



When does early palliative care influence aggressive care at the end of life?

Mellar P. Davis¹ · Erin A. Vanenkevort¹ · Alexander Elder¹ · Amanda Young¹ · Irina D. Correa Ordonez¹ · Mark J. Wojtowicz¹ · Halle Ellison¹ · Carlos Fernandez¹ · Zankhana Mehta¹ · Bertrand Behm¹ · Glen Digwood¹ · Rajiv Panikkar¹

Received: 13 August 2021 / Accepted: 3 March 2022 / Published online: 15 March 2022
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Abstract

Background Early palliative care improves patient quality of life and influences cancer care. The time frame of early has not been established. Eight quality measures reflect aggressive care at the end of life. We retrospectively reviewed patients who died with cancer between January 1, 2018, through December 31, 2019, and compared the timing of palliative care consultation, advance directives (AD), and home palliative care with aggressive care at the end of life (ACEOL).

Methods Patients without ACEOL indicators were compared to patients with one or more than one indicator of ACEOL. The proportion of patients who received palliative care, completed AD, and the timing of palliative care and AD (less than 30 days, 30–90 days, and greater than 90 days prior to death) was compared for patients who had ACEOL versus those who did not. Chi-square analysis was used for categorical data, one-way ANOVA for continuous variables, and odds ratio (OR) with confidence intervals (CI) was reported as a measure of effect size. A p value ≤ 0.05 was considered significant.

Results 1727 patients died, 46% were female, and the mean age was 69 (SD 11.91). Seventy-one percent had a palliative care consult, 26% completed AD, and 888 (51.4%) had at least one indicator of ACEOL. The most common indicator of ACEOL was new chemotherapy within 30 days of death, in 571 of 888 (64%) of patients experiencing ACEOL. ADs completed at any time reduced ACEOL (OR 0.80, 95%CI 0.64–0.99). Palliative care initiated at 30 days was associated with a greater risk of ACEOL (OR 5.32, 95% CI 3.94–7.18) and initiated between 30 and 90 days (OR 1.39, 95% CI 1.07–1.80) compared to no palliative care but was associated with reduced chemotherapy as an indicator of ACEOL when >90 days (OR 0.46, 95% CI 0.38–0.57) before death.

Discussion Completed ADs were associated with reduced chemotherapy in the last 30 days of life and reduced ICU admissions. This may reflect goals of care and end-of-life discussions and transition of care to comfort measures. Palliative care paradoxically when initiated within 90 days before death was associated with greater ACEOL compared to no palliative care. This may be due to consultation late in the course of illness with a focus on crisis management in patients frequently utilizing the health care system. There is an associated reduction in the use of chemotherapy in the last 30 days of life if palliative care is consulted 90 days prior to death.

Conclusions An initial palliative care consult greater than 90 days before death and ADs completed at any time during the disease trajectory was associated only with reduced chemotherapy in the last 30 days of life compared with no palliative care among the 7 ACEOL indicators. ADs were associated with reduced ICU admissions. Most palliative care consults occurred within 90 days of death and a palliative care consult within 90 days of death is not an optimal utilization of services.

Keywords Aggressive · Care · End-of-life · Palliative · Advance directives

Introduction

Aggressive cancer care includes chemotherapy at the end of life, multiple emergency department visits, rehospitalizations, intensive care unit (ICU) admissions, and hospital mortality. A retrospective review of the National

✉ Mellar P. Davis
mdavis2@geisinger.edu

¹ Geisinger Health System, 100 N. Academy Ave, Danville, PA 17822, USA

Cancer Institute Surveillance, Epidemiology, and End Results (SEER) database dating from 1993 to 1996 identified characteristics of aggressive care at the end of life (ACEOL) (Table 1) [1]. These seven indicators, and hospitalization for 14 days within the last month of life, [1] were identified as poor outcomes to cancer care.

One third of patients are reported to have at least one indicator of ACEOL [2]. Several studies found that early palliative care reduces ACEOL [3, 4]. Intrinsic to an early palliative care referral is a prognostic understanding of the patient's cancer [5, 6]. Definitions and timeframe of early palliative care are not established [2]. Timely palliative care has been variously defined as more than 30 days before death, greater than eight weeks before death, or within eight weeks of diagnosis of metastatic disease [2, 3, 7, 8]. Benefits are reported to occur regardless of the trajectory of advanced cancer [9–11]. Paradoxically, palliative care has been associated with ACEOL if consultations are late in the disease course of cancer [2].

