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Hospice, Opiates, and Acute Care Utilization Among the Elderly Prior to Death From Heart Failure or Cancer

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Abstract

Background—Advances in heart failure (HF) treatments have prolonged survival but more patients die from HF than from any type of cancer. Little is known about the current practice in end-of-life (EOL) care in HF.

Methods—Two EOL cohorts (HF and cancer) were identified using Medicare data linked with pharmacy and cancer registry data. We assessed use of hospice, opiates, and acute care services (hospitalizations, emergency room [ER] visits, intensive care unit [ICU] admissions, and death in acute care). Time trends and predictors of use were assessed using multivariate regression including demographics and cardiovascular and non-cardiovascular comorbidities.

Results—Among 5,836 HF patients with median age 85, 77% female and 4% black, 20% were referred to hospice compared to 51% of 7,565 cancer patients. A modest rise in hospice use over time was parallel in the two groups. Twenty two percent of HF patients filled opiate prescriptions during 60 days prior to death compared to 46% of cancer patients. Use of acute care services in the 30 days prior to death was higher for HF (64% vs. 39% for ER visits, 60% vs. 45% for hospitalizations, and 19% vs. 7% for ICU admission). More HF patients died during their hospitalization than cancer patients (39% vs. 21%).

Conclusion—Patients dying of HF were less likely to be supported by hospice and opiates but more likely to die in hospitals than patients with cancer. Our study suggests that opportunities may exist to improve hospice and opiate use in HF.

Keywords

Heart failure; end-of-life; hospice; opiate; acute care; cancer

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INTRODUCTION

Advances in understanding the pathophysiology of heart failure (HF) introduced many effective therapies, which have prolonged survival in trial and community populations¹. As more patients survive into late-stage HF, they carry a longer burden of dyspnea, pain, and other end-of-life symptoms prior to death. Studies have shown that 20% to 78% of HF patients report pain and/or severe dyspnea²⁻⁷ which may be more severe closer to death.². As for pain and dyspnea in late-stage diseases, opiates can be effective for HF⁸ as well as for cancer. Hospice has been associated with better patient satisfaction⁹, better quality of death¹⁰, and less emotional stress in patients and families¹¹. While more patients die from HF than from any type of cancer¹², quality of care improvement for HF has focused largely on education and initiation of life-saving treatments.

We previously reported that the number of HF hospitalization is an independent predictor of prognosis in HF patients¹³ and the median survival decreased progressively with repeated hospitalizations (median survival <1.5 years after two hospitalizations and < 1 year after three hospitalizations). These patients may be particularly appropriate for studying the use of hospice and opiates.

The purpose of the current study is to 1) describe the use of hospice, opiates, and acute care services at the end-of-life in HF patients with repeated hospitalizations and 2) compare HF and cancer patients with respect to their use of these medications and services.

METHOD

Data Sources

We linked Medicare files (Part A, Part B, long-term care, hospice, and enrollment files), the state cancer registry, and pharmaceutical dispensing data from the state-sponsored pharmacy assistance program in Pennsylvania (PA). Pennsylvania Pharmaceutical Assistance Contract for the Elderly (PACE) is the largest state prescription benefits program for the low to middle income elderly. PACE has no deductibles or maximum annual benefit and charges a modest co-payment (\$6 generic, \$9 brand-name). The 2007 income ceiling for eligibility was \$27,676 for a married couple. These data sources provided basic demographic information, death date and causes of death from death certificate as well as coded diagnostic, procedural, and pharmacy dispensing information with high accuracy¹⁴. The Institutional Review Boards of the Brigham and Women's Hospital approved this study, and data-use agreements were established. All potentially traceable personal identifiers were removed from the data prior to analyses to protect patients' privacy.

