Review Article

Palliative care interventions for surgical patients: a narrative review

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Background and Objective: Palliative interventions have known benefits in the care of surgical patients with advanced illness. However, the literature supporting the routine use and implementation of palliative care in the context of surgery is limited. The primary aim of this review was to explore the literature that has been published in the field of surgical palliative care since 2016. The secondary aim of this analysis was to categorize updates in literature in three foundational domains (I) measuring outcomes that matter to patients; (II) communication and decision making; and (III) delivery of palliative care to surgical patients.

Methods: This analysis included citations from PubMed, EMBASE, PsychINFO, and CINAHL, circulated between 01/01/2016 and 22/02/2022 that studied palliative care interventions for surgical patients. Additional articles were included following a manual review of citations and publications from the Annals of Palliative Medicine.

Key Content and Findings: A total of 3,258 unique articles were identified through the database search, and eight additional studies were identified from manual review. Twenty-two articles were included in the final narrative review: seven addressed the first foundational domain, three explored the second, and twelve summarized developments in the third.

Conclusions: With advances in clinical opportunities to support seriously ill patients, the adoption of palliative care frameworks in surgical settings is essential to achieving value-concordant care. Though the literature studying the delivery of palliative care for surgical patients is slowly expanding, additional work is needed to optimize pre and post-operative patient engagement in complex decision making, align surgical treatments with patient-oriented outcomes, and integrate palliative care principles into routine surgical practice.

Keywords: Surgical; palliative; interventions; review

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Introduction

Surgeons play an integral role in perioperative pain and symptom management, supporting patients through post-operative complications, and navigating end-of-life (EOL) decision making (1). Current literature has established that palliative care interventions reduce healthcare utilization (2-8), mitigate symptoms, improve EOL care planning (3,4,6), and allow for improved physician and patient communication among surgical patients with serious illness (9,10). Despite these known benefits, routine implementation of surgical palliative care is limited, and the

Table 1 Search strategy summary

Items	Specification
Date of search (specified to date, month and year)	22/02/2022
Databases and other sources searched	PubMed, EMBASE, PsychINFO, CINAHL, manual method
Search terms used (including MeSH and free text search terms and filters)	Palliative care interventions surgical patients
Timeframe	01/01/2016–21/02/2022
Inclusion and exclusion criteria (study type, language restrictions etc.)	No language limitations for full-text publications; perspective pieces, review articles, and scientific meeting abstracts were included in the initial review. LVAD studies were excluded as were studies of pediatric heart failure, ENT, cardiac surgery and urology
Selection process (who conducted the selection, whether it was conducted independently, how consensus was obtained, etc.)	Original selection was independently performed by KK and IF. Titles and abstracts were screened and discrepancies were addressed in a manner that was conservative and inclusive so as to not erroneously exclude any potentially relevant publications

LVAD, left ventricular assist device; ENT, ear, nose, and throat.

body of evidence to support routine use of palliative care interventions for surgical patients remains sparse (11).

In 2003, the American College of Surgeons proposed seven areas of study in the realm of palliative care decision making for surgical patients: surgical decision making, EOL decision making, patient-centered decision making, symptom management, processes of care, communication, and surgical education regarding palliative care (12). Using these domains as a framework to categorize existing publications, Lilley *et al.* published the first systematic review of palliative care interventions for surgical patients in 2016. Twenty-five articles met criteria for inclusion, however most of the studies were of low quality. The authors concluded that additional research was needed in order to clarify which surgical patient populations most benefit from palliative care interventions, and how such interventions should be most effectively employed (13).

In 2018, acknowledging a need for focused research goals as well as the documented knowledge gaps in palliative care research for surgical patients, Lilley *et al.* published a national agenda to delineate priority areas for palliative care research in surgical patient populations. This agenda established three foundational domains for future study: (I) measuring outcomes that matter to patients; (II) communication and decision making; (III) delivery of palliative care to surgical patients (11). With these consensus research directives, we undertook the task of updating the literature and summarizing recent contributions in the space of surgical palliative care since the first systematic review published in 2016 (14). We present the following article in accordance with the Narrative Review reporting checklist (available at https://apm.amegroups.com/article/view/10.21037/apm-22-770/rc).