The multiple studies describe the timing of palliative referral as “late,” the time ranges from five to fifty-four days [12–14]. In a recently published systematic review, the median time between palliative care consultation and death was 18.9 days (IQR 0.1) [15].

This retrospective study was to primarily determine the proportion of patients who underwent ACEOL. More specifically, we wanted to understand the influence of a comprehensive palliative care consisting of inpatient, outpatient services, and an inpatient unit on ACEOL with ADs on ACEOL. Our hypothesis prior to collecting the data was that palliative care service consultations first instituted greater than 30 days before death and/or completed ADs would be associated with reduction of at least one of the seven characteristics of ACEOL listed in Table 1.

Methods

This is a retrospective cohort study of patients ages 18–99 diagnosed with cancer who received chemotherapy, followed within the Geisinger Health System, who died in the years 2018 or 2019. Data were collected from the electronic

Table 1 Indicators of aggressive care at the end of life

- New chemotherapy initiated within 30 days of death
- Chemotherapy administered within 14 days of death
- Greater than 1 hospitalization within 30 days of death
- Greater than 2 emergency room visits within 30 days of death
- An intensive care admission within 30 days of death
- Death within the hospital
- No hospice admission or hospice services of less than 3 days in duration

medical record between 01/01/2018 and 12/31/2019. All patients had available to them inpatient and outpatient palliative care services, but the timing was contingent on the referring oncologist or primary care physician, and the decision to utilize was patient dependent. Additionally, the Geisinger Health Plan also has a community-based palliative care program for members called Geisinger at Home Palliative services. Patients who died within 30 days of the diagnosis of cancer were excluded. This study was approved by the Geisinger Institutional Review Board.

The primary outcome of interest was the proportion of patients having indicator(s) of ACEOL as outlined and included the metric of 14 days of hospitalization in the last 30 days of life. The second primary outcome was the completion and timing of ADs. Data for hospice referrals and duration of hospice services could not be obtained; therefore, this indicator was excluded.

Demographic and clinical characteristics were summarized and compared across aggressive care groups defined as receiving no indicators of ACEOL compared to one or more indicators. Demographic and clinical data included sex, age at death, organ site of primary disease, Charlson Comorbidity Index (CCI), Geisinger Health Plan insurance, and clinical visit with hematology or oncology within 12 months before death. Frequencies and percentages were reported for categorical variables; for continuous variables mean and standard deviations were reported. To assess differences among patients who had one or more indicators of ACEOL to those who did not have any, Chi-square analyses were conducted for categorical data and one-way analysis of variance (ANOVA) tests for continuous outcome variables. To measure effect size odds ratios were calculated and associated 95% confidence intervals and p-values were reported. A p value ≤ 0.05 indicated statistical significance. Statistical analyses were conducted using SAS Enterprise Guide Version 8.3 (SAS Institute, Inc., Cary, NC), USA).

Results

Of the 1727 eligible patients, 790 (46%) were female; the average age was 69 (SD = 11.9). Thirty-five percent ($n = 611$) had Geisinger Health Plan, 27% had lung cancer ($n = 473$), the majority (88%) of patients had hematology or oncology visits within 12 months prior to death. The average CCI score was seven (SD = 3.7).

There were no significant differences in sex or CCI scores between those receiving palliative care services and those not. There was a significant difference between patients who had no indicators of aggressive care at end of life, one indicator of aggressive care, and more than one indicator of aggressive care on type of cancer and age at death. Patients who received no aggressive care were older, and those with

more than one indicator were younger than those who only had one indicator of aggressive care (Table 2).

Twenty-six percent had completed ADs documented. Patients who had no indicators had a greater percentage of documented ADs compared to patients who had ACEOL, but the difference was not statistically significant (Table 3). ADs were categorized as completed within 30 days, between 30 and 90 days, and more than 90 days before death. There were no significant group differences. Completed ADs reduced chemotherapy utilization within 30 days of death and ICU admissions (Table 4).

