospice enrollment.

Methods: Retrospective cohort study. Patients in the solid tumor inpatient unit who were discharged to hospice between September 1, 2009, and June 30, 2010 (pre-PC integration), and September 1, 2011, to June 30, 2012 (postintegration). Cohorts were compared on the following outcomes from their final hospitalization before hospice enrollment: intensive care unit days, invasive procedures, subspecialty consultations, radiographic studies, hospital length of stay, and use of chemotherapy or radiation. Cohort differences were examined with descriptive statistics and nonparametric tests.

Results: Two hundred ninety-six patients were included in the analysis (133 pre-PC integration; 163 post-PC integration). Patient characteristics were similar between cohorts. Health care utilization was relatively low in both groups, although 26% and 24% were receiving chemotherapy at the time of admission or during hospitalization in the pre- and post-PC integration cohorts, respectively, and 6.8% in each cohort spent time in an intensive care unit. We found no significant differences in utilization between cohorts.

Discussion: PC integration into an inpatient solid tumor service may not impact health care utilization during the final hospitalization before discharge to hospice. This likely reflects the

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greater benefits of integrating PC farther upstream from the terminal hospitalization, if one hopes to meaningfully impact utilization near the end of life.

Keywords

cancer patients; end-of-life care; health care utilization; hospice; oncology; palliative care in oncology

Introduction

Early palliative care (PC) has been repeatedly high-lighted by key stakeholders as an important intervention to improve cancer care and reduce costs,[1] but despite this recognition, patients continue to be referred late, often in the final days of life, after many costly and morbid interventions have occurred.[2–6] We previously described a novel, integrated inpatient rounding model between medical oncology and PC in the solid tumor inpatient unit at Duke University Hospital (DUH), and found associated improvements in patient and health system outcomes, including 7-day read-mission rates.[7] While other studies have demonstrated the impact of PC consultation on length of stay, readmissions, and even cost of care,[8,9] it remains unclear whether integration of PC with the medical oncology team for *all* inpatients would further decrease health care utilization. We aimed to assess the potential impact of integrated PC on resource utilization for patients with advanced cancer during their final hospitalization before hospice enrollment.

Patients and Methods

We conducted a single-institution, retrospective cohort study that included all patients hospitalized in the solid tumor inpatient unit at DUH and discharged to hospice care between September 1, 2009, and June 30, 2010 (“pre-PC integration” cohort), and September 1, 2011, and June 30, 2012 (“post-PC integration” cohort). Our integrated co-rounding model is described in great detail elsewhere.[7] Briefly, the inpatient service is staffed by one medical oncologist and one PC physician, in addition to two interns, a fellow, and several advanced practice providers (APPs). Each admitted patient is assigned either to the PC attending or the oncology attending. Formal discussions of all admitted patients occur three times daily as part of multidisciplinary care rounds, with both the medical oncologist and PC specialist available to provide input for all patients. Both attendings share supervisory responsibilities for trainees and the APPs. We measured the following outcomes, based on availability and clinical relevance, to represent health care utilization during the final hospitalization before hospice: invasive procedures, consultations by other medical teams, radiologic studies, days in the intensive care unit (ICU), use of chemotherapy, and use of radiation therapy. The number of hospitalizations, emergency department (ED) visits, and medical oncology clinic visits during the 30 days before hospital discharge was also collected for descriptive purposes. Data were collected by chart review.

The pre- and post-PC integration cohorts were compared for all outcomes using descriptive statistics. For continuous variables, outcomes were compared using a two-sided Wilcoxon rank-sum test. For dichotomous outcomes, the estimate and 95% confidence interval of the difference in the proportions were calculated. ICU days were dichotomized due to few

nonzero values. *p* Values were intended to be descriptive, not to be judged for statistical significance, and were not adjusted for multiplicity. Analyses were conducted using SAS version 9.3 (Cary, NC). This study was approved by the Duke University Institutional Review Board.