Methods

We performed a literature search for publications circulated between 01/01/2016 and 21/02/2022 that studied palliative care interventions for surgical patients (*Table 1*). Citations were pulled from the following databases: PubMed, EMBASE, PsychINFO, and CINAHL. There were no language limitations for full-text publications; perspective pieces, review articles, and scientific meeting abstracts were included in the initial review. Additional articles were included following a manual review of citations and publications from the *Annals of Palliative Medicine* special series on Palliative Care and Surgery. Given our limited scope of knowledge in other surgical subspecialties and indications for palliative care interventions outside our area of expertise, this review only included publications focusing on adult general surgical patients receiving palliative care interventions. Studies describing the experience of palliative care for pediatric patients with heart failure, patients with ear, nose, and throat-related disease, patients receiving cardiac surgery, patients receiving urological care, and patients receiving left ventricular assist devices were excluded from the analysis. Included and excluded studies were reviewed by two authors, KK and IF, for analysis and discussion. Once the manuscript was complete, the narrative review reporting checklist was saved and finalized.

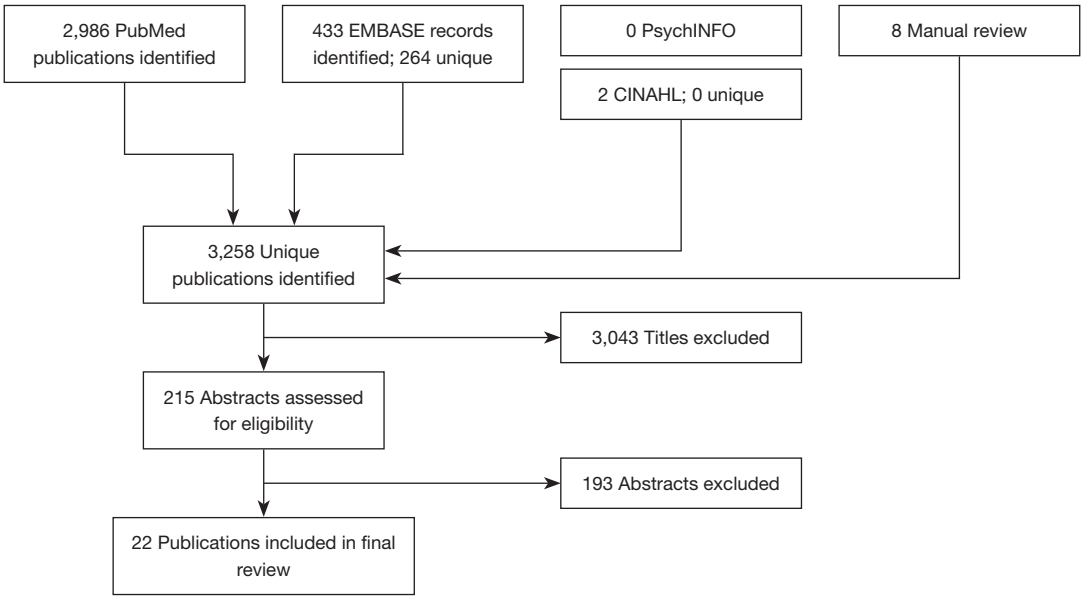

Figure 1 Flowchart of literature review strategies.

Results

A total of 3,258 unique articles were identified through the PubMed, EMBASE, PsychINFO, and CINAHL databases, and an additional eight studies were identified from manual review (*Figure 1*). Three thousand and forty-three articles were excluded based on title review alone. Two hundred and fifteen abstracts were assessed in full and 22 articles were included in the final narrative review (*Table 2*). Of the 215 abstracts assessed, 88 were focused on palliative surgical interventions, 40 were perspective/opinion pieces or reviews, and 23 were retrospective series exploring (I) rates of palliative care consultation; (II) triggers for palliative care consultation; or (III) documentation of advanced care planning (ACP). Six reported palliative care education interventions for surgical providers and three publications were pre-study plans for ongoing trials. Eleven publications were available only as scientific meeting abstracts.

All studies included in the final review were mapped to the 2018 national "Priority Areas of Research" for palliative care for surgical patients (*Figure 2*) (11). As previously described, this publication laid out three broad domains for palliative care research for surgical patients: (I) measuring outcomes that matter to patients; (II) communication and decision making; (III) delivery of palliative care to surgical patients. These three domains were further subdivided into eight sub-domains: 'Defining Outcomes that Patients Value', 'Measures to Evaluate High-quality Palliative Care in Surgery', 'Aligning Surgical Treatments with Patient-oriented Outcomes', 'Preoperative Advance Care Planning', 'Decision Making After Postoperative Complications or Critical Illness', 'Integrating Palliative Care Principles into Routine Surgical Practice', 'Developing Scalable Models of Primary Palliative Care Delivery for Surgical Patients', and 'Identifying Patients Who Would Benefit from Palliative Care Specialist Consultation'. The goal of categorizing the publications according to each Priority Area was to draw attention to the remaining knowledge gaps as well as to areas that had been satisfactorily addressed. We present the results below.

