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Surgical Palliative Care Consultations Over Time in Relationship to Systemwide Frailty Screening

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Abstract

IMPORTANCE—The need for integrating palliative care into surgical services has been established within the surgical literature. The ability to effectively screen, obtain an appropriately timed consultation, and determine the effect of consultation remains problematic.

OBJECTIVE—To examine surgical palliative care consultations over time and their relationship to the initiation and implementation of a systemwide frailty-screening program.

DESIGN, SETTING, AND PARTICIPANTS—We reviewed all surgical palliative care consultations performed between January 1, 2006, and August 31, 2013, and abstracted the referring service (medicine/surgery), date of surgery (if any), date of death (if any), and all variables required to calculate a frailty score using the risk analysis index. We examined changes

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in mortality and referral patterns before and after implementation of the frailty-screening program using multivariable logistic regression.

EXPOSURES—Surgical palliative care consultations, including frailty screening.

MAIN OUTCOMES AND MEASURES—The primary study outcomes were 30-, 180-, and 360-day mortality.

RESULTS—From 2006 to 2013, a total of 310 palliative care consultations were ordered for surgical patients: 160 before initiation of frailty screening (January 1, 2011) and 150 after initiation of the program. The groups had similar demographics, comorbidities, and frailty scores. After initiation, we observed dramatically decreased mortality at 30, 180, and 360 days (21.3% vs 31.9%, 44.0% vs 70.6%, and 66.0% vs 78.8%, respectively; all $P < .05$). This coincided with an increased rate of palliative care consultations from 32 per year to 56 per year. After initiation of the program, consultations were more likely to be requested by surgeons (56.7% vs 24.4%; $P < .05$) and were more likely to occur before the index operation (52.0% vs 26.3%; $P < .05$). Implementation of the screening program was associated with a 33% reduction in 180-day mortality (odds ratio [OR], 0.37; 95% CI, 0.22–0.62; $P < .001$) even after controlling for age, frailty, and whether the patients had surgery. Modeled mortality was also reduced when the palliative care consultation was ordered by a surgeon (OR, 0.50; CI, 0.30–0.83; $P = .007$) or ordered before the operation (OR, 0.52; CI, 0.30–0.90; $P = .02$).

CONCLUSIONS AND RELEVANCE—Our data suggest that a systematic frailty-screening program effectively identifies at-risk surgical patients and is associated with a significant reduction in mortality for patients undergoing palliative care consultation. Analysis also suggests that preoperative palliative care consultations ordered by surgeons are associated with reduced mortality rates.

During the past 15 years, there has been increasing awareness of the benefits of palliative care for all patients facing severe illness.[1,2] In 2005, the American College of Surgeons affirmed that palliative care is a significant and required component of quality surgical care and that it should be offered to a broad range of patients—not just those at the end of their life.[3] Data have demonstrated[1] that, through emotional support, pain management, and other interventions, palliative care improves the quality of life and satisfaction with care for patients and their caregivers, especially if initiated early in the disease process. However, there is no consensus about how to effectively screen for or obtain an appropriately timed consultation in surgical patients.

Frailty is a validated concept established in the geriatric literature that identifies patients (regardless of age) at increased risk of dying within 6 months to 5 years.[4] In essence, diagnosing frailty is to diagnose dying.[5] Half of veterans older than 65 years seeking colorectal or cardiac surgery are frail or prefrail, doubling the costs of care[6] as well as the risks for postoperative mortality and complications.[7] Based on similar findings in other populations,[8] there is consensus that this increased risk should inform shared decision making and that it may be a useful concept for identifying patients for palliative care consultation.

Despite some controversy about how best to measure frailty, we recently implemented a quality improvement initiative to screen patients scheduled for elective surgery for frailty to identify patients at high risk for postoperative mortality and morbidity. More than 8000 patients scheduled for elective surgery have been screened since 2011 and, as a part of this program, we have actively encouraged preoperative palliative care consultation in frail patients. We designed the present study to examine the effect of our frailty-screening program on palliative care consultation and patient mortality.

