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Selected Readings in General Surgery (SRGS) is a topic oriented, in-depth review of the field of general surgery presented eight times annually as an educational offering of the Division of Education of the American College of Surgeons. The mission of the Division of Education is to improve the quality of surgical care through lifelong learning, based on educational programs and products designed to enhance the competence or performance of practicing surgeons, surgery residents, and members of the surgical team. The intent of the publication is to analyze relevant medical literature to give the surgeon the knowledge necessary to practice state-of-the-art surgery. To accomplish this goal, the editor selects 100–125 pertinent articles from the literature for each issue. Each article is reviewed and an overview is written that places the content of these articles in the perspective of the best, day-to-day, clinical practice. In addition to the overview, 12–18 full-text articles are reprinted in each issue.

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and Alexandra Easson, MD, FACS

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1. By the year 2030, the proportion of patients older than 65 in the United States is expected to be which of the following?
   a) 20%
   b) 35%
   c) 11%
   d) 61%
   e) 4%

2. Disability in older patients is suspected when all of the following are present except which one?
   a) Reduced mobility
   b) Decreased ability to complete shopping for food
   c) Inability to prepare meals
   d) History of urinary tract infection
   e) Difficulty managing money

3. Frailty is estimated to be present in which proportion of patients older than 80?
   a) 10%
   b) 60%
   c) 33%
   d) 40%
   e) 72%

4. A diagnosis of frailty is predictive of which of the following?
   a) Skin infections
   b) Decreasing visual acuity
   c) Increasing deafness
   d) Increased risk for obesity
   e) Increased risk for falls

5. Frailty can be suspected if any of the following are present except which one?
   a) Decreased grip strength
   b) Decreased walking speed over a standard distance
   c) Elevated serum C-reactive protein
   d) Abnormal TUG test score
   e) Recent unintentional weight loss >10 lbs

6. Following sphincter-preserving resections for rectal cancer, fecal incontinence is observed in which proportion of patients?
   a) 3%
   b) 20%
   c) 37%
   d) 55%
   e) 7.5%

7. In elderly patients undergoing resection for rectal cancer, the risk for development of decubitus ulcer during the index hospitalization is which of the following?
   a) 25%
   b) 2.1%
   c) 11%
   d) 33%
   e) 51%

8. Mortality risk at one year following operations for revascularization of the lower extremity in nursing home residents is which of the following?
   a) 10%
   b) 51%
   c) 24%
   d) 2.8%
   e) 35%
9. Risk of discharge to a long-term care facility is associated with all of the following except which one?
   a) Increased Charlson comorbidity score
   b) Anemia
   c) Hypoalbuminemia
   d) History of myocardial infarction
   e) History of recent fall

10. All of the following are recommended during the preoperative assessment of the geriatric patient except which one?
   a) MRI of the entire spine
   b) Assessment of cognition
   c) Assessment of function in activities of daily living
   d) Assessment of nutritional status
   e) Listing and adjustment of medications

11. Which of the following is true regarding the “double effect” of medications used in palliative care?
   a) The potency of some narcotics is increased in terminally ill patients
   b) Double effect is a term used to describe euthanasia practices
   c) Narcotic doses required to relieve uncomfortable symptoms may hasten death due to respiratory depression
   d) Double effect refers to the practice of giving sequential doses of intravenous narcotics
   e) Double effect refers to relief of pain through a combination of medications and spiritual counselling

12. Common symptoms of approaching death in a terminally ill patient include all of the following except which one?
   a) Decreasing attention span
   b) Hunger and thirst
   c) Sleeping most of the time
   d) Vivid dreams
   e) Difficulty swallowing

13. Common palliative procedures include all of the following except which one?
   a) Placement of biliary drainage tubes
   b) Placement of ureteral stents
   c) Colostomy for colon obstruction
   d) Tracheostomy
   e) Pleurodesis