Measuring outcomes that matter to patients

Defining outcomes that patients value

Two publications set out to evaluate the outcomes that matter most to surgical patients. Nabozny *et al.* convened focus groups with community-dwelling adults over age 60 to facilitate conversation around hypothetical high-stakes surgical decisions. The study found that seniors have strong fears that "living in a nursing home would lead to personal suffering, loneliness, depression and a downward trajectory toward the end of life" (15). Despite these deeply held worries, when presented with a hypothetical emergency surgical scenario, many participants favored surgical intervention, even if that decision yielded a feared

Table 2 Included studies by Priority Area with notes on the primary findings

Manuscript title	Authors	Year of publication	Primary findings
Measuring outcomes that matter to patients: Defining outcomes that patients value			
Constructing High-stakes Surgical Decisions: It's Better to Die Trying	Nabozny *et al.* (15)	2016	Despite deeply held worries that living in a nursing home "would lead to personal suffering, loneliness, depression and a downward trajectory toward the end of life", community-dwelling adults over the age of 60 would undergo surgical intervention, even if it led to an unwanted outcome
Talking about death and dying in a hospital setting - a qualitative study of the wishes for end-of-life conversations from the perspective of patients and spouses	Bergenholtz *et al.* (16)	2020	The coauthors characterized the priorities and preferences of medical and surgical patients who were in the palliative phase of their disease trajectory for various diagnoses. The authors found that patients are more concerned about the daily physical and social toll of advanced illness than about its implications on end-of-life planning. There was vast diversity in patient and family expectations regarding the pertinence of in-hospital end-of-life discussions
Measuring outcomes that matter to patients: Measures to evaluate high-quality palliative care in surgery			
Palliative Care in Surgery: Defining the Research Priorities	Lilley *et al.* (11)	2018	Defined three national priority areas for research in palliative care for surgical patients: 1) measuring outcomes that matter to patients; 2) communication and decision making; and 3) delivery of palliative care to surgical patients
Palliative Care and End-of-Life Outcomes Following High-Risk Surgery	Yefimova *et al.* (17)	2020	This study characterized end of life experiences of veterans who died within 90 days of a high-risk surgical operation by reporting family ratings of overall care in the last month of life. The coauthors found that families of decedents who received palliative care were more likely to rate communication, support, and overall care at the end of life as 'excellent' compared with surgical patients who did not receive palliative care. Moreover, of veterans who died after surgery, only 5.6% received a pre-operative palliative care consultation
Natural Language Processing Accurately Measures Adherence to Best Practice Guidelines for Palliative Care in Trauma	Lee *et al.* (18)	2020	NLP identified palliative care delivery in 33% of admissions, as compared to 8% recorded through administrative coding, and was completed 50 times faster than manual review
Measuring Processes of Care in Palliative Surgery: A Novel Approach Using Natural Language Processing	Lilley *et al.* (19)	2018	The coauthors explored the use of NLP to support the measurement and documentation of goals of care conversations, code status discussions, palliative care consultations and hospice eligibility assessment with a further goal of measuring goal-concordant treatment decisions
Natural Language Processing to Assess End-of-Life Quality Indicators in Cancer Patients Receiving Palliative Surgery	Lindvall *et al.* (20)	2019	When applied to surgical oncology patients, NLP was highly sensitive and specific relative to manual coding, and was 2,600 times faster in identifying patients undergoing palliative gastrostomy tube placement
Communication and decision making: Aligning surgical treatments with patient-oriented outcomes			
N/A	N/A	N/A	N/A
Communication and decision making: Preoperative advance care planning			
Integrating Advance Care Planning Videos into Surgical Oncologic Care: A Randomized Clinical Trial.	Aslakson *et al.* (21)	2019	The coauthors implemented ACP in the clinical setting and found that ACP educational videos could be safely and logistically integrated into a pre-operative surgical oncology clinic visit. Though viewing the ACP video did not impact the pre-operative surgical discussion in a substantive manner, patients found it to be helpful
Mortality After Elective Surgery: The Potential Role for Preoperative Palliative Care.	Robbins *et al.* (22)	2021	Robbins *et al.* summarized a retrospective cohort study of 29,132 patients undergoing inpatient elective procedures and demonstrated that preoperative palliative care consultation was associated with a higher likelihood of pre-operative completion of ACP paperwork. Additional data is needed to optimize pre-operative screening metrics and clarify measures of 'success' in preoperative ACP in the surgical patient population