Methods

The procedures reported on were determined to be operation activities associated with quality improvement. Thus, ethical oversight and approval were provided by the hospital administrator pursuant to provisions set forth by the Veterans Affairs Office of Research Oversight in*VHA Handbook 1058.05*.[9]

As part of a quality improvement initiative, we implemented a formal screening process to identify frail patients considering elective surgery. We developed a brief screening tool for use in surgical patients called the *risk analysis index* (RAI) (eAppendix in the Supplement) and validated its ability to discriminate frail patients from nonfrail patients using data from the National Surgery Quality Improvement Project and local administrative databases.[10] Beginning January 1, 2011, we initiated a program to screen patients scheduled for elective surgery for frailty. Screening began in patients with a hip fracture, but after confirming the feasibility of the RAI in this population, on July 1, 2011, we started screening all patients presenting to the surgical evaluation unit for elective surgery. Because this method captured only 65% of the elective operations, on February 1, 2012, we started screening patients presenting to the individual surgical clinics and thereby recorded a frailty score on 90% of all electively scheduled operations. Starting July 1, 2012, we required a frailty score for all patients with electively scheduled surgery, thereby capturing frailty scores on all but emergent procedures.

Approximately 10% of all patients scheduled for elective surgery were identified as frail (RAI score, ≥21). The chief of surgery or designee reviewed the medical record of each frail patient to confirm surgical planning and examine the potential for system intervention. Given the increased risk for mortality and morbidity, frail patients were strongly encouraged by the surgical services to undergo preoperative palliative care consultation. No requirement was made for palliative care consultation. If the patient, family, or surgical team chose not to accept the recommendation for palliative care consultation, the operation proceeded as planned. The palliative care team consisting of a palliative care physician and midlevel providers performed all consultations. A template consultation note was completed addressing end-of-life care issues including do not resuscitate, power of attorney, and goals of care.

For the present analysis, we obtained all palliative care consultations ordered at the Nebraska Western Iowa Veterans Affairs Medical Center from January 1, 2006, to August 31, 2006. A single analyst (K.F.E.) reviewed the electronic medical record of each patient to confirm the nature of the consultation. Palliative care consultations were defined as surgical

if (1) they had been ordered by a surgeon, (2) the patient had undergone a surgical procedure within 30 days before the consultation, or (3) the reason for the consultation was directly connected to an operation performed in the previous 6 months. The analyst then abstracted the ordering service (medicine vs surgery), the date of the order for palliative care consultation, and the date of the associated surgical procedure (if any). The sample thus included patients receiving a surgical palliative care consultation but not undergoing the associated surgical procedure. The analyst also abstracted the data needed to calculate a frailty score using the RAI and the Veterans Affairs Surgical Quality Improvement Project (VASQIP) postoperative risk calculators for each specialty type. For patients undergoing procedures after the implementation of frailty screening, the RAI score was calculated prospectively based on patient interviews at the time of the preoperative evaluation collected by a member of the health care team (attending, resident, case manager, medical student, or medical assistant). For patients undergoing procedures before implementation of the screening, frailty scores were calculated retrospectively based on preoperative data available in the medical record.

All statistical analyses were conducted using SPSS, version 21.0 (IBM Corp). Using the raw data, we calculated several variables to represent outcomes and predictors of interest. From the date of the index operation and death, we calculated overall survival as well as 30-, 180-, and 360-day mortality. For patients who had a palliative care consultation but no operation, these variables were calculated from the date of the palliative care consultation to the date of death. Mortality data were confirmed on March 31, 2014, and the overall length of survival was calculated up to this date. If the date of the palliative care consultation preceded the index operation, the consultation was coded as transpiring before the operation. Consultations that were ordered for patients who never underwent an associated operation, regardless of whether one was contemplated, were considered as transpiring before the “operation.”

Descriptive statistics and plots were constructed and examined for each variable. Continuous variables were summarized with means (SDs), and differences between groups were assessed using 2-tailed *t* tests. Categorical variables were summarized with frequencies and proportions, and differences between groups were assessed using *z* tests. All pairwise comparisons were performed using the Bonferroni correction. Multistep, multivariable logistic regression estimated patient mortality according to several independent predictor and control variables. Differences at $P < .05$ were considered statistically significant.

Results

From January 2006 to August 2013, there were 310 surgical palliative care consultations, with 160 occurring before the initiation and implementation of the screening program and 150 occurring after implementation (Table 1). We observed similar demographic and comorbidity profiles before and after frailty screening, including similar RAI scores and VASQIP-predicted 30-day mortality. The only exception was that after program initiation and implementation, the patients were slightly older than before (71.3 vs 68.3 years; $P < .05$).