14. Characteristics of “complicated grief” after the death of a loved one include which of the following?
   a) Seeking spiritual support
   b) Requesting advice from friends
   c) Longing for the deceased
   d) Spending time with friends and relatives
   e) Attending concerts and lectures

15. A 76-year-old man is admitted to the intensive care unit with mid-epigastric pain and signs of gastrointestinal bleeding. Imaging discloses that the patient has locally recurrent pancreatic cancer with extensive hepatic metastases. The patient and the family wish to implement a plan for terminal analgesia and sedation. Which of the following is an important component of such a plan?
   a) Presence of a do not resuscitate order to document actions taken when cardiopulmonary arrest occurs
   b) Documentation of a plan for enteral nutrition
   c) Endoscopy to document the site of gastrointestinal bleeding
   d) Determining the maximum allowable dose of analgesic drugs
   e) Insertion of an endotracheal tube
16. A 92-year-old man who is chronically wheelchair-bound due to a prior stroke is admitted to the emergency department hypotensive due to a free intraperitoneal rupture of an abdominal aortic aneurysm. Rapid assessment of the patient convinces the surgeon and the anesthesiologist that chances of survival and recovery are slim. In discussing with family members the advisability of operation in this patient, which of the following terms should not be used?
   a) Quality of life
   b) Long-term ventilator support
   c) Dialysis
   d) Futility
   e) Patient preferences

17. A 3-day-old premature infant with hydrocephalus, multiple central nervous system abnormalities, and heart failure due to a patent ductus arteriosus requires treatment of the ductus arteriosus and the hydrocephalus. All members of the care team agree that the patient has less than a 5% chance of long-term survival and chance of survival without severe neurologic deficits is estimated to be nearly zero. The parents desire that the patient have operations to close the patent ductus and place a ventricular-peritoneal shunt. Surgeons are reluctant to operate because the operations are not likely to improve chances of meaningful quality of life. What course of action is most appropriate?
   a) Inform the family that surgeons refuse to operate
   b) Treat the patent ductus with indomethacin while efforts to educate the parents proceed
   c) Perform the operations as requested by the parents
   d) Administer high doses of intravenous opioids
   e) Refer the patient to another hospital

18. A 79-year-old woman with multiple bone and brain metastases from breast cancer is admitted to the intensive care unit comatose and with clinical evidence of severe pneumonia. She is intubated and on the ventilator. The metastases are resistant to chemotherapy. An advance directive states the patient does not wish to have futile therapeutic interventions. The family wishes that the advance directive be enforced. All of the following statements are true regarding this clinical problem except which one?
   a) A feeding tube will make the patient more comfortable
   b) The family should be allowed unlimited access to the patient
   c) Heart rate and blood pressure monitors should be turned off
   d) The family should be assured that treatment for dyspnea and noisy breathing due to secretions will be employed promptly when needed
   e) Health care team members should visit the patient and family frequently

19. Available data suggest that comprehensive end-of-life planning leads to successful end-of-life care in what proportion of patients with terminal cancer.
   a) 10%
   b) 34%
   c) 85%
   d) 100%
   e) 21%

20. Which of the following make treatment of depression at the end of life difficult?
   a) Patients are frequently allergic to psychoactive medications
   b) Patients and families usually prefer conventional psychotherapy to medications
   c) Strong evidence supports the use of psychoactive medications, but palliative care specialists resist using the drugs
   d) Frequent dose adjustments are necessary and these are difficult in patients receiving other consciousness-altering drugs
   e) Depression is difficult to diagnose at the end of life

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Available data has confirmed that the proportion of patients 65 years and older is rising in the United States. A recent best practices document developed by the American College of Surgeons National Surgical Quality Improvement Project® (ACS NSQIP®) cited data estimating that the proportion of patients older than 65 in the United States will reach 20% by 2030. This document, as well as other publications dealing with the preoperative preparation of elderly patients for colon and rectal operative procedures, was discussed in Volume 41, Number 5 of Selected Readings in General Surgery (SRGS), and readers are encouraged to review this material. In this issue of SRGS, we will review articles relevant to the care of geriatric patients who require surgical interventions.