Table 2 (*continued*)

Table 2 (*continued*)

Manuscript title	Authors	Year of publication	Primary findings
Communication and decision making: Decision making after postoperative complications or critical illness			
Sudden Advanced Illness: An Emerging Concept Among Palliative Care and Surgical Critical Care Physicians	Barnett *et al.* (23)	2016	The coauthors characterized an emerging model of unexpected, catastrophic, and often incapacitating illness: Sudden Advanced Illness. The authors outlined this cognitive framework to help clinicians and families navigate unanticipated and devastating illness in the face of prognostic uncertainty and extreme grief. The authors anticipate that use of the sudden advanced illness cognitive framework will assist medical providers of all types, including surgeons and palliative medicine specialists, in the care of patients diagnosed with unexpected, overwhelming, and emotionally-laden ailments
Delivery of palliative care to surgical patients: Integrating palliative care principles into routine surgical practice			
Characterizing the Role of U.S. Surgeons in the Provision of Palliative Care: A Systematic Review and Mixed-Methods Meta-Synthesis	Suwanabol *et al.* (24)	2018	A systematic review and mixed methods analysis evaluated 2,589 publications characterizing the role of U.S. surgeons in the provision of palliative care and found that surgeons have limited knowledge of and comfort introducing palliative care concepts to their patients.
Comparison of common risk stratification indices to predict outcomes among stage IV cancer patients with bowel obstruction undergoing surgery	Bateni *et al.* (25)	2018	Surgeons have fewer hours of palliative care training compared to other specialists
Primary palliative care for surgeons: a narrative review and synthesis of core competencies	Marterre *et al.* (26)	2022	Coauthors offered a synthesis of core competencies for surgeons interested in gaining palliative care skills and knowledge
Defining Serious Illness Among Adult Surgical Patients	Lee *et al.* (27)	2019	The coauthors convened a twelve member expert advisory panel to develop a serious illness definition for surgical patients. A consensus definition was reached and includes the following variables: ASA risk score, age, presence of absence of advanced cancer, pulmonary disease, heart disease, cirrhosis, renal disease, frailty, severe traumatic injury, and place of residence. A consensus definition of serious illness in surgery offers clinical guidance to practicing providers, and facilitates the uniform inclusion of surgical patient populations in studies focused on palliative care processes
"Best Case/Worst Case": Training Surgeons to Use a Novel Communication Tool for High-Risk Acute Surgical Problems	Kruser *et al.* (28)	2017	Coauthors analyzed use of the BC/WC tool to establish goal-concordant care in high-risk surgical patients. The researchers found that physician-patient dyads using this framework were better equipped to navigate complex surgical decision-making. Patients and families, in particular, felt that the use of the BC/WC tool helped surgeons clearly outline treatment choices and prepare for possible adverse events
Recommendations for Best Communication Practices to Facilitate Goal-concordant Care for Seriously Ill Older Patients With Emergency Surgical Conditions	Cooper *et al.* (29)	2016	Coauthors focused on pre-operative communication and defined 9 components of communication with elderly patients facing surgical emergencies: 1) discussing a prognosis; 2) creating a personal connection with the patient; 3) contextualizing the acute problem in the greater scheme of the patient's overall illness; 4) creating a common understanding of the patient's condition; 5) creating space for silence to cope with emotion; 6) identifying surgical and palliative treatment plans; 7) identifying patient priorities and goals; 8) recommending a care plan; and 9) encouraging ongoing support for the patient and family. The aim of this structured approach to communication is to ensure goal-concordant care as well as candid discussion of likely outcomes

Table 2 (*continued*)

Table 2 (*continued*)