Study Cohorts

End-of-life HF Cohorts—To define a cohort of end-of-life HF patients, we first required patients to have two or more HF hospitalizations during 1997-2004 in PA. The HF hospitalization was defined as an admission with HF as the primary discharge diagnosis (ICD9-CM of 428.xx), which has previously been shown to have a positive predictive value of 94% for HF using the Framingham criteria.¹⁵ We further required that 1) patients died from cardiac diseases¹⁶ using information in the death certificate and filled 1 ≥ prescriptions for loop diuretics during 365 days prior to death. All patients were active participants in their insurance programs. We also identified a subset of the HF cohort whose cause of death was specifically HF to conduct the sensitivity analyses.

End-of-life Cancer Cohort—The end-of-life cancer cohort consisted of patients diagnosed with one of the 4 most frequent solid malignant tumors (colorectal, lung, breast,

and prostate). Patients were identified from the state cancer registry as having a diagnosis between 1/1/1997 and 12/31/2004. These patients also had been active participants in their insurance programs. We further required that the patients died during the study period with cancer as the primary cause of death.

Covariates

From the enrollment files for Medicare and PACE, we obtained patient demographic information such as date of birth, gender, race (Black vs. White and other), and income. Patients' comorbid conditions were assessed during the 1 year prior to death using diagnosis codes from in-patient and out-patient files. The measured comorbidities included the patient's history of myocardial infarction (MI)¹⁷, prior HF¹⁵, other ischemic heart disease, cerebrovascular disease¹⁷, peripheral artery disease¹⁷, atrial fibrillation, hypertension, diabetes, chronic kidney diseases (CKD)¹⁸, chronic pulmonary diseases, gastrointestinal bleeding¹⁹, cancer, arthritis, depression and dementia.. We also assessed the cardiovascular prescription drug use (See Table 1)

Use of Hospice and Opiates at the End-of-Life

We assessed the date of the first hospice enrollment after the date of the index HF hospitalization or cancer diagnosis. As both HF and cancer patients at the end-of-life may suffer from considerable pain and dyspnea^{4-5, 20-21} that may require use of opiates, we also assessed whether these patients received any short- or long-acting opiate within 60 days prior to death. To ensure the complete capture of pharmacy claims, opiate use was only evaluated only in a subset of patients who reside outside the nursing home or hospice in the last 60 days prior to death.

Use of Acute Care Services at the End-of-Life

To describe the intensity of acute medical management at the end-of-life, we assessed whether patients had 1) any emergency room (ER) visit within 30 days prior to death, 2) any acute care hospitalization within 30 days prior to death, 3) any admission to intensive care unit (ICU) within the 30 days prior to death, or 4) died in an acute care setting.

Many of these measures for palliative and acute care services are modifications of previously published bench marks of quality of cancer care at the end-of-life²²⁻²⁴.

Analysis

Trends in the use of hospice, opiates, ER visits, ICU admissions, acute care hospitalizations, and deaths in an acute care setting were plotted for yearly intervals from 1997-2004 for each cohort. To assess major predictors of comfort care, we constructed multivariate modified Poisson regression models²⁵, which allowed direct estimation of risk ratios (RR) for binary outcomes with the corresponding 95% confidence intervals (95% confidence interval [CI]) even with frequent outcomes. SAS for Windows software (release 9.2) was used for all statistical analyses (The SAS Institute, Cary, NC)

No extramural funding was used to support this work.

RESULTS

Patients

We identified a total of 45,559 patients who had at least one HF admission between 1/1/1997 and 12/31/2004 and had been active participants in their insurance programs for >1 year prior to the index HF admission in our base population. Of those, 5,836 had ≥ 2 HF

hospitalizations, died from cardiac disease during the study period, were on loop diuretics during 365 days prior to death, and thereby entered the EOL HF cohort. Among the 15,231 patients linked to the state cancer registry with active participation in their insurance programs for at least 1 year prior to diagnosis, 7,565 died of cancer, and thereby entered the EOL cancer cohort. Table 1 compares the characteristics of the study patients. The mean age of HF patients who died of cardiac causes was 85 years at the time of death and 77% were female. Several comorbid conditions were quite common: 22% had a previous MI, 91% had coronary artery disease, 44% had cerebrovascular disease, 53% had diabetes, 61% had chronic pulmonary disease, 55% had chronic kidney disease, 29% had depression, and 33% had dementia. Similar characteristics were observed in the subgroup of these patients who died of HF (N=1,350) were similar. The cancer patients were relatively younger with fewer cardiovascular comorbidities, CKD, depression, or dementia but with similar prevalence of chronic pulmonary disease.