Seventy-one percent had a palliative care consultation. This frequency differed among the groups. Specifically, 78% of patients who had more than one indicator of aggressive care, 70% of those who had one indicator, and 66% of those who did not receive ACEOL had palliative

care services (Table 5). The odds of having a palliative care consultation for patients with one or more than one indicator of aggressive care were 1.20 (95% CI 0.90, 1.59) and 1.78 (95% CI 1.40, 2.27)-fold greater than those with no indicators. This pattern was consistent with a large proportion of palliative care consultations within 30 days of death and palliative care consultations 30–90 days before death. However, those who had no indicators of aggressive care (45%), and one indicator of aggressive care (33%) were more likely to receive a palliative care consultation greater than 90 days before death compared to those who had more than one indicator of aggressive care (25%). The odds of a palliative care consult being initiated more than 90 days before death for those with one or more than one aggressive care indicator was 0.59 (95% CI 0.45, 0.78) and

Table 2 Demographic characteristics by aggressive care indicators

	Total (<i>N</i> =1727)	No aggressive care (<i>N</i> =839)	One indicator of aggressive care (<i>N</i> =314)	More than one indicator of aggressive care (<i>N</i> =574)	<i>P</i> value
Female, <i>N</i> (%)	790 (45.7%)	387 (46.1%)	141 (44.9%)	262 (45.6%)	0.932
Age at death, mean (SD)	69.0 (11.91)	70.5 (12.01)	68.9 (11.82)	66.8 (11.48)	<.0001
Disease, <i>N</i> (%)					0.024
Bladder/kidney	72 (4.2%)	32 (3.8%)	16 (5.1%)	24 (4.2%)	
Breast	113 (6.5%)	58 (6.9%)	18 (5.7%)	37 (6.4%)	
Colon/rectum	137 (7.9%)	75 (8.9%)	24 (7.6%)	38 (6.6%)	
Esophageal	63 (3.6%)	27 (3.2%)	15 (4.8%)	21 (3.7%)	
Female reproductive	99 (5.7%)	48 (5.7%)	22 (7.0%)	29 (5.1%)	
Head and neck	76 (4.4%)	48 (5.7%)	12 (3.8%)	16 (2.8%)	
Liver and bile duct	28 (1.6%)	18 (2.1%)	1 (0.3%)	9 (1.6%)	
Lung	473 (27.4%)	220 (26.2%)	82 (26.1%)	171 (29.8%)	
Lymphoma	89 (5.2%)	39 (4.6%)	16 (5.1%)	34 (5.9%)	
Melanoma and other skin	43 (2.5%)	19 (2.3%)	7 (2.2%)	17 (3.0%)	
Pancreas	112 (6.5%)	56 (6.7%)	26 (8.3%)	30 (5.2%)	
Prostate	95 (5.5%)	61 (7.3%)	15 (4.8%)	19 (3.3%)	
Thyroid	10 (0.6%)	5 (0.6%)	1 (0.3%)	4 (0.7%)	
Other	317 (18.4%)	133 (15.9%)	59 (18.8%)	125 (21.8%)	
Geisinger Health Plan, <i>N</i> (%)	611 (35.4%)	303 (36.1%)	118 (37.6%)	190 (33.1%)	0.339
HemOnc a year before, <i>N</i> (%)	1528 (88.5%)	741 (88.3%)	276 (87.9%)	511 (89.0%)	0.864
Charlson Score, mean (SD)	7.1 (3.75)	7.2 (3.91)	7.0 (3.55)	7.0 (3.63)	0.454

Table 3 Advanced directives by aggressive care indicators

	Total (<i>N</i> =1727)	Aggressive care (<i>N</i> =888)	No aggressive care (<i>N</i> =839)	<i>P</i> value ¹	Odds ratio (OR) (95% CI)
Any advanced directive	443 (25.7%)	209 (23.5%)	234 (27.9%)	0.038	0.80 (0.64, 0.99)
Advanced directives 30–90 days	4 (0.2%)	4 (0.5%)	0 (0.0%)	0.052	-
Advanced directives > 90 days	439 (25.4%)	205 (23.1%)	234 (27.9%)	0.022	0.78 (0.62, 0.96)