Manuscript title	Authors	Year of publication	Primary findings
Sustainability of Palliative Care Principles in the Surgical Intensive Care Unit Using a Multi-Faceted Integration Model	Cralley *et al.* (30)	2022	The coauthors confirm prior conclusions that interventions such as implementing standardized palliative care documentation in the electronic medical record, integrating palliative care goals in daily rounding ICU checklists, and offering special education about palliative care is associated with increased identification of surrogate decision makers in the surgical ICU. The authors highlight the importance of a strong working relationship between surgeons and palliative care clinicians as one of the keys to sustained success
Delays in palliative care referral among surgical patients: perspectives of surgical residents across the state of Michigan	Lee *et al.* (31)	2019	The coauthors characterized barriers to palliative care referral for surgical patients in the state of Michigan. They found four main barriers as perceived by surgical residents at all stages of training: 1) difficulties with prognostication; 2) communication barriers not only with patients and families, but also with other providers; 3) respect for the surgical hierarchy and getting permission from superiors; and 4) surgeon mentality including both unrealistic hope that patients will recover, and that most problems are 'fixable'. More work is required to surmount these barriers and to characterize the existing problems that limit access to palliative care for surgical patients
Surgical palliative care disparities	Rowe *et al.* (32)	2022	The coauthors review disparities in access to specialty palliative care services among racial/ethnic and rural populations. The authors offer an overview of provider, institutional, and geographic factors that influence access to care and health resources. Further research is needed to clarify the extent of the current disparities in access to palliative care and how such disparities might be mitigated in order to offer all patients appropriate and indicated consultations, referrals, and resources to palliative therapy in the setting of advanced illness
Delivery of palliative care to surgical patients: Developing scalable models of primary palliative care delivery for surgical patients			
Quality Indicators in Surgical Palliative Care: A Systematic Review	Lee *et al.* (33)	2021	Lee *et al.* performed a systematic review of quality indicators in surgical palliative care and generated guidelines for palliative care quality in surgical patients
Improving Serious Illness Care for Surgical Patients: Quality Indicators for Surgical Palliative Care	Lee *et al.* (34)	2022	The coauthors performed a systematic review of quality indicators in surgical palliative care and generated guidelines for palliative care quality in surgical patients. The literature review identified and abstracted quality indicators from patient populations ranging from patients with advanced cancer, vulnerable elders, critically ill patients admitted to the ICU, and geriatric and trauma patients
Delivery of palliative care to surgical patients: Identifying patients who would benefit from palliative specialist consultation			
The impact of inpatient palliative care on end-of-life care among older trauma patients who die after hospital discharge	Lilley *et al.* (35)	2018	The authors found that inpatient palliative care consultation for patients with moderate to severe trauma reduced healthcare utilization at the end of life

NLP, natural language processing; ACP, advanced care planning; ASA, American Society of Anesthesiology; BC/WC, best case/worst case.

or unwanted outcome. Bergenholtz *et al.* confirmed these findings (16). In this study, the coauthors characterized the priorities and preferences of medical and surgical patients who were in the palliative phase of their disease trajectory for diagnoses including cirrhosis, pancreatic cancer, colon cancer, renal failure, heart failure, and chronic obstructive pulmonary disease (COPD) (16). The authors found that patients were more concerned about the daily physical and social toll of advanced illness than about its implications on EOL planning. Similar to the study of Nabozny *et al.*, the authors found vast diversity in patient and family expectations regarding the pertinence of in-hospital EOL discussions. For some, EOL considerations were noted to be a "sensitive and personal matter… rather than something they expected to be addressed in a hospital setting" (16). Others, conversely, expected EOL discussions to be initiated by hospital staff. Several were astonished that non-intervention was an option;

I. Measuring Outcomes that Matter to Patients
- **Defining Outcomes that Patients Value**
  - > Talking about death and dying in a hospital setting
  - > Constructing High-stakes Surgical Decisions
- **Measures to Evaluate High-quality Palliative Care in Surgery**
  - > Palliative Care in Surgery: Defining the Research Priorities
  - > Palliative Care and End-of-Life Outcomes Following High-risk Surgery
  - > Measuring Processes of Care in Palliative Surgery: A Novel Approach Using Natural Language Processing
  - > Natural Language Processing Accurately Measures Adherence to Best Practice Guidelines for Palliative Care in Trauma
  - > Natural Language Processing to Assess End-of-Life Quality Indicators in Cancer Patients Receiving Palliative Surgery

II. Communication and Decision Making
- **Aligning Surgical Treatments with Patient-oriented Outcomes**
  - > No published studies
- **Preoperative Advance Care Planning**
  - > Integrating Advance Care Planning Videos into Surgical Oncologic Care: A Randomized Clinical Trial
  - > Mortality After Elective Surgery: The Potential Role for Preoperative Palliative Care
- **Decision Making After Postoperative Complications or Critical Illness**
  - > Sudden Advanced Illness: An Emerging Concept Among Palliative Care and Surgical Critical Care Physicians