Use of Hospice, Opiates, and Acute Care at the End-of-Life

Hospice enrollment was observed in 51% of cancer patients compared to 20% of HF patients (Table 2). Figure 1 shows that the modest rise in hospice use over time is parallel across the two groups. In the multivariate analysis of HF patients, younger age, male gender, income, and dialysis treatment were associated with 2% per year (95% CI: 1- 3%), 25% (95% CI: 14- 35%), 2% per \$1,000 increase (95%CI: 0.2 - 3%) and 65% (95% CI: 44- 78%) reduction in the enrollment in hospice, respectively.

Figure 2 shows the use of opiates over time in the subset of patients not admitted to a hospice or nursing home prior to death (N= 1,795 for HF cohort and 1,888 for cancer cohort). In HF, 22% of patients filled opiate prescriptions during the 60 days prior to death. The fraction was lower for those who eventually died in an acute-care-hospital (19%) compared to those who died outside of non-acute care settings (27%) (Table 2). Opiate use was 23% higher in patients with cancer prior to death (46%). For the multivariate analysis in HF patients, opiate dispensing was less likely to occur in male patients (risk ratio [RR] =0.70; 95% CI: 0.56-0.87), Black patients (RR=0.56; 95% CI: 0.33-0.97), patients with dementia (RR=0.72; 95% CI: 0.55-0.94), or patients with cerebrovascular disease (RR=0.82; 95% CI: 0.68-0.99). Those with chronic arthritis (RR=1.43; 95% CI: 1.19-1.71) were more likely to dispense opiates. Even after adjusting for these factors, there was no trend for increased opiate use over time (p=0.13). Finally, we conducted sensitivity analyses by changing the length of the assessment window for opiate use to 30 days or 365 days. The frequency of opiate dispensing decreased to 15% for HF patients and 33% for cancer patients using the 30-day window and increased to 40% for HF patients and 63% in cancer patients using the 365-day window). However, the difference between HF and cancer patients and the time trend for opiate dispensing remained similar to those in the primary analysis using 60-day window.

Use of acute care services within the 30 days prior to death was higher in HF patients than that in cancer patients. (60% vs. 39% for ER visits, 64% vs. 45% for hospitalizations, and 19% vs. 7% for ICU admissions). There was no trend over time in the frequency of ER visits, acute care hospitalizations, or ICU admissions during the 30 days prior to death in either cohort. More HF patients died in acute care hospitals than cancer patients (39% vs. 21%). However, we observed a modest decrease over time in the frequencies of deaths in acute care hospitals, which appeared parallel in HF and cancer patients (Figure 3).

We repeated all analyses in the subset of HF patients whose death was specifically attributed to HF (N=1,350) which yielded no substantial changes from the main analyses.

DISCUSSION

Using population-based health care utilization data for the elderly, we characterized use of hospice, opiates, and acute care services in HF patients at end-of-life and compared it to that in cancer patients. Overall, use of opiates and hospice was not high and use of acute care services was high in both HF and cancer patients. Over time, hospice use has increased slowly in both patient groups, but the contribution of hospice remained lower in HF. Also, more HF patients died in acute care settings. Various components of effective end-of-life care may be provided in non-hospice settings that are not easily captured. However, we were able to assess opiate use in HF patients in non-hospice settings, which was low compared to that in cancer patients and remained low over the duration of study period. To our knowledge, this is the first population-based study described trends in the use of hospice, opiates, and acute care services in elderly HF patients near death and compared them to those in cancer patients.