¹Chi-square *p* value

Table 4 The influence of advance directives on aggressive care at the end of life

Indicator	No advanced directives (<i>n</i> = 1284)	Advanced directives (<i>n</i> = 443)	<i>P</i> value ¹
New chemotherapy initiated within 30 days of death	448 (34.8%)	123 (27.8%)	0.006
Chemotherapy given within 2 weeks of death	204 (15.9%)	59 (13.3%)	0.194
An ICU admission within 30 days of death	54 (4.2%)	9 (2.0%)	0.035
Greater than 1 ED visit within 30 days of death	205 (16.0%)	67 (15.1%)	0.675
Greater than 1 hospitalization visit within 30 days of death	163 (12.7%)	59 (13.3%)	0.735
Death within the hospital	251 (19.5%)	84 (19.0%)	0.788
Admission greater than 14 days in last 30 days before death	107 (8.3%)	43 (9.7%)	0.376

¹Chi-square *p* value

Table 5 Palliative care services by aggressive care indicators

	Total (<i>N</i> = 1727)	Aggressive care (<i>N</i> = 888)	No aggressive care (<i>N</i> = 839)	<i>P</i> value ¹	Odds ratio (OR) (95% CI)
Any palliative care services	1221 (70.7%)	666 (75.0%)	555 (66.2%)	<.0001	1.53 (1.25, 1.89)
Palliative consult within 30 days	318 (18.4%)	258 (29.1%)	60 (7.2%)	<.0001	5.32 (3.94, 7.18)
Palliative consult 30–90 days	278 (16.1%)	162 (18.2%)	116 (13.8%)	0.012	1.39 (1.07, 1.80)
Palliative consult > 90 days	625 (36.2%)	246 (27.7%)	379 (45.2%)	<.0001	0.46 (0.38, 0.57)

¹Chi-square *p* value

0.40 (95% CI 0.32, 0.51) times the odds of those with no aggressive care indicators, respectively.

Seven percent received Geisinger at Home Palliative services which did not differ among groups. Geisinger at Home Palliative services within 30 days of death, 30–90 days before death, and more than 90 days before death also did not differ among groups.

Supportive services included completed ADs, palliative care services, and Geisinger at Home Palliative services. There was a significant difference in the number of supportive services across groups. Specifically, more patients with more than one indicator of ACEOL received at least one supportive service compared to those with one indicator or no indicator. Patients with one indicator of aggressive care had the greatest percentage of receiving two supportive services (23.2%), and those with no indicators had the greatest percentage of receiving all three supportive services (2.6%). The odds of having one or more supportive services for those with one or more than one indicator of aggressive care was 0.98 (95% CI 0.76, 1.22) and 0.88 (95% CI 0.72, 1.08) relative to no aggressive care indicators, respectively (Table 6). To determine the impact of palliative care services, Geisinger at Home Palliative and palliative care inpatient and outpatient consultations were combined to create a “palliative care service” indicator. Table 6 demonstrates the differences across groups, no supportive services, palliative care services only, palliative care services and ADs, or only ADs. There is a significant difference among groups ($p = 0.0003$)

where the odds of supportive services for patients with one or more than one indicator of ACEOL of 0.84 (95% CI 0.66, 1.07) and 0.61 (95% CI 0.50, 0.75) fold less than those with no indicators, respectively (Table 6). We also examined the influence of any supportive services that included palliative care services compared to those who only completed ADs or no supportive services (Supplementary Table 1). There was a significant group difference ($p = 0.0001$). The likelihood of any supportive services that included palliative care for those with one or more than one indicator was 1.18 (95% CI 0.88, 1.57) and 1.71 (95% CI 1.33, 2.19) fold the odds of those with no indicators, respectively.