Results

Our analysis included 296 patients: 133 in the pre-PC integration cohort and 163 in the post-PC integration cohort. The cohorts were similar regarding age, sex, race, insurance, cancer type, and disease status (Table 1). Health care utilization was generally low in both cohorts, and no significant differences were detected. Of note, during the pre-PC integration period, PC provided consultation to only 15 patients on the inpatient oncology service. As seen in Tables 2 and 3, the median number and distribution of invasive procedures, consults by other medical teams, radiographic studies, and hospital length of stay were the same pre- and post-PC integration. In addition, after integration of PC, patients were just as likely to receive ICU care, chemotherapy, or radiation therapy. Further review of utilization in the 30 days before discharge to hospice (thus including data even before the final hospitalization) demonstrated overall low utilization, with patients averaging one hospitalization, ED visit, and oncology clinic visit.

Discussion

We aimed to assess the impact of a novel inpatient co-rounding partnership between PC and medical oncology on utilization outcomes on a solid tumor inpatient service. We chose to study the patient population discharged to hospice, as these patients are arguably most vulnerable to low-value utilization, and most appropriate for de-escalation of aggressive interventions. Surprisingly, we found no significant impact of this integrated model on utilization in this population.

There are several potential explanations and implications for these findings. First, utilization was generally low in both cohorts. It may be that by the time patients with an advanced solid tumor experience a final hospitalization leading to hospice referral, their utilization during that hospital stay is somewhat fixed, regardless of who cares for them (a PC clinician or an oncologist). Notably, there were outliers in each cohort with much higher utilization than average, and perhaps it is these outliers who warrant further study to curb low-value care in extreme cases.

Our findings also support the notion that initiation of PC in the hospital setting is perhaps too late to be maximally effective in cancer patients. After all, most solid tumor care is provided in the outpatient setting, and thus, a hospitalization inherently implies something serious is already occurring. Given the positive results of multiple randomized trials of early PC integration, and the difficulty of developing effective therapeutic rapport between a PC clinician and a patient/family during a short hospitalization, earlier involvement may be necessary to minimize low-value care and perhaps avoid the need for a terminal hospitalization altogether. Of note, we also feel it is germane to mention that the standard quality measures of cancer care at the end of life, as used in this study, may fail to describe

some of the more meaningful benefits of integrated PC on patient- and family-centered outcomes.

We did note high utilization of radiologic studies in both cohorts, and a relatively high rate of chemotherapy administration during or entering into the last hospitalization. This utilization may be attributed, in part, to an acceleration of aggressive care at the end of life before a subsequent deceleration with initiation of hospice. This “final push” is something we have observed among patients with advanced solid tumors who are admitted for uncontrolled symptoms or treatment-related adverse events. Addressing these symptoms often requires an invasive procedure (e.g., thoracentesis for a pleural effusion) that confers marked palliative benefits. Appropriately, this utilization did not decrease with PC integration. Similarly, for patients receiving chemotherapy or radiation, the adverse event prompting admission is often the first signal that it is time to shift to comfort-oriented care. In our experience, use of radiologic studies and procedures to assess disease status and fully address symptoms is essential to the readiness of patients and families to accept that they have “done everything” and can bring peace of mind amid transitions to hospice. While we have observed this “final push” phenomenon clinically, we are interested in better characterizing the trajectory of utilization near the end of life, perhaps using claims data, in future investigations. While this study focused on utilization during the final hospitalization, claims data would enable a longer study period to determine if this observed acceleration before deceleration is a true phenomenon. Our findings that involvement of PC does not preclude aggressive care when warranted may reduce one barrier to early PC involvement, namely the perception among patients, families, and sometimes even clinicians that PC equates to stopping all interventions.