Prior studies found that hospice utilization was lower in patients who died of heart disease compared to that in patients who died of cancer²⁶⁻²⁷. Connor et al. found that 12% of patients died of heart disease used hospice compared to 65% in patients died of cancer²⁶ using 100% Medicare hospice file in 2002. White race, female gender, and advanced age were shown to be associated with higher utilization of hospice^{26, 28}. In our study, the enrollment to hospice in 2002 was 26% in HF patients, much higher than the national figure. This higher rate can be explained by the demographic characteristics of our study population. Our study population is dominated by older, White, and/or female patients. Geographic variation in the use of hospice has been reported²⁶⁻²⁷ and PA is one of the states with relatively lower use of hospice compared to other states²⁶. However, it is possible that there is a within-state variation contributing to the higher use in our patients since our study patients are a subset of Medicare beneficiaries in PA.

Patients with advanced HF experience significant pain²⁻⁷, dyspnea^{2, 5-7}, and diminished quality of life²⁹. While the specific causes of pain are unclear, 20 - 70% of patients with advanced HF report pain in a population based study⁴ or in community dwelling representative samples⁴⁻⁵. No evidence exists on how to manage pain and symptomatic dispend at the end-of-life in HF patients³⁰. Opiates are considered "essential" medications for palliative care by the World Health Organization³¹. Opiates have been used to alleviate pain in cancer patients and can be effective in managing pain and dispend in patients with end stage HF⁸. Hospice and other palliative care services can address various aspects of suffering at the end of life including physical, emotional, psychological and spiritual issues and provides caregiver support³². Although patients with HF and cancer have similar needs for palliative care as assessed by symptom burden, depression, and spiritual well-being²¹, we found that approximately 20% of HF patients were enrolled in hospice or dispensed opiates compared to approximately 50% of cancer patients.

Although our data do not provide insights on reasons and appropriateness of hospice, opiates, or acute care service use in end-of-life HF patients, they shed light on the current status of end-of-life care for HF patients. Several factors could have potentially contributed to the low use of hospice and opiates and high use of acute care services prior to death in our HF patients. First, physicians may be unsure about or underestimate the high mortality after multiple HF hospitalizations and feel reluctant to discuss limited prognosis with HF patients. According to a recent survey for physicians taking care of HF patients, only 16% of the physicians stated that they could predict death within 6 months well³³. Thomas et al. showed that physicians overestimated the survival in 68% of HF patients vs. 11% of cancer patients³⁴. Secondly, physicians may not discuss with patients about their end-of-life preferences. While physicians' discussion of hospice was independently associated with a

large increase in the likelihood of hospice use (odds ratio = 5.3; 95% CI: 2.3-13)³⁴, only 2.5%³⁵ or 7%³⁴ of HF patients had a discussion about resuscitation preferences or hospice. A recent study showed that patients often have a change in their preferences in survival during or following a recent hospitalization. However, their preferences tend to remain stable during the next 6 months³⁶ where many HF patients with advanced symptoms are more interested in feeling well than in living longer³⁶.

In addition, patients and families may be unwilling to hear about their limited life expectancy. However, in a survey conducted in elderly patients with cancer, HF, or chronic obstructive pulmonary disease and their caregivers³⁷, 55% of HF patients who had no discussion of their life expectancy with physicians reported that they wanted one. Also, 75% of the caregivers reported that they preferred to have a discussion on life expectancy³⁷. Finally, unwelcome connotations of “hospice” and “narcotics” in non-cancer settings and limited availability of palliative care services for HF³⁸ may have contributed to the lower utilization in HF patients.