Three hundred fourteen of 888 (35.4%) patients had one ACEOL indicator and 574 (64.6%) had more than one indicator (Supplementary Table 1, 2). The most common indicator was chemotherapy within the last 30 days of life, which occurred in 571 of 888 (64.3%) patients. Younger patients were more likely to receive chemotherapy within the last 30 days of life. Neither sex nor CCI were associated with chemotherapy at 30 or 15 days before death. (Supplementary Table 3). Approximately 20% of patients died in the hospital. The least common indicator was ICU admissions, which occurred in 63 of 888 patients (7%). Compared with no palliative care services, palliative care initiated at greater than 90 days was associated with reduced new chemotherapy within 30 days of death and chemotherapy administered within 15 days of death (Supplementary Table 4) only compared with no palliative care and palliative care within

Table 6 Supportive services by indicators of aggressive care

	Total (N= 1727)	Aggressive care (N= 888)	No aggressive care (N= 839)	P value ¹	Odds ratio (OR) (95%CI)
Number of supportive services				0.052	0.91 (0.76, 1.10)
No Supportive Services	370 (21.4%)	173 (19.5%)	197 (23.5%)		
1 supportive service	956 (55.4%)	511 (57.5%)	445 (53.0%)		
2 supportive services	366 (21.2%)	191 (21.5%)	175 (20.9%)		
3 supportive services	35 (2.0%)	13 (1.5%)	22 (2.6%)		
Palliative care vs. advanced directives				0.0002	0.69 (0.57, 0.82)
No supportive services	370 (21.4%)	173 (19.5%)	197 (23.5%)		
Advanced directives only	98 (5.7%)	34 (3.8%)	64 (7.6%)		
Palliative care only	914 (52.9%)	506 (57.0%)	408 (48.6%)		
Palliative care and advanced directives	345 (20.0%)	175 (19.7%)	170 (20.3%)		
Any palliative care vs. advanced directives				0.0001	0.66 (0.53, 0.81)
No supportive services	370 (21.4%)	173 (19.5%)	197 (23.5%)		
Advanced directives only	98 (5.7%)	34 (3.8%)	64 (7.6%)		
Palliative care services	1259 (72.9%)	681 (76.7%)	578 (68.9%)		
Palliative care vs. no palliative care				0.0003	1.49 (1.20, 1.84)
No palliative care services	468 (27.1%)	207 (23.3%)	261 (31.1%)		
Palliative care services	1259 (72.9%)	681 (76.7%)	578 (68.9%)		

¹Chi-square *p* value

90 days of death. Palliative care services initiated greater than 90 days before death was associated with decreased emergency department utilization and hospital admission compared with palliative care initiated at less than 90 days but not less than those who were not seen by palliative care. However, palliative consults greater than 90 days before death have significantly less chemotherapy initiated within 30 days of death and less chemotherapy continued within 2 weeks of death than those who had not had a palliative care consult (Supplementary Table 4). Palliative care consultations within 90 days of death were not associated with a reduction in any of the seven characteristics of ACEOL.

Discussion

Half of the patients who died in the years 2018 and 2019 in our tumor registry had at least one indicator of ACEOL; only 1/3 were seen by palliative care greater than 90 days prior to death. A quarter of the patients had completed ADs, most were completed > 90 days prior to death. Documented ADs were associated with a reduced number of patients receiving chemotherapy at the end-of-life and ICU admission. Palliative care consultation > 90 days before death reduced was associated with reduced chemotherapy given to patients in the last month of life. Palliative care initiated within 90 days of death is associated with a greater number of indicators of ACEOL relative to no palliative care.

Advance directives

Completion ADs has been reported to reduce ACEOL. To complete ADs properly requires discussions about patient values and prognosis. End-of life-discussions are likely to occur with discussions about prognosis. Prognostic awareness occurs in 49% of patients with an advanced illness but this varies based upon the country surveyed [16]. Lack of prognostic awareness and inaccurate prognostication have been associated with ACEOL [5, 17–20]. Oncologists tend to be optimistic in their prognostication and may delay ADs discussions for that reason [21]. However early discussions and ongoing conversations are an important approach to patients with an incurable illness with the aim of completing ADs in a timely fashion [22].

Most in our study completed ADs greater than 90 days before death which was associated with reduced rehospitalization (odds ratio 0.21: 90 5% CI 0.12 to 0.37) [23]. In a study of women with advanced ovarian cancer a similar finding occurred. End-of-life discussions greater than 30 days before death was associated with less chemotherapy in the last 14 days of life, reduced hospitalizations within 30 days of death, and increased hospice days [24]. In a large cohort study of lung and colon cancer patients, 39% of end-of-life discussions took place in the last 30 days of death but for the subset in which discussions occurred greater than 30 days before death, there was an associated reduction in all indicators of ACEOL except ICU admissions [5]. Likewise, the Cancer Care Outcomes Research and Surveillance

Consortium study found the median time between end-of-life discussions and death was 33 days with lost opportunities to discuss choices at the end-of-life [25].

