Surgical Palliation at a Cancer Center

Incidence and Outcomes

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Hypothesis: Surgical intervention in palliative care is common; however, the indications, risks, and outcomes are not well described.

Design: Retrospective review of surgical cases during a 1-year period with a minimum 1-year survival update.

Setting: A National Cancer Institute–designated comprehensive cancer center.

Patients: Patients with a cancer diagnosis undergoing operative procedures.

Main Outcome Measures: Number of palliative surgeries and analysis of length of stay, morbidity, and mortality.

Results: Palliative surgeries comprised 240 (12.5%) of 1915 surgical procedures. There were 170 major and 70 minor procedures. Neurosurgical (46.0%), orthopedic (31.3%), and thoracic (21.5%) surgical procedures were frequently palliative. The most common primary diagnoses were lung, colorectal, breast, and prostate cancers. Length of hospital stay was 12.4 days (range, 0-99 days), with 21.3% of procedures performed on an outpatient basis. The 30-day mortality was 12.2%, with 5 patients dying within 5 days of their procedure. The overall mortality was 23.3% (56/240). Mortality for surgical procedures classified as major was 21.9% (44/170) and 10.0% (7/70) for those classified as minor (Fisher exact test, \( P < .01 \)).

Conclusions: Significant numbers of palliative procedures are performed at our cancer center. Overall morbidity and mortality were high; however, a significant number of patients had short hospital stays and low morbidity. Palliative surgery should remain an important part of end-of-life care. Patients and their families must be aware of the high risks and understand the clear objectives of these procedures.


Cancer is the second most common cause of death in the United States. One of every three Americans will be diagnosed with a form of cancer in their lifetime, and more than one third of these patients will die of the disease. Three of four families will have a family member with cancer. Cancer care involves many forms of treatment intended for either cure or palliation, including chemotherapy, radiation therapy, as well as surgical therapy. Palliative cancer surgery is a consideration for disease-related complications that compromise vital functions and generate symptoms such as pain, dyspnea, nausea, and other symptoms that interfere with function and quality of life (QOL).

Palliative surgery is an important yet understudied aspect of palliative care. The World Health Organization (WHO) defines palliative care as "the active total care of patients whose disease is not responsive to curative treatment. Control of pain, of other symptoms, and of psychological, social, and spiritual problems, is paramount. The goal of palliative care is achievement of the best QOL for patients and their families." Although this broad definition is useful, it lacks description of precise aspects of palliation such as onset, duration and degree of palliation, and specific symptom control.

See Invited Critique at end of article

Palliative care has focused predominantly on the use of palliative chemotherapy or radiation therapy rather than surgical interventions. The role of surgery in palliative care is multifaceted and not well characterized. The 5 essential roles of surgical palliation as defined by Ball et al are (1) initial evaluation of the disease, (2) local control of the disease, (3) control of discharge or hemorrhage, (4) control of pain, and (5) reconstruction and rehabilitation. However, the intent of a surgical pro-
The COH National Medical Center is a National Cancer Institute–designated comprehensive cancer center. In April 1999, case logs from April 1, 1998, to March 31, 1999, were retrospectively reviewed by 14 staff surgeons (5 general oncol ogic [L.D.W., D.Z.J.C.], 3 urologic, 1 thoracic, 1 neurosurgeon, 1 gynecologic, 1 reconstructive, 1 otolaryngologist, and 1 orthopedic) from the Division of Surgery. An operating surgeon (L.D.W., D.Z.J.C.) was asked to code each case as palliative based on the definition that “the goal of the operation was the improvement of the QOL of a patient whose long-term survival was less than 5%.” All procedures for a given patient after a designated palliative procedure were included in the palliative procedure listing if the nature of the procedure was similar to or was related to a complication of the original procedure. If a patient had an unrelated surgery, the procedure remained with the designation of the operating surgeon based on his interpretation of the definition of a palliative procedure.