After implementation of the screening program, we observed significant decreases in 30-day, 180-day, 360-day, and overall mortality, although the mean total days of survival did not differ significantly (Table 2). There were also significant changes in the pattern of palliative care consultation, with the mean annual consultation rate increasing from 32 (20) to 56 (8) consultations per year ($P < .05$). After frailty screening was initiated, palliative care consultations were more frequently ordered by surgeons (56.7% vs 24.4%; $P < .05$), and they were more likely to transpire before the index operation (52.0% vs 26.3%; $P < .05$). Analysis of all patients identified as having a palliative care consultation and not undergoing surgical intervention demonstrated that after implementation of the screening program, a greater proportion of patients did not have the associated surgical procedure (19.3% after implementation vs 5.6% before implementation; $P < .05$). Further detailed analysis of patients not undergoing surgical intervention revealed clinical contexts in which the benefit of the proposed surgery was equivocal (eg, resection of locally advanced cancer for symptom control in the setting of disseminated metastases).

Implementation of the screening program was associated with a significantly reduced odds of death (odds ratio [OR], 0.37; 95% CI, 0.22–0.62; $P < .001$) (Table 3), even after controlling for age, frailty, surgery status (had surgery or did not have surgery), timing of consultation (before or after surgery), and ordering service (medicine or surgery). Given the 70.6% mortality at 180 days before implementation of the frailty-screening program, this corresponds to a 33% reduction in the relative risk of dying, and the number needed to screen to prevent 1 death at 180 days was 4.24.

Modeled mortality was also reduced when the palliative care consultation was ordered by a surgeon (OR, 0.50; 95% CI, 0.30–0.83; $P = .007$) or ordered before the operation (OR, 0.52; 95% CI, 0.30–0.90; $P = .02$) even after controlling for age, frailty, and surgery status (data not shown). Finally, we found a strong statistical interaction between the referring service and the timing of the palliative care consultation: preoperative palliative care consultations ordered by a surgeon were associated with the greatest reduction in mortality (OR, 0.27; 95% CI, 0.11–0.68; $P = .006$) (Table 4) even after controlling for age, frailty, surgery status, and implementation of the screening program.

Discussion

This report describes a quality improvement program consisting of palliative care consultation based on initiation and implementation of a formal preoperative frailty assessment. We found that the number of palliative care consultations ordered at our institution increased significantly from 2006 to 2013, coinciding with the introduction and development of our frailty-screening program. After introduction of the program, the proportion of consultations ordered by surgeons increased and the consultations were more likely to be made preoperatively, although most were still ordered during the postoperative period. These data demonstrate that a frailty-screening program altered the pattern and timing of palliative care consultation at our institution.

Although our analysis was limited to patients for whom palliative care consultation was ordered, we found that implementation of the screening program was associated with a

dramatic decrease in mortality. Given the high risk of dying in this frail cohort (70.6% at 180 days), our models suggest that, for every 4 patients screened, we prevented (or delayed) 1 death at 180 days. Furthermore, we found that, independent of the screening program, the strongest association with reduced mortality was when surgeons (not internists) ordered a preoperative palliative care consultation (OR, 0.27), suggesting that 1 death was prevented for every 3 surgeon-ordered preoperative consultations.

The significance of these survival advantages is even more dramatic when considering that the findings were controlled for age, frailty (RAI score), and whether the patient received the surgical procedure associated with the palliative care consultation. Although our sampling frame prevents inferences about the effect of the screening program among all patients with electively scheduled surgery, these data should reassure the health care professionals who fear that palliative care consultation might increase patient mortality by steering patients away from beneficial surgical treatment.

Although many operations are performed for palliative purposes, the precise role of the palliative care consultation in surgical populations remains unclear, largely because it is difficult to identify which surgical patients might benefit. The 2011 report from the Center to Advance Palliative Care[11] noted that palliative care consultation in surgical patients should focus on patients with serious or potentially life-threatening conditions and that there are typically 2 models (integrative and consultative) for initiating palliative care consultation (Table 5). The consultative model uses a set of criteria that screen intensive care unit (ICU) patients for palliative care needs. Once the criteria are met, those patients are referred to a team of palliative care specialists.[10] However, these criteria were developed in the context of the medical ICU; when applied to the surgical ICU, comparatively few patients meet the criteria for palliative care consultation, leading to undertreatment.[12,13] Furthermore, patients meeting trigger criteria in the present study were so far into their course of illness and close to death that they did not receive all of the potential benefits of palliative care consultation.

The second approach, the integrative or bundled model, provides palliative care assessments to every patient within 24 hours of admission to the ICU, and family meetings as well as comprehensive palliative care plans are completed within 72 hours of admission. This approach applies palliative care consultation to surgical ICU care regardless of the patient's prognosis and may not be appropriate for many patients with strong physiologic reserves undergoing curative surgical therapy. In addition, the success of this model depends on a high level of knowledge and commitment from the clinicians who are involved.[14] A precomparison and postcomparison study[10] of this method in a medical ICU showed that mortality remained stable and discussions of symptom management and goals of care increased after implementation. To our knowledge, the effects of such a method in the surgical ICU are yet to be evaluated.