III. Delivery of Palliative Care to Surgical Patients
- **Integrating Palliative Care Principles into Routine Surgical Practice**
  - > Characterizing the Role of U.S. Surgeons in the Provision of Palliative Care: A Systematic Review and Mixed-Methods Meta-Synthesis
  - > Primary palliative care for surgeons: a narrative review and synthesis of core competencies
  - > Defining Serious Illness Among Adult Surgical Patients
  - > Recommendations for Best Communication Practices to Facilitate Goal-concordant Care for Seriously Ill Older Patients with Emergency Surgical Conditions
  - > "Best Case/Worst Case": Training Surgeons to Use a Novel Communication Tool for High-Risk Acute Surgical Problems
  - > Sustainability of Palliative Care Principles in the Surgical Intensive Care Unit Using a Multi-Faceted Integration Model
  - > Delays in Palliative Care Referral Among Surgical Patients: Perspectives of Surgical Residents Across the State of Michigan
  - > Palliative Care Training and Decision-Making for Patients with Advanced Cancer: A Comparison of Surgeons and Medical Physicians
  - > Surgical palliative care disparities
- **Developing Scalable Models of Primary Palliative Care Delivery for Surgical Patients**
  - > Quality Indicators in Surgical Palliative Care: A Systematic Review
  - > Improving Serious Illness Care for Surgical Patients: Quality Indicators for Surgical Palliative Care
- **Identifying Patients Who Would Benefit from Palliative Care Specialist Consultation**
  - > The impact of inpatient palliative care on end-of-life care among older trauma patients who die after hospital discharge

Figure 2 Included studies, categorized according to 2018 Priority Area from *Palliative Care in Surgery: Defining the Research Priorities* (14).

these patients felt that "declining any life prolonging measure was [equivalent to] evading responsibility to live" (15). Other participants in the focus group setting felt that surgical intervention was not worthwhile if suffering was predicted; these people embraced the opportunity to dictate how they wished to die.

Measures to evaluate high-quality palliative care in surgery

Five studies discussed improvement to the delivery and measurement of high-quality palliative care for surgical patients. Lilley *et al.* (11) outlined three national priority areas for research in palliative care for surgical patients (as above). Yefimova *et al.* characterized EOL experiences of veterans who died within 90 days of a high-risk surgical operation by reporting family ratings of overall care in the last month of life (17). The researchers found that families of decedents who received palliative care were more likely to rate communication, support, and overall care at the EOL as 'excellent' compared with surgical patients who did not receive palliative care. Overall, the study found that of veterans who died after surgery, only 5.6% received a pre-operative palliative care consultation (17).

The three additional studies explored the use of natural language processing (NLP) to support the measurement and documentation of goals of care conversations, code status discussions, palliative care consultations and hospice eligibility assessment with a further goal of measuring goal-concordant treatment decisions (18-20). NLP identified palliative care delivery in 33% of admissions, as compared to 8% recorded through administrative coding, and was completed 50 times faster than manual review (18). When applied to surgical oncology patients, NLP was highly sensitive and specific relative to manual coding, and was 2,600 times faster in identifying patients undergoing palliative gastrostomy tube placement (20). Further work

remains to enable timely assessment of palliative care process measures with the assistance of NLP technology.

Communication and decision making

Aligning surgical treatments with patient-oriented outcomes

No studies reported on best practices for aligning surgical treatments with patient-oriented outcomes.

Preoperative advance care planning

Two publications explored perioperative ACP (21,22). Robbins *et al.* summarized a retrospective cohort study of 29,132 patients undergoing inpatient elective procedures and demonstrated that preoperative palliative care consultation was associated with a higher likelihood of pre-operative completion of ACP paperwork (22). Despite these encouraging findings, the authors concluded that additional data is needed to optimize pre-operative screening metrics and clarify measures of 'success' in preoperative ACP in the surgical patient population. Aslakson *et al.* implemented ACP in the clinical setting and found that ACP educational videos could be safely and logistically integrated into a pre-operative surgical oncology clinic visit. Though viewing the ACP video did not impact the pre-operative surgical discussion in a substantive manner, patients found it to be helpful (21).