A significant proportion of patients do not engage or want to engage in end-of-life discussions which then often occur under crisis conditions in the last 30 days of life. On the other hand, less than half of physicians know their patients' preferences for end-of-life care which makes the completion of ADs important [5, 26–28]. ADs completed prior to hospitalization would be preferred because most patients have decision-making capacity at admission while half of advanced cancer patients will lose decision-making capacity during hospitalization. If then a surrogate becomes the decision-maker, there is an associated increased frequency of ACEOL [29]. Decisions regarding resuscitation prior to hospitalization is associated with reduced resuscitations during hospitalization, reduced intensive care length of stay and hospital mortality [30].

Our findings are consistent with the findings from two systematic reviews [31]. Both reviews demonstrated that end-of-life discussions and advanced care planning was associated with reduced ACEOL. The strongest association was with reduced intensive care utilization (odds ratio 0.26–0.68) and chemotherapy (odds ratio 0.41–0.57).

Timing of palliative care consultations and aggressive care

Seventy percent of patients who died of their cancer were seen by our palliative care service but only 1/3 were seen > 90 days prior to death. Palliative consultations within 90 days of death were associated with increased some types of ACEOL; only those patients initially seen > 90 days prior to death had a reduction in chemotherapy as ACEOL.

Half of patients in our study had at least one indicator of aggressive care; 64% had new chemotherapy started within 1 month of death and nearly 30% continued chemotherapy within 2 weeks of death. A study of women with gynecological cancers found 41% had at least one indicator [32]. Younger patients were more likely to receive chemotherapy at the end of life. Comorbidities and gender was not associated with ACEOL in our study though comorbidity has been a risk factor for ACEOL in another study [33]. Gender in several studies has been found to be a factor with males undergoing more late chemotherapy [2, 9].

Targeted therapy has also been associated with administration near death. A recent study of immune checkpoint inhibitors found that 29% of patients continue immune checkpoint inhibitors within 30 days and 6% were started on a checkpoint inhibitor despite high tumor burden and a poor performance score [34].

A small study of patients with cervical cancer found that the median time frame for palliative care referral to death

was 2.3 months with 34% referred in the last month of life [35]. A systematic review found that the average time from palliative care consultation to death was 18.9 days [15].

In a large patient cohort with advanced gastrointestinal cancers ($n=34,630$), the average time from palliative care to death of 76 days; 46% had palliative care services initiated greater than 90 days prior to death. Twelve percent had services initiated within 7 days of dying [11]. A retrospective review of patients with pancreatic cancer found the median survival time from palliative consultation was 75 days, with only 52% having a palliative care consultation [9].

Palliative care associated with increased aggressive care

We found that palliative care consultations within 90 days of death were associated with more ACEOL which differs from other studies [9, 11]. Our experience though is not unique [2]. A retrospective study of patients with pancreatic cancer found that late palliative care consultations defined as occurring less than 90 days prior to death was associated with an 18% greater use of emergency department visits, 12.5% greater number of hospitalizations, and increased chemotherapy administration in the last 30 days of life [36].

A study utilized the National Cancer Institute Surveillance, Epidemiology and Result (SEER) database and linked patients 66 years or older with pancreatic cancer to palliative care utilization and acute care services in the last 30 days of life [37]. Of the 54,130 patients, 31.6% had their first palliative care consult within 7 days, 70% within 30 days, 14% between 30 and 60 days, and only 11% greater than 12 weeks (90 days) before death. Emergency room utilization was higher in those consulted within 30 days compared with those who did not have a consult. Palliative care referrals increased as death approached, palliative care was seen as the unique service for the terminally ill. Palliative care is offered to the sicker patients near death which increases the utilization of acute healthcare services. This study contrasts with prospective studies which suggests that palliative care even late in the course of cancer reduces costs [38, 39].