Both the integrative and consultative models are limited by their focus on the ICU that delays consultation to the acute setting of critical illness, thus perpetuating the false notion that palliative care is purely end-of-life care.[6] Late consultation also undermines the goal setting and symptom management of anticipated surgical complications that constitute the focus of high-quality palliative care. As such, there is a growing consensus that the most

appropriate time to obtain palliative care consultation on a surgical patient is before the procedure. Data[15] demonstrate that earlier consultations are associated with better family perceptions of care owing to the increased communication and emotional support.

Although there is no consensus regarding the best way to identify the surgical patient who is most likely to benefit from palliative care, we opted to pursue a new approach to frailty screening by using a questionnaire-based mortality risk calculator and modifying it for a surgical population. This approach was chosen because the administrative burden of existing risk calculators (eg, the VASQIP) can be problematic in a busy surgical clinic, often requiring time-intensive review of medical records or functional testing. Our tool, the RAI, was aimed at minimizing the resources required for screening while still effectively identifying patients who might benefit from palliative care consultation. The RAI is a bedside tool that relies on patient (or surrogate) responses to simple questions and it can be completed in only 2 to 3minutes. This objective tool reliably identifies patients with an increased risk of postoperative death and disability, thus allowing surgeons to engage in a shared decision making process with the patient that more accurately identifies expected outcomes and, through palliative care consultation, clarifies postoperative expectations.

Implementation of the RAI at our institution demonstrated the ability to actively initiate a surgical risk-screening system that meets Center to Advance Palliative Care recommendations for patients who would benefit from a palliative care consultation on hospital admission. Patients in our system were identified as being at high risk for postoperative mortality and morbidity and underwent further review and discussions during which potential palliative care needs were addressed. The systematic approach to identification and discussion was initially met with skepticism by clinicians on both the medical and surgical services. However, as individual cases were addressed, clinicians readily accepted the usefulness of the RAI tool to such an extent that preoperative palliative care screening has become part of our standardized preoperative protocol, with the score listed on our surgical scheduling package. As more systems such as ours are put into practice and palliative care use increases in end-of-life patients undergoing surgical procedures, an increased need for already scarce palliative care specialists will become even greater.[16,17]

Our findings are limited in several ways. First, our sample included only patients with formally ordered palliative care consultations, which probably reflects a bias toward the sickest and most frail of all patients with electively scheduled surgery. Second, as a quality improvement project, our findings cannot be generalized beyond the setting of our institution. Third, our design compares prospectively measured frailty (RAI questionnaires) with RAI scores derived retrospectively from administrative data. An experimental design would lead to more reliable inferences. Finally, we analyzed only formal palliative care consultations ordered in the medical record; thus, we cannot account for any increase in the informal palliative care offered by the physicians (medical or surgical) at the Nebraska Western Iowa Veterans Affairs Medical Center.

Conclusions

We observed a significant change in the patterns of palliative care consultation after implementing a frailty-screening program. The rate of consultation increased after implementation of the program, and consultations were more likely to be ordered by surgeons before the operation. These changes in the patterns of palliative care consultation were associated with dramatic reductions in postoperative mortality, suggesting that systematic frailty screening provides an objective basis for appropriate surgical palliative care consultation that in turn led to reduced postoperative mortality in frail patients.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Demographics and Comorbidities Before and After Implementation

Variable	No. (%)[a]	
	Before Implementation (n = 160)	After Implementation (n = 150)
Male sex	157 (98.1)	150 (100.0)
Cancer history	124 (77.5)	107 (71.3)
Recent weight loss	57 (35.6)	49 (32.7)
Renal failure	18 (11.3)	21 (14.0)
Congestive heart failure	21 (13.1)	25 (16.7)
Poor appetite	52 (32.5)	45 (30.0)
Short of breath at rest	36 (22.5)	29 (19.3)
Not living independently	26 (16.3)	35 (23.3)
Age, mean (SD), y	68.3 (11.2)	71.3 (10.6)[b]
ADL score, mean (SD)	1.2 (3.9)	1.9 (4.4)
Preoperative RAI score, mean (SD)[c]	28.8 (9.6)	28.8 (9.1)
VASQIP, 30-d mortality score, mean (SD)[d]	6.5 (9.7)	6.0 (7.1)

Abbreviations: ADL, activities of daily living; RAI, risk assessment index; VASQIP, Veterans Affairs Surgical Quality Improvement Project.