Elderly patients are often treated for one or more chronic comorbid conditions; such conditions may influence operative risk and require management of the agents and devices being used to treat the associated condition(s). Surgeons caring for elderly patients need to accurately quantify this operative risk and use efficient and dependable means of communication to inform the patient, as well as the patient’s family and surrogate caregivers. For our discussion on managing geriatric surgical patients, I am grateful for the editorial assistance of Marcia McGory Russell, MD, FACS, of the Department of Surgery at the David Geffen School of Medicine at the University of California Los Angeles, who selected the articles for review.

In addition to effectively managing surgical care, another critically important responsibility is the provision of care to patients whose basic disease is serious or incurable and, in some instances, is anticipated to cause the patient’s death within a short interval. Planning for surgical interventions will need to include consideration of situations in which certain therapeutic interventions will not be helpful and may even hasten death and/or adversely influence quality of life. This issue of SRGS will present methods for determining when palliative care is indicated; communicating options to patients will be presented in the second section of this issue—articles reviewed on this topic will emphasize the importance of a team approach to palliative care and the need for clear explanations of all options available to the patient. The importance of understanding patient preferences will also be emphasized, and data on dependable methods for developing patient-centered management plans will be reviewed. Articles for our palliative care discussion were chosen by Alexandra Easson, MD, FACS, of the Department of Surgical Oncology at the University of Toronto, Canada.
Clinical Assessment of the Geriatric Patient

The extent of preexisting disability, comorbid conditions, and frailty influence the risk of operative mortality and postoperative complications in elderly patients. A review article describing the impact of these factors was presented by Fried and coauthors in the *Journals of Gerontology Series A, Biological and Medical Sciences*, 2004. The authors opened their discussion by noting that the concepts of frailty, disability, and comorbid conditions have been lumped together when describing the health status of vulnerable older patients. They cited evidence supporting the belief that these factors, although interrelated, are distinct components of the older patient’s health status and, as such, need individualized attention.

Fried and colleagues provided a useful definition for disability: a significant difficulty in completing necessary activities for independent living in a home and accomplishing tasks necessary to preserve quality of life. Professional medical organizations have recommended that primary care physicians screen for disability by questioning the patient regarding the level of success in performing activities of daily living (including self-care, food preparation, and housecleaning). A standard scale (Instrumental Activities of Daily Living, or IADL) is helpful for completing this assessment. The authors cited data indicating that some degree of disability is present in 20%-30% of community-dwelling adults older than 70. These disabilities manifest as reduced mobility and the impaired ability to complete tasks such as meal preparation, shopping, managing money, and self-care tasks (bathing, dressing, and eating). Disability can also occur as the result of an acute event, such as a fall, stroke, or as a consequence of progression of a comorbid disease or increasing frailty.

Frailty is common according to data cited by Fried and colleagues. Forty percent of adults 80 years and older are frail, but despite the commonness of this condition, arriving at a standard definition that can be used in multiple clinical situations is difficult. Frailty produces increased vulnerability to various stressors resulting from decreased physiologic reserve and dysregulation of multiple body systems. The clinical phenotype of frailty includes wasting: a loss of muscle mass and strength with accompanying weight loss, loss of endurance, disordered balance and mobility, and decreased cognitive function. The combined effects of these changes result in reduced performance and increased intervals of inactivity; the frailty phenotype can be diagnosed when these abnormalities are present.