A database of the procedures was then established. Data regarding length of stay, mortality, morbidity, number of procedures, and primary diagnosis were analyzed. Case logs were reviewed with the operating surgeon for individual procedures for which classification was unclear. The research team, which was made up of members from the Departments of Surgery (R.S.K., B.G., L.D.W., D.Z.J.C.), Nursing Research (G.J., B.R.F.), and Biostatistics (R.A.N.), met frequently to review the classification schema, the data, and the methods of analyses. This included validation of the coding of cases and methods to capture all cases and outcomes. The survival data was updated so that a minimum of 1-year follow-up was confirmed.

Multiple factors were then analyzed from the database. Criteria to consider a procedure as single included whether the procedure was related to the same disease process. Examples included multiple subcutaneous or skin excisions for the same diagnosis, nodal biopsies in continuum with the organ of interest, and complex intra-abdominal operations that included multiple different procedures. An operation was designated as having multiple procedures if it included reconstruction or resection by a separate surgical team, procedures in unrelated areas of the body, or procedures for completely independent purposes. Each case was also reviewed for its status as a “major” or “minor” procedure by use of criteria such as technical difficulty, the anesthesia given, length of the operation, and known morbidities and mortalities associated with the procedures. Examples of major procedures for palliation include gastrointestinal bypass; resection or externalization of gastrointestinal or urologic organs to relieve obstruction; intracranial resections for neurologic symptoms; skin and soft tissue resections and reconstructions for pain or cosmesis; and orthopedic stabilization and repairs for ambulation. Minor procedures include those for venous access, chest tube insertion for drainage or pleurodesis, debridement of wounds, or endoscopic feeding tube placement. The database of surgical procedures and specific end points were cross-checked for accuracy with multiple computer systems through the Department of Information Technology Services, the Department of Quality Risk and Resource Management, the Department of Biostatistics, and the Department of Medical Record Services. Morbidity information was obtained from surgical morbidity and mortality conference reports and unscheduled admissions. All surgical cases were included with the exception of vascular access procedures, endoscopy, bronchoscopy, and cystoscopy procedures without biopsies.

Statistical analyses were conducted using SAS and JMP software (SAS Institute Inc, Cary, NC). All P values are 2-sided, with α = .05. Survival curves were performed using the Kaplan-Meier method, with P values computed using the log-rank test.

METHODS

From April 1, 1998, to March 31, 1999, a total of 1915 major and minor surgical procedures were performed on 1466 patients at the COH National Medical Center. Through retrospective review by the primary surgeon, 240 of these procedures (12.5%) were classified as palliative in intent for 164 patients (Table 1). Of these 164 patients, 83 were men and 81 were women, with a mean age of 56.4 years (age range, 6-88 years). The most common primary cancers involving palliative surgery were
lung, colorectal, breast, and prostate (Table 2), with surgical procedures performed for primary, recurrent, and metastatic disease. For those procedures classified as palliative, there were 170 major and 70 minor operations (Table 1), with 52 (31.7%) of the 164 patients undergoing more than 1 palliative procedure (range, 2-7) during the year. Of these 52 patients, 24 (46.2%) underwent more than 1 procedure within 30 days. In addition, many surgical procedures included more than 1 palliative procedure at 1 setting (29.7%) (Table 3), with most of these (81.7%) performed by more than 1 staff surgeon. In all, 24.4% of surgical procedures included more than 1 surgeon. The percentage of surgeons’ cases that were deemed palliative had a wide range within the Departments of Urology (4.3%-19.5%) and General Oncologic Surgery (4.9%-19.7%).

The overall morbidity was 21.3% (51 of 240), with surgical procedures classified as major having a 25.9% (44 of 170) morbidity and those classified as minor having only 10% morbidity (7 of 70) (P = .004). There was a statistically significant difference in morbidity across general oncologic surgery (24.5% morbidity), urology (13.3% morbidity), thoracic (6.9% morbidity), and neurosurgical (35.0% morbidity) services (P = .01). The average length of hospital stay was 12.4 days (range, 0-99 days) with 51 surgical procedures (21.3%) performed on an outpatient basis. A total of 20 patients (12.2%) died within 30 days of surgery, and 5 of these patients died within the first week. Survival analyses comparing major to minor procedures revealed no difference in median survival across groups (P = .91) (Figure).