There exist significant differences in the pattern of palliative care utilization between institutions [38, 40]. The increased utilization of healthcare resources in the palliative care population studies in “real world” experiences reflects perhaps more symptomatic patients referred to palliative care late [37, 41]. The SEER data suggests this is true and that palliative care is not offered universally to patients with a poor prognosis but when instituted so late in sicker patients is associated with limited impact palliative care on healthcare utilization. This is in contrast to certain outcomes published from prospective studies [42]. Patients referred late are more likely to have experienced cancer or treatment complications, utilize healthcare services more frequently

before being referred to palliative care limiting the impact of palliative care on ACEOL [43].

A study of patients who died between 2010 and 2012 in Ontario had the aim of determining the influence of the timing of palliative care on acute care service utilization. Early palliative care in this study was defined as a consultation greater than 60 days prior to death, late consultation > 15 days < 60 days prior to death, and very late within 14 days of death [44]. Of the 230,921 descendants, 60% had at least one acute service day in the last 2 weeks of life; 46% never had a palliative consult [44]. The late consult group was seen on average 32 days prior to death while the early consult group was seen was 210 days prior to death. Late consults were usually hospital-based versus early which were more frequently community-based. Early consults were associated with reduced hospital-based service utilization. Late consults were associated with a 2.3-fold increased utilization of acute care healthcare resources compared to early palliative care [44]. The odds of spending greater than 1 week in acute care during the last 2 weeks of life was higher with late referrals (odds ratio 1.84) [44]. Palliative acute care accounted for most of the acute care service in the last weeks of life. Early palliative care in contrast to late palliative care was associated with lower odds of hospitalization more than 1 week in the last 2 weeks of life, greater utilization of community-based services. Early referral improved the quality of care by reducing aggressive care and likely reducing the costs.

Early palliative care

We observed a reduction in late chemotherapy in the last 30 days of life when a palliative care consultation took place greater than 90 days before death. Though there is no universal definition of “early palliative care,” we believe that > 90 days before death has practical utility. Others have defined “early palliative care” as consultation > 90 days to death to within 8 weeks of the diagnosis of metastatic disease [2, 3, 10]. Two studies suggest that the number of contacts rather than the timing may be an important factor [9, 45]. Increased contacts between the patient and palliative services were associated with reduced ACEOL, the number of contacts is likely to increase with time which allows for the development of a trusting relationship, symptom management, and end-of-life discussions. Two studies suggest that the number of contacts is an important factor in palliative care outcomes [9, 45]. A systematic referral within a care pathway may facilitate early referral and thus may reduce ACEOL [8].

This study has several weaknesses. We defined advanced cancer patients by their diagnosis and by receiving chemotherapy. Some patients may have received adjuvant chemotherapy and died from other causes rather than their cancer.

The association of ACEOL with palliative care < 90 days may reflect a referral pattern of sicker patients though the CCI did not differ between groups. We were unable to obtain hospice referral data which is one of the indicators of ACEOL and hence some patients in the “nonaggressive care” group may actually have been referred to hospice later or not at all and would have been part of the group experiencing ACEOL. The use of palliative care services early in the course of advanced cancer and completed ADs may reflect a patient’s value which emphasizes quality of life and less ACEOL. So, the association may not be causation. Finally, there could be unmeasured confounders that we did not include that could have influenced the results. This was a single institution study and so may not be generalizable.

Conclusions

Half of the patients who died with cancer experience at least one of seven indicators of ACEOL. The most frequent indicator of aggressive care in our study was new chemotherapy within 30 days of death. Palliative care consultations greater than 90 days before death were associated with significant chemotherapy in the last month of life as were completed ADs. Palliative care within 90 days of death paradoxically is associated with 1 or more indicators of ACEOL relative to no palliative care.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s00520-022-06954-2>.

Author contribution Manuscript development and writing; Mellar Davis, Erin A. Vanenkevort, Alexander Elder, Amanda Young, Irina D. Correa Ordonez, Mark J Wojtowicz, Halle Ellison, Carlos Fernandez, Zankhana Mehta, Bertrand Behm, Glen Digwood, Rajiv Panikkar.

Data availability NA.

Code availability NA.

Declarations

Ethics approval NA.

Consent to participate NA.

Consent for publication NA.

Competing interests The authors declare no competing interests.

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