Additional perspective on the frailty phenotype was published in an article by Fried and coauthors in the *Journals of Gerontology Series A, Biological and Medical Sciences*, 2001. The authors obtained long-term—follow-up data on two cohorts of patients 65 or older. The total population consisted of 5,317 patients. Frailty was diagnosed if three or more of the following characteristics could be confirmed: unintentional weight loss of more than 10 lbs. in the past year, exhaustion and/or decreased grip strength, slow walking speed, and low physical activity. The baseline incidence of frailty was 6.9%, and an additional 7.2% of patients followed for four years or more developed frailty. Frailty was independently predictive of falls, worsening mobility, hospitalization, and mortality. Frailty risk factors included female gender, African-American ethnicity, lower educational level, and higher rates of comorbid conditions. Intermediate frailty—defined as the presence of two or more of the previously mentioned characteristics—was predictive of developing the full frailty phenotype over long-term—follow-up. Data analysis showed the influence of comorbid conditions on the development of frailty and disability, particularly when two or more conditions were present. However, frailty existed and progressed in some individuals who were free of comorbid disease, suggesting at least two pathways for development of diminished physiologic reserves leading to frailty and increased risk for falls, reduced mobility, and increased risk for development of comorbid conditions.

In their 2004 article, Fried and coauthors described the major health implications for patients with frailty, comorbidity, and disability. They noted that the interaction of frailty, comorbidity, and disability may mean that all indicated treatments for conditions diagnosed in such patients may not be feasible because the potential for even short-term benefit is minimal for some of the interventions. They also emphasized the importance of early detection of frailty and treatment with nutritional support.
therapy, physical therapy, and other interventions. Using these approaches, some of the morbidity and mortality risks of frailty may be reduced.

Data relevant to the preoperative diagnosis and perioperative management of patients with diagnosed frailty was presented in a summary of a panel discussion on this topic held at the 2014 meeting of the Association of VA Surgeons (AVAS). The summary was published in the November 2014 issue JAMA-Surgery, and data highlighted in the discussion indicated that the degree of frailty may be predictive of the patient’s ability to withstand the stress of surgery. While frailty has been predictive of mortality following a surgical procedure, the authors also cited data suggesting that in older patients considering a surgical procedure, fear of functional or cognitive impairment was significantly greater than the fear of mortality risk. Nearly 90% of patients stated they would forego an operation if the risk of cognitive or functional impairment was high, but would accept a 50% mortality risk to potentially achieve improved quality of life. These data strongly suggest the need to assess patient preferences and beliefs carefully when frailty is present.

The panel summary reviewed existing measures for diagnosing the presence and extent of frailty. Accepted scoring systems include the Hopkins-Fried frailty index, which assesses grip strength, weight loss history, exhaustion, physical activity, and slowness. A score of 4–5 indicates significant frailty. The Rockwood-Robinson frailty index assesses dependence, decreased mobility, comorbidity burden, abnormal cognition, poor nutrition, anemia, and presence of geriatric syndrome. If four or more traits are present, frailty is diagnosed. The advantages of these scoring systems are precision and reproducibility, while the disadvantages include the time and resources necessary to complete the assessments—these scoring systems cannot be used in acute conditions where making rapid decisions is required. Several surrogate measuring systems reviewed by the panel included the gait speed test (time to walk 15 ft), hand grip strength test (abnormal <30 kg for men and <20 kg for women), and the Timed Up and Go (TUG) Test, which assesses the time it takes a person to rise from a chair, walk 10 ft, and return to the chair. Patients are scored as fast if the test is completed in 10 seconds or less, intermediate is the test requires 11-14 seconds, and slow if the test requires more than 15 seconds; frailty is diagnosed if the time required is >15. These tests also require time to complete and some special equipment (grip dynamometer).

Additional data cited suggest that preoperative nutritional therapy and exercise programs may help mitigate the increased operative risk associated with surgery in frail patients. Intraoperative practices, such as the use of regional anesthesia and goal-directed fluid therapy, may also help to reduce risk. The AVAS panel participants prepared an algorithm for assessing and mitigating increased operative risk in frail patients; this algorithm is reproduced as Figure 1.

A conference sponsored by the National