Palliative surgery is an important part of the comprehensive multidisciplinary oncologic care at cancer centers; however, its scope, number of procedures, and cost have not been well documented. In fact, the surgical oncology literature rarely focuses on QOL issues, and primarily relies on end points of morbidity and mortality and on retrospective review. Among the multidisciplinary cancer management approaches (radiotherapy, chemotherapy, rehabilitation, pain service consultation, etc), surgery is the least investigated. A recent study reviewed 50 leading medical textbooks to evaluate end-of-life content. While all specialty areas had major defi-

**COMMENT**

*Several patients had more than one primary cancer diagnosis.*
ciencies, surgery texts scored the poorest, with 71.8% of the end-of-life topics reviewed completely absent in the leading surgery texts. Finally, it has been shown that surgical training may be deficient in adequately educating residents concerning end-of-life care.10 Palliative surgery is a paramount, central subject for further research as both surgical techniques and end-of-life care improves.11

It is surprising that although many cancer treatments are palliative in intent, there is no agreed definition of “palliation” or a standard approach to its measurement.3 In this review, we define palliation broadly, and its interpretation is primarily based on the individual surgeon’s subjective classifications. While this may be a limitation of this study, there is no single definition of surgical palliation, and the terminology of palliative surgery can raise disagreement among surgeons and investigators. This can be seen in the wide variance of responses in the General Oncologic Surgery and Urology services. There may be variability on an individual surgeon’s definition based on multiple factors. Palliative procedures may be seen as only procedures in which the intent is to relieve problems directly related to a tumor. Others may include more broad definitions, including averting impending complications of cancers, problems related to oncology treatments, or non-cancer-related surgical emergencies in a patient with incurable disease. There are also many procedures for which, owing to the nature of the disease, long-term goals cannot be elucidated until the operation has been completed. Ultimately, for all studies dealing with palliation, these terms must be defined so that a common vocabulary can be used and results can be more uniformly scrutinized. In an attempt to assert more universal definitions of palliative surgery, we are currently conducting a survey of cancer surgeons, which we hope will clarify these issues.

Our retrospective review demonstrates that palliative surgical procedures are an important part of end-of-life care of a cancer patient, including 12.5% of surgical cases at our institution. As stated previously, the Oxford Textbook of Palliative Medicine4 highlights 5 essential roles of palliative medicine. Examples of palliative surgical procedures from our series that encompassed the defined roles are given in Table 4. Our review indicates that many of these procedures (170 of 240) were major, with multiple procedures having more than 1 surgeon (24.4%).

Surgical and other treatment options must be considered closely before therapy is initiated. The intent of many palliative procedures includes the hope of enhancing the length of survival, in addition to improving QOL. Our study does display the high mortality of palliative procedures, although many patients do have long-term survival. The Figure shows that survival is most dependent on the underlying prognosis due to the underlying diagnosis and not on the complexity of the procedure performed.

Some controversies exist regarding surgery in advanced disease. For example, many patients with advanced disease have “do not resuscitate” (DNR) orders, yet many institutions require that the DNR order be suspended during surgery. This may create staff conflicts with performing surgery on patients with a palliative intent. Serious factors are also related to costs and managed care. Palliative surgery can increase medical expenses owing to the use of costly technologies, although newer techniques such as minimally invasive surgery may lead to decreased costs. Surgical morbidity can add to health care costs. The overall morbidity of our study was 21.3%, which is higher than the overall general surgical morbidity rates of 3% to 5.45% reported by others.12,13 Conversely, judicious use of palliative surgical procedures can considerably reduce costs by decreasing the need for inpatient care and preventing other disease-related complications. Thirty percent of the procedures in our study were either performed on an outpatient basis or simply an overnight stay (72 of 240), demonstrating that hospital charges can often be kept at a minimum. Also, numerous procedures were considered minor, with the implication that minimal resources were necessary.