Decision making after postoperative complications or critical illness

A single novel study characterized an emerging model of unexpected, catastrophic, and often incapacitating illness: Sudden Advanced Illness (SAI) (23). The authors outlined this cognitive framework to help clinicians and families navigate unanticipated and devastating illness in the face of prognostic uncertainty and extreme grief (23). The authors anticipate that use of the SAI cognitive framework will assist medical providers of all types, including surgeons and palliative medicine specialists, in the care of patients diagnosed with unexpected, overwhelming, and emotionally-laden ailments.

Delivery of palliative care to surgical patients

Integrating palliative care principles into routine surgical practice

Twelve manuscripts explored the delivery of palliative care to surgical patients. Of these, nine fell into the domain of integrating palliative care principles into routine surgical practice. A systematic review and mixed methods analysis evaluated 2,589 publications characterizing the role of U.S. surgeons in the provision of palliative care and found that surgeons have limited knowledge of and comfort introducing palliative care concepts to their patients (24). Per Suwanabol *et al.*, "a persistent theme across studies was the difficulty of communicating realistic estimates of risk and benefit to patients and families who were struggling with decision making for high-risk surgery and surgery at the end of life" (24). Many studies highlighted the prevalence of surgeon discomfort with communicating to patients and families regarding prognosis and goals of care. Bateni *et al.* confirmed, as others have, that surgeons have fewer hours of palliative care training compared to other specialists (25) and Marterre *et al.* offered a synthesis of core competencies for surgeons interested in gaining palliative care skills and knowledge (26). In order to facilitate the integration of palliative care principles into routine use by surgeons, Lee *et al.* convened a 12-member expert advisory panel to develop a serious illness definition for surgical patients (27). A consensus definition was reached and includes the following variables: American Society of Anesthesiology (ASA) risk score, age, presence of absence of advanced cancer, pulmonary disease, heart disease, cirrhosis, renal disease, frailty, severe traumatic injury, and place of residence. A consensus definition of serious illness in surgery offers clinical guidance to practicing providers, and facilitates the uniform inclusion of surgical patient populations in studies focused on palliative care processes.

Two publications studied communication approaches for surgical patient populations facing emergent or high-risk surgeries. The first analyzed use of the Best Case/Worst Case (BC/WC) tool to establish goal-concordant care in high-risk surgical patients (28). The researchers found that physician-patient dyads using this framework were better equipped to navigate complex surgical decision-making (28). Patients and families, in particular, felt that the use of the BC/WC tool helped surgeons clearly outline treatment choices and prepare for possible adverse events (28). The second publication focused on pre-operative communication and defined 9 components of communication with elderly patients facing surgical emergencies: (I) discussing a prognosis, (II) creating a personal connection with the patient, (III) contextualizing the acute problem in the greater scheme of the patient's overall illness, (IV) creating a common understanding of the patient's condition, (V) creating space for silence to

cope with emotion, (VI) identifying surgical and palliative treatment plans, (VII) identifying patient priorities and goals, (VIII) recommending a care plan, and (IX) encouraging ongoing support for the patient and family (29). The aim of this structured approach to communication is to ensure goal-concordant care as well as candid discussion of likely outcomes.

The sustainability of palliative care principles in the surgical intensive care unit is discussed in an article by Cralley *et al.* This publication confirms prior conclusions that interventions such as implementing standardized palliative care documentation in the electronic medical record, integrating palliative care goals in daily rounding ICU checklists, and offering special education about palliative care is associated with increased identification of surrogate decision makers in the surgical ICU (30). The authors highlight the importance of a strong working relationship between surgeons and palliative care clinicians as one of the keys to sustained success.

Regarding access to care, Lee *et al.* characterized barriers to palliative care referral for surgical patients in the state of Michigan (31). They found four main barriers as perceived by surgical residents at all stages of training: (I) difficulties with prognostication; (II) communication barriers not only with patients and families, but also with other providers; (III) respect for the surgical hierarchy and getting permission from superiors; and (IV) surgeon mentality including both unrealistic hope that patients will recover, and that most problems are 'fixable'. More work is required to surmount these barriers and to characterize the existing problems that limit access to palliative care for surgical patients.

In their 2022 paper, Rowe *et al.* review disparities in access to specialty palliative care services among racial/ethnic and rural populations (32). The authors offer an overview of provider, institutional, and geographic factors that influence access to care and health resources. Further research is needed to clarify the extent of the current disparities in access to palliative care and how such disparities might be mitigated in order to offer all patients appropriate and indicated consultations, referrals, and resources to palliative therapy in the setting of advanced illness.

