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Medical manuscripts impact of hospice enrollment on cost and length of stay of a terminal admission

Michelle T Weckmann, MS, MD[1,2], **Katherine Freund**[3], **Camden Bay, MS**[1], and **Ann Broderick, MS, MD**[4]

[1]Department of Family Medicine, University of Iowa Carver College of Medicine, Iowa City, IA, USA

[2]Department of Psychiatry, University of Iowa Carver College of Medicine, Iowa City, IA, USA

[3]University of Iowa, Roy and Lucille Carver College of Medicine, Iowa City, IA, USA

[4]Department of Internal Medicine, University of Iowa Carver College of Medicine, Iowa City, IA, USA

Abstract

Objective—Determine if hospice enrollment at the time of a terminal admission alters the length of stay (LOS) or costs compared with patients not enrolled in hospice.

Methods—Retrospective chart review of all non-traumatic inpatient deaths of patients with a previous admission in the preceding 12 months at an academic hospital.

Results—209 patients had a non-traumatic death and an admission in the year prior to the terminal admission. Patients enrolled in hospice had a shorter LOS ($p = 0.02$) and lower cost ($p<0.0001$) than patients not enrolled at the time of their terminal admission.

Conclusions—Enrollment in hospice during a terminal admission decreased cost and length of stay. Hospice may be a way to provide more cost effective, appropriate care to dying patients.

Keywords

hospice; terminal admission; cost; length of stay; cancer; palliative care consult

Introduction

There is increasing evidence that enrollment in hospice decreases cost, improves patient and family satisfaction, reduces hospital days, and improves the odds that a patient will die in a non-hospital setting.[1,2] While patients enrolled in hospice may be more likely to die at home than patients not enrolled in hospice,[3] some still die in the hospital for a variety of reasons: including admission for the management of symptoms (e.g. pain crisis or terminal delirium), patient and family preference, and as an unexpected consequence (e.g. someone panics and

Corresponding Author and address for reprint requests: Michelle T. Weckmann, MD, University of Iowa, Department of Family Medicine, 01102 PFP, Iowa City, IA 52242-1000. Tel: 319-384-7000. FAX: 319-384-7822. michelle-weckmann@uiowa.edu.

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calls 911).[4] We hypothesized that patients who were admitted and died in the hospital while under hospice care had a decreased cost and length of stay compared to people who died in the hospital and did not have hospice support.

Methods

Study Selection and Population

Approval of this study was granted by the University of Iowa Hospitals and Clinics (UIHC) Institutional Review Board. We conducted a retrospective review of all adult inpatient deaths at the University of Iowa Hospitals and Clinics (UIHC) in 2009. Inclusion criteria was an inpatient admission in the previous 12 months. Exclusion criteria was a death due to trauma. For each eligible patient, we recorded age, sex, race, date of death, primary and secondary diagnoses, hospice enrollment, length of stay and total hospital costs on both the final discharge summary and the discharge summary prior to the terminal admission. We also determined which patients were eligible for hospice based on NHPCO criteria at the time of their admission prior to their terminal admission (results in previous publication).[5]

Statistical analysis

Data were entered in a database using coded identifiers. Statistical analysis was conducted using SAS 9.2 for Windows (SAS 9.2, SAS Institute, Inc., Cary, NC). Standard descriptive statistics were used with wilcoxon rank-sum tests to describe differences in age, cost, and length of stay (LOS) for patients enrolled in hospice versus patients not enrolled in hospice. The LOS and cost of hospice patients were also compared to those of non-hospice patients with diagnoses (primary or secondary) of cancer. This was done with wilcoxon rank-sum tests as well. Wilcoxon rank-sum tests were used because of the small number of hospice enrolled patients (n = 7). Due to this small n, visually comparing the distributions of the samples was difficult, so significant results may be influenced by factors other than those with and without hospice enrollment truly having different medians. To compare the cost and LOS of patients with palliative care vs. those without it, two independent sample t-tests with log transformations of the variables of interest were performed (log transformations were used to better approximate normality of the distributions). The pearson chi square test, as well as the fisher exact test, were used to test for significant differences in proportions of sex, race, primary diagnosis, and type of insurance/payer for patients who were hospice eligible versus those who were ineligible. More specifically, the fisher exact test was used to test proportions which did not meet the assumptions of the pearson chi square test due to small cell sizes. These proportions included terminal diagnosis, race, and type of insurance/payer. The number of days between penultimate and terminal admission were compared between those who were hospice eligible and those who were ineligible as well, and a two independent sample t-test with a log transformation of the variable of interest was used. Spearman correlation was used to determine and test the monotonic relationship between cost observed and the number of secondary diagnoses. Spearman was used in place of pearson correlation due to concerns regarding the normality of the data. Corresponding p-values were recorded, with significance being considered at the standard level of 0.05.

Results

Patient characteristics

This study involved patients who were admitted and died at a large academic institution. The overall demographics and findings are characterized in a previous publication.[5] Briefly, of the 688 adult patients who died during 2009, 209 (30%) had a non-traumatic death and a hospital admission in the 12 months preceding the terminal admission. 60% (n = 126) were hospice eligible during the admission proceeding the terminal admission. Days between the previous admission and terminal admission was greater for patients not eligible for hospice (p-value <.0001), with the mean number of days being 62.80 (median 42) for hospice eligible and 130.16 (median 96) for hospice ineligible. There was no significant association between gender, race, or insurance and hospice eligibility status; however, primary diagnosis was associated with it (p-value < .001).