The treatment of cancer with curative intent follows well-defined surgical principles with the primary goals of prolonging life, preserving function, and limiting toxic effects. The role of surgical intervention in enhancing QOL is less well defined. Issues of disease-specific survival, morbidity of invasive interventions, and ultimately the impact on QOL become tantamount in palliative surgery. Although some guidelines for surgical palliation have been previously published,4,6,14,15 there is no standard used in practice. In general, the surgical literature has focused on the physiological and biological outcomes with less consideration of QOL outcomes or family perspectives.

Case reports, retrospective studies, and prospective randomized trials have evaluated a variety of outcomes for numerous types of cancer treated with palliative surgery. Considerations for palliative intervention include safety, efficacy, patient comfort, resolution of symptoms, length of hospital stay, mean survival, postoperative complications, recurrence of symptoms, and temporization for alternative interventions such as transplantation.10,27 In advanced cancer, the primary focus of the surgeon should be symptom relief rather than reversing the malignant process itself.3 In our study, palliative procedures mirrored the most common cancers leading to death in the United States.18 This is in contrast to the primary diagnoses in most reports for pallia-
tive procedures in the literature, which include esophagogastric, colorectal, pancreatic, and biliary cancers.

For local or distant recurrence, there are multiple indications for palliative surgery. At times, these must be performed on an emergency basis. One example of such indications for palliative procedures is obstruction of vis-
cera, such as large or small bowel, stomach, esophagus, bile ducts, or the urinary system. Next, tumors may need to be resected for bleeding (stomach, colon, kidney), prevention of local complications (breast, melanoma, bone metastasis), or pain control (nerve root impingement, head and neck tumors, chest wall invasion). In addition, procedures to relieve fluid accumulation, such as pleural, pericardial, or intraperitoneal, can be related to impaired respiratory function, difficulty eating, or discomfort. Spinal cord compression may necessitate a surgical procedure for stabilization, especially if the tumor is radiosensitive or if the patient is unable to receive treatment based on prior therapy. Similarly, brain metastasis may also need surgical intervention based on neurologic symptoms. Treatment of impending pathologic fractures and tumor invasion of the spine with pain, neurologic impairment, or spine instability are often indications for such procedures. Surgical resection, stabilization, and decompression can improve QOL by reducing pain, improving function, and facilitating improved nursing care.

There are many factors influencing a patient and his or her decision making regarding end-of-life care. Discussions with the patient and family should revolve around the aims of the surgical procedure, the potential results, the risks and complications, the uncertainty of the findings at the time of surgery, as well as the evolution of the disease in the absence of surgical intervention. As shown in our study, patients often have multiple complications of palliative procedures, and goals may not always be met.

For palliative surgery, the influencing factors for decision making include the patient, the health care team, and the family. As each member involved in decision making considers palliative surgery as an option, the process begins with acknowledging alternatives. The intent of palliative care is to select the best treatment that maximizes QOL while minimizing risks and harm. To make such a choice, the overall goal of care must be identified. This goal often focuses on maintenance of function as long as possible or the relief of distressing symptoms. As patients’ needs vary tremendously, such decisions must recognize patient values. Patient choices in palliative care include options of palliative surgery, chemotherapy, radiation therapy, or a combination of these treatments. Other noninvasive treatments must also be considered. Positive outcomes would include relief of symptoms, improved QOL, possible increase in survival, and the ultimate goal of a peaceful death. Conversely, negative outcomes of treatment would result in uncontrolled symptoms, diminished QOL, potential for decreased survival, and a nonpeaceful death.

This study is a first step in the identification and quantification of palliative procedures at a cancer center. The outcomes measured are common to those used to determine efficacy for cancer treatments. Quality of life outcomes may be extrapolated based on these outcomes but cannot truly be measured without input from...