Several limitations should be noted in interpreting our results. First, our data are limited to low to middle income Medicare beneficiaries who participated in the pharmacy benefit program. The findings in our study may not be generalizable to younger or wealthier patients. However, approximately a half of the states have similar pharmacy assistance programs providing services to patients similar to ours in socioeconomic status. Second, our data lack detailed clinical information and the study population may have included those who were hospitalized for HF but did not die of HF. However, sensitivity analyses using more stringent definition of end-of-life HF cohort requiring 2 HF hospitalizations + loop diuretic use + death due to HF) or less stringent definition requiring (2 HF hospitalizations + cardiac death) yielded very similar results. Also, this potential misclassification of including patients who might have not died of the disease applies to the cancer cohort and therefore is likely to be non-differential. Third, we could not assess whether patients were consulted to palliative care service as no specific procedure code was available to identify palliative care referrals. Finally, we could not assess opiate use after our patients entered a nursing home or enrolled in hospice because the dispensing information is incompletely recorded during their stay in a nursing home or hospice. Opiate use can be much higher in HF patients enrolled in hospice as it has been reported that 74% of HF patients in hospice were prescribed the medication⁶.

We found that HF patients were less likely to be supported by a hospice or opiates prior to death and more likely to die in acute care hospitals than patients dying of cancer. More detailed studies are needed to understand the appropriateness and reasons of the low hospice and opiate use. Opportunities may exist to improve the end-of-life care in HF patients by recognizing limited prognosis in patients with repeated HF hospitalizations, communicating about the prognosis and the role of hospice and opiates, and improving availability of palliative care services in HF patients.

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ABBREVIATION LIST

HF	heart failure
EOL	end-of-life

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Figure 1.
Trend in the Use of Hospice in HF vs. Cancer Patients (1997-2004)

Figure 2.
Trend in Filling Opiate Prescriptions Out of the Hospital in HF and Cancer Patients
(1997-2004)r Patients (1997-2004)
Admission to Intensive Care Units in HF and Cancer Patients (1997-2004)

Figure 3.
Trend in Deaths in Acute Care Hospitals in HF and Cancer Patients (1997-2004)

Table1

Characteristics of the End-of-Life Patients with Heart Failure vs. Cancer (1997-2004)

□□	HF patients died of cardiac causes (N=5,836)	Lung, Breast, Colorectal and Prostate Cancer Patients died of cancer (N=7,565)
<u>Demographic</u>	□	□
Age at death (years)	85 (10)	80 (7)
Female	77	65
Race (Black)	4	6
<u>Previous Diagnosis</u>		
Prior MI	22	4
Coronary artery disease	91	50
Atrial fibrillation	70	28
Peripheral vascular diseases	46	26
Hypertension	70	55
Cerebrovascular disease	44	28
Diabetes	53	31
Chronic pulmonary diseases	61	54
Chronic kidney diseases	55	22
Dialysis	4	1
Cancer	22	100
Dementia	29	19
Depression	33	24
<u>Use of Other Drugs</u>		
Statin	19	13
Beta blocker	47	26
Angiotensin converting enzyme inhibitor	54	22
Angiotensin receptor blocker	16	6
Digoxin	56	19
Spironolacton	18	5
Calcium channel blocker	37	31
Loop diuretic	100	34
□ Warfarin	38	17

Values represent % for categorical variables and median (interquartile range) for continuous variables

HF: heart failure, MI: myocardial infarction

Table 2

Use of Hospice, Opiates and Acute Care Services in Heart Failure and Cancer Patients prior to Death

	HF patients died of cardiac causes (N=5,836)	Lung, Breast, Colorectal and Prostate Cancer Patients died of cancer (N=7,565)
Enrolled in hospice prior to death	20.4	50.8
Died in hospice within 3 days after enrollment [‡]	22.8	11.0
Use of opiates within 60 days prior to death *	22.2	45.6
Use of opiates in those died in acute care hospital *	19.1	43.7
Use of opiates in those did not die in acute care hospital *	26.8	48.0
ER visits within 30 days prior to death	60.1	38.9
Acute care hospitalization within 7 days prior to death	30.3	15.9
Acute care hospitalization within 30 days prior to death	64.2	45.3
ICU admission within 30 days prior to death	19.0	7.2
Admission to nursing home prior to death	60.6	38.3
Death in acute care hospital	39.1	21.0

Values represent % (count)

N=1,795 for HF cohort and N=1,888 for cancer cohort

[‡] the denominator is the number of patients enrolled in hospice

* Assessed only among those with no hospice use or no nursing home admission prior to death