The majority of patients had multiple secondary diagnoses listed on the discharge summary from the terminal admission (number 0 to 8, mean 2.88, SD 1.73). The breakdown of the primary terminal diagnosis is 17% cardiac/vascular (n = 36), 20% respiratory (n = 41), 8% gastrointestinal (n = 17), 13% cancer (n = 28), 3% renal (n = 7), 27% infection (n = 56), 1% rheumatoid/autoimmune (n = 3), and 10% neurological (n = 21).86 of the patients had cancer listed as either a primary or secondary diagnosis.

Patients enrolled in hospice at the time of the terminal admission

Seven patients had enrolled in hospice prior to their terminal admission. All had cancer. Terminal diagnosis listed in the discharge summary included cancer (n=3), respiratory causes (n=3) and sepsis (n=1).

Hospital costs and length of stay

No significant difference in age (p-value = .05) was found between the patients enrolled in hospice versus those not enrolled in hospice. The 7 patients enrolled in hospice demonstrated a decreased cost (p-value < 0.0001) and length of stay (p-value = .02) during the terminal admission compared to patients not enrolled in hospice (Table 1). The same 7 patients did not demonstrate a decreased cost or length of stay during the admission prior to the terminal admission. It is worth noting that no patients were enrolled in hospice during the admission prior to the terminal admission. The decrease in cost and length of stay was maintained when the 7 patients enrolled in hospice were compared with only the other patients that had a diagnosis (primary or secondary) of cancer (p-value < .001, p-value = .0307 respectively). We also identified a correlation between the number of secondary diagnoses and the observed cost. Increased number of secondary diagnosis were correlated with an increased cost (Spearman Correlation value =0.32, p-value <0.001).

Patients who received a palliative care consult during the terminal admission, also demonstrated a decreased cost (mean cost $41, 859, n=98) but not a decreased length of stay (mean LOS 13.16 days, n = 98) compared to patients who did not receive a palliative care consult (mean cost $58,386, mean LOS 12.89 days, n= 111), with p-values of .04 and .4899 respectively.

Conclusions

Patients enrolled in hospice at the time of a terminal admission demonstrated a striking difference in length of stay and cost when compared to patients who were not enrolled in hospice. This savings was maintained when the pool was decreased to only include cancer patients. This finding is different from Tan's finding that there was no difference in cost when cancer patients are admitted from hospice but his study was not looking at terminal admissions.[6] It is similar to previous studies which have shown hospice enrollment demonstrates decreased costs at the end of life as well as decreased length of stay and intensive care utilization while subsequently increasing the quality and satisfaction of the care received.[7-12] This may be due to any number of factors, including, the tendencies for hospice patients to have had; goals of care discussions leading to clearer goals of care, a discussion of prognosis leading to an understanding of the terminal nature of the condition, and improved patient monitoring and advocacy. In addition, in support of recent findings regarding palliative care,[13] we also confirmed that a palliative care consult, during a terminal admission, has a positive benefit on cost.

This study was exploratory in nature and as such has clear limitations. These include the retrospective study design which was designed to capture only patients who have had a previous hospitalization. It does not include the 479 patients who died in the hospital in 2009 without having a previous admission. The full sample may have included more hospice patients but we feel that is unlikely since repeat hospitalizations can be a marker of disease severity and should make recognition that a patient may be hospice eligible more likely. We also had a very small sample size of hospice patients which may make the results less reliable; however given the robust difference found we think that is unlikely. It would have been interesting to know why patients were being enrolled in hospice but that information was not consistently available in the electronic medical record.

It was striking to us how few inpatients died under hospice care. The majority of the patients had complex medical conditions yet were not enrolled in a beneficial and potentially life extending service. The number of palliative care consults increased from the admission prior to the terminal admission indicating that the primary team was more likely to recognize how ill a patient was during the terminal admission. Unfortunately by this time, it is typically too late for an effective hospice referral. Our previous paper illustrated that hospice eligibility was often not considered even in patients with multiple serious medical illnesses. It is difficult to know how to overcome that hurdle. Educational efforts and further research needs to be done.

This data has implications for the healthcare system. As we strive to provide cost effective, evidence based care, hospice may be an effective tool to meet those objectives in patients with a serious life-limiting illness. Increasing hospice referrals and enrollment rates in appropriate patients is likely to be beneficial to our patients and their families as well as our entire healthcare system.

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Table 1

Comparison of cast and length of stay between patients enrolled and not enrolled in hospice during a terminal hospital admission

	Enrolled in hospice (n=7)	Not enrolled in hospice, all diagnoses (n=202)	Not enrolled in hospice, cancer diagnosis only (n=79)
Cost			
Mean	$4,963	$52,219	$33,047
Median	$3,690	$23,322	$16,091
Standard Deviation	$3,250	$85,101	$52,507
Length of Stay			
Mean	3.43	13.35	10.51
Median	1	6	6
Standard Deviation	4.47	25.05	17.49