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**Table 4. Case Examples of the Five Essential Roles of Palliative Surgery**

<table>
<thead>
<tr>
<th>Essential Role *</th>
<th>Pertinent History</th>
<th>Intervention</th>
<th>Clinical Outcome</th>
<th>Length of Stay, d</th>
<th>Postoperative Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial evaluation</td>
<td>37-year-old woman with history of locally recurrent extremity melanoma with recent bloating and ascites; cytology of unclear origin</td>
<td>EGD† laparoscopy with peritoneal biopsies</td>
<td>Biopsy findings revealed melanoma, patient went home following day</td>
<td>1</td>
<td>Died at 16 months</td>
</tr>
<tr>
<td>Local control</td>
<td>64-year-old woman with anemia, an invasive ampullary carcinoma, and multiple comorbidities</td>
<td>Ampullectomy/feeding jejunostomy/gastrostomy tube placement</td>
<td>No further anemia/tumor recurrence</td>
<td>14</td>
<td>Alive at 13 months</td>
</tr>
<tr>
<td>Control of discharge or hemorrhage</td>
<td>49-year-old woman with breast cancer and extreme shortness of breath owing to recurrent malignant effusions after multiple thoracenteses</td>
<td>Bronchoscopy/thoracoscopic insertion of permanent drainage catheter</td>
<td>No further shortness of breath with intermittent drainage through catheter</td>
<td>1</td>
<td>Died at 1 month</td>
</tr>
<tr>
<td>Control of pain</td>
<td>64-year-old woman with history of small cell carcinoma of the lung and painful chest wall incisional recurrence</td>
<td>Excision of chest wall mass</td>
<td>Complete pain relief</td>
<td>Outpatient</td>
<td>Died at 21 months</td>
</tr>
<tr>
<td>Reconstruction/rehabilitation</td>
<td>39-year-old man with recurrent glioma and frequent seizures</td>
<td>Craniotomy with tumor resection</td>
<td>Rare seizures with recurrent disease 10 months postoperatively and resection</td>
<td>6</td>
<td>Died at 12 months</td>
</tr>
</tbody>
</table>

*Roles based on Ball et al.†EGD indicates esophagogastroduodenoscopy.
patients and their families. Through this interaction, we will be able to determine the effects of palliative procedures and delineate their appropriateness, especially when nonsurgical approaches are available. We are also currently conducting a national survey of surgeons in oncology to gain their perspective of issues in palliative care.

In summary, surgical procedures are an important part of palliative care. Their numbers and scope have not been well defined, but this review demonstrates the need for studies to describe the multifaceted impact of palliative procedures on patients, families, and health services outcomes. Refinement of study methods is needed to provide more standard definitions of palliative surgery. Decision making related to palliative surgery as a treatment option, given the paucity of data in this area, can be difficult for all parties involved, and direction for care is needed to help define goals and forecast outcomes. The medical community, and most importantly the surgical community, needs to be educated as to the nature of palliative procedures. The essence of palliative care suggests that all treatment modalities should be considered such that care is ultimately based on aggressive attention to symptoms, QOL, and a peaceful death.

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REFERENCES


Palliation, like class, is hard to describe but easy to recognize. The authors describe palliative surgery as comprising 12.5% of total surgical operations (not “surgeries”). They emphasize the difficulties in both definition and evaluation of efficacy. One might surely question their definitions by examining the examples given in Table 4. Most surgeons would not see the diagnosis of metastatic cancer as a palliative procedure but rather a diagnostic one. Similarly, local control in the absence of metastatic disease would seem to be a primary treatment.

Central to the theme of palliation is a clear understanding between patient, surgeon, and family of both expectations and ability to fulfill those expectations. As with many other aspects central to the care of the cancer patient, an overriding tenet is “do not promise what you cannot deliver.” This central theme is particularly important for the surgeon committed to the care of the patient with cancer, as surgeons are often those who make the diagnosis. If surgeons are to take leadership roles, then they should be able to provide or at least guide cancer care from diagnosis to demise. To provide effective palliation, surgeons will have to understand both likely outcome and potential benefit. Once that is available, then realistic expectations can be defined. Even then, however, expectations and delivery will need to be individualized. Palliation for a 12-month symptom-free life is easy to promote. Palliation that provides 1 month of prolonged dying rather than prolonged living is easy to deny, but if palliation is effective with minimal personal cost, then it may be justified to deliver, even if measured in days or weeks.

The authors are to be congratulated on bringing this subject further to the forefront and emphasizing that much needs to be done if we are to deliver what we would so often like to promise.

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