[a] Data before vs after implementation were compared with the 2-sided *t* test of equality for column proportions. The tests assumed equal variances and were adjusted for all pairwise comparisons within a row using the Bonferroni correction.

[b] Indicates significantly different at $P < .05$.

[c] Measurement of frailty.

[d] Probability of dying within the first 30 days after the index operation as determined by the VASQIP online risk calculators.

Table 2

Changes in Survival and Palliative Care Consultation Before and After Implementation

Variable	No. (%)[a]	
	Before Implementation (n = 160)	After Implementation (n = 150)
Annual consultation rate, mean (SD), consults/y	32 (20)	56 (8)[b]
Died within		
30 d	51 (31.9)	32 (21.3)[b]
180 d	113 (70.6)	66 (44.0)[b]
360 d	126 (78.8)	99 (66.0)[b]
Died during study	145 (90.6)	104 (69.3)[b]
Mean survival, d	295 (492)	314 (296)
PCC timing		
Before surgery	42 (26.3)	78 (52.0)[b]
After surgery	118 (73.8)	72 (48.0)[b]
PCC referring service		
Medicine	121 (75.6)	65 (43.3)[b]
Surgery	39 (24.4)	85 (56.7)[b]
Surgery status		
Did not have surgery	9 (5.6)	29 (19.3)[b]
Had surgery	151 (94.4)	121 (80.7)[b]

Abbreviation: PCC, palliative care consultation.

[a] Data before vs after implementation were compared with the 2-sided *t* test of equality for column proportions. The tests assumed equal variances and were adjusted for all pairwise comparisons within a row using the Bonferroni correction.

[b] Indicates significantly different at $P < .05$.

Table 3

The Effect of Frailty Screening on Mortality With Controls

Variable	B (SE)	Wald	*df*	*P* Value	Exp B (95% CI)
Screening implementation	−0.99 (0.26)	14.07	1	<.001	0.37 (0.22 to 0.62)
Age	−0.02 (0.01)	1.83	1	.18	0.99 (0.96 to 1.01)
Frailty (RAI)	−0.03 (0.01)	4.13	1	.04	0.97 (0.95 to 0.10)
Surgery status	−0.19 (0.43)	0.20	1	.65	0.82 (0.35 to 1.93)
PCC timing	−0.42 (0.29)	2.08	1	.15	0.660 (0.38 to 1.16)
Referring service	−0.40 (0.27)	2.09	1	.15	0.673 (0.39 to 1.15)
Constant	2.51 (0.95)	6.94	1	.008	12.36

Abbreviations: PCC, palliative care consultation; RAI, risk assessment index.

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Table 4

The Effect of Surgeon-Ordered Palliative Care Consultation Palliative Care Timing on Mortality With Controls[a]

Variable	B (SE)	Wald	*df*	*P* Value	Exp B (95% CI)
Referring service, PCC timing	−1.31 (0.48)	7.62	1	.006	0.27 (0.11 to 0.68)
Age	0.02 (0.01)	2.29	1	.13	1.02 (0.10 to 1.04)
Frailty (RAI)	0.03 (0.01)	3.97	1	.046	1.03 (1.00 to 1.06)
Surgery status	−0.72 (0.53)	1.90	1	.17	0.48 (0.17 to 1.36)
Screening implementation	−1.04 (0.26)	16.46	1	<.001	0.36 (0.22 to 0.59)
Constant	−0.27 (1.04)	.066	1	.78	0.76

Abbreviations: PCC, palliative care consultation; RAI, risk assessment index.

[a]Testing controlled for the variables presented.

Table 5

Phases of Palliative Care Consultation

Method of Consultation	Trigger for Consultation	Trigger Characteristics	Preoperative	Postoperative
Integrative	No	Consultation for all patients	None	SICU only
Consultative	Yes; predefined items	Family request, futility, family disagreement, death expected during stay, SICU stay >1 mo, diagnosis with survival <60 mo, GCS score ≤8 for >1 wk in patients aged >75 y, GOS score <3, multiorgan system failure	None	SICU only
NWI	Yes; elevated surgical risk based on frailty screening	All patients screened	High-risk patients recommended for consultation	At request of care team based on patient and family needs

Abbreviations: GCS, Glasgow Coma Scale; GOS, Glasgow Outcome Scale; NWI, Nebraska Western Iowa; SICU, surgical intensive care unit.