There are limitations to our study and its conclusions. First, our data set did not capture utilization that occurred outside of our institution. Second, our assessment of chemotherapy and radiation therapy use during the final hospitalization included patients who had been receiving these therapies at the time of admission, as well as those patients who received these therapies while hospitalized. Separation of prior use and in-hospital use may have better detected an effect of the integrated PC model, although our assessment of therapy at the time of admission highlights that, for many cancer patients enrolled in hospice, the transition in goals of care does not occur until the time of hospitalization. Third, this retrospective study compared two cohorts that received care during two different time periods. There may be confounding factors, such as performance status, number of sites and burden of metastatic disease, number and type of prior therapies, code status, and comorbidities, which could only be eliminated through a prospective, randomized trial and could not be evaluated here due to the limitations of electronic medical records. Patient characteristics appear similar between cohorts, so our suspicion for this is low. Finally, we did not evaluate cost, which would be necessary to determine whether lower cost interventions were chosen more frequently after PC integration. Study of the types of health care resources utilized and associated costs may reveal differences between cohorts and is an area of future investigation.

In conclusion, we found no difference in health care resource utilization with an integrated PC model on our inpatient solid tumor service during patients’ final hospitalization before

discharge with hospice care. This may reflect the need to integrate PC farther upstream from the terminal hospitalization to meaningfully impact utilization near the end of life. Ongoing research is needed to determine the most effective ways to integrate PC into cancer care.

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Table 1.

Demographics

Characteristic	***Preintervention* (n = *133*)**	***Postintervention* (n = *163*)**	***Overall* (n = *296*)**
Age, years			
Mean	62	63	63
Median	62	64	63
Range	26–88	25–96	25–96
Sex, *n* (%)			
Female	64 (48)	82 (50)	146 (49)
Male	69 (52)	81 (50)	150 (51)
Race			
White	83 (62)	101 (62)	184 (62)
Black	46 (35)	53 (33)	99 (33)
Other	4(3)	9 (5)	13 (4)
Insurance, *n* (%)			
Medicare	63 (47)	91 (56)	154 (52)
Managed care	51 (38)	49 (30)	100 (34)
NC Medicaid	13 (10)	14 (9)	27 (9)
Other	6 (5)	9 (6)	15 (5)
Recurrent or metastatic, *n* (%)			
Yes	130 (98)	159 (98)	289 (98)
No	3 (2)	4 (2)	7 (2)
Cancer type, *n* (%)			
Bone and soft tissue	2 (2)	8 (5)	10 (3)
Breast	15 (11)	19 (12)	34 (11)
Colorectal	14 (11)	17 (10)	31 (10)
Cancer of unknown primary	8 (6)	6(4)	14 (5)
GI (noncolorectal)	15 (11)	10 (6)	25 (8)
Genitourinary (nonprostate)	5 (4)	9 (6)	14 (5)
Head and neck	5 (4)	2(1)	7 (2)
Hepatobiliary	8 (6)	12 (7)	20 (7)

Characteristic	*Preintervention* (n = *133*)	*Postintervention* (n = *163*)	*Overall* (n = *296*)
Lung	32 (24)	34 (21)	66 (22)
Melanoma	1 (1)	5 (3)	6 (2)
Multiple	8 (6)	14 (9)	22 (7)
Neuroendocrine	3 (2)	7 (4)	10 (3)
Pancreatic	14 (11)	15 (9)	29 (10)
Prostate	3 (2)	5 (3)	8 (3)

Table 2.

Resource Utilization Variables for Pre- and Postpalliative Care Integration Cohorts: Numeric Variables

Variable	Preintegration (median; IQR; range)	Postintegration (median; IQR; range)
Invasive procedures	0; 0–1; 0–5	0; 0–1; 0–7
Consultations	1; 0–1; 0–5	0; 0–1; 0–5
Radiographic studies	4; 2–6; 0–23	4; 1–6; 0–21
Hospital length of stay	4; 2.2–6.6; 0.8–29.4	3.8; 2.6–5.9; 0.6–21.2

IQR, interquartile range.

Table 3.

Resource Utilization Variables for Pre- and Postpalliative Care Integration Cohorts: Dichotomous Variables

Variable	Preintegration (%)	Postintegration (%)	Difference (95% CI)
Experienced care in an ICU	6.8	6.8	0.02 (−5.7 to 5.7)
Received chemotherapy	26	24	1.6 (−8.3 to 12)
Received radiation therapy	9.8	15	−5.6 (−13 to 1.9)

CI, confidence interval; ICU, intensive care unit.

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