Developing scalable models of primary palliative care delivery for surgical patients

Two studies discuss scalable models of primary palliative care delivery for surgical patients. Lee *et al.* performed a systematic review of quality indicators in surgical palliative care and generated guidelines for palliative care quality in surgical patients (33). The literature review identified and abstracted quality indicators from patient populations ranging from patients with advanced cancer, vulnerable elders, critically ill patients admitted to the ICU, and geriatric and trauma patients. Ultimately, their work to catalog quality indicators for surgical palliative care was published in the *Annals of Surgery* as an original article (34). This foundational work is crucial to ensuring that palliative care interventions for surgical patients can be tracked and monitored and analyzed over time.

Identifying patients who would benefit from palliative care specialist consultation

Given the considerable number of publications on the subject of 'triggers' for palliative care consultation, we adopted the Lilley *et al.* inclusion criteria which indicated that a patient-oriented outcome must be measured for review and inclusion in this analysis (13). Only one study met these criteria and is included for discussion. The authors of the included publication found that inpatient palliative care consultation for patients with moderate to severe trauma reduced healthcare utilization at the EOL (35).

Discussion

The body of literature exploring the implementation of palliative care for surgical patients remains limited in scope. This analysis has identified 22 manuscripts published since 2016 that have studied the implementation of palliative care interventions for seriously ill surgical patients. We categorized our findings according to the 2018 priority guidelines for research in palliative care for surgical patients (*Figure 2*) and found that although progress has been made over the last six years, additional work is still needed to standardize and refine the delivery of palliative care interventions to surgical patients.

The majority of the publications circulated since 2016 focus on the mechanisms of palliative care delivery to surgical patients. As a whole, these projects emphasize the importance of implementing standardized palliative care documentation in electronic medical records, offer recommendations on how to define critical illness, and provide guidelines on how to engage in conversations centered around palliative care. Progress towards measuring the success of studied interventions is evolving with the implementation and use of NLP. The remaining gap in the literature centers around the ideal timepoint to incorporate

palliative care principles into the care of surgical patients, and whether palliative care specialists or surgeons would be better equipped to offer this type of care for a particular patient.

The projects exploring the outcomes most valued by patients found that hospitalized patients with serious illness fear functional debility and experience more unease about burdening loved ones than about controlling decisions about their medical care. These findings support previous research in other clinical contexts (36,37). Additional progress is needed to help surgeons and palliative care providers tailor value-concordant recommendations that focus on the day-to-day impact of potential interventions for surgical patients facing serious illness, and to recognize that patients facing high-stakes surgical decisions are prone to paradoxical decision making.

Contributions to the literature in the realm of communication and decision making were quite limited, with only three new publications circulated since 2016. These projects outlined cognitive frameworks for navigating unanticipated critical illness and demonstrated the importance and intricacies of initiating perioperative ACP conversations with seriously ill surgical patients. Additional work is needed to document outcomes for surgical patients who have completed preoperative ACP versus those that have not, and if preoperative ACP impacted the timeliness or quality of palliative care discussions.

No publications identified in this narrative review offer insight into the current practice of aligning surgical treatments with patient-oriented outcomes, the epitome of palliative care research. In the presented studies, palliative care or hospice referral/consultation was viewed as 'success' without confirming concordance of treatment goals. As such, additional inquiry is needed to explore reliable mechanisms to facilitate goal-concordant care for surgical patients. As the data supporting palliative care interventions for surgical patients grows, albeit slowly, and as multidisciplinary models of patient care continue to become the norm, we are hopeful that surgeons and palliative care specialists can continue to foster both clinical and research relationships. Surgeons and palliative care specialists can find common ground in supporting patient autonomy while offering realistic hope regarding anticipated clinical outcomes.

As with any narrative review, our study has limitations including potentially missed publications despite a comprehensive search of multiple databases and citation searching with manual review of select high-yield journals. The inclusion of expert guidance statements (27,29) helps to establish benchmarks for additional research in this area but is not itself objectively evidence-based. Bias (38) and quality ratings of the included studies were not formally assessed and had the potential to influence the conclusions of the studies included in this analysis.

Conclusions

As therapies to support seriously ill surgical patients continues to evolve, it is essential to establish guidelines and best-practices to achieve goal-concordant care. Despite calls for continued research in this patient population, the existing body of literature remains lacking and more work is needed to clarify which surgical patient populations benefit most from palliative care interventions, and how such interventions can be most effectively employed.

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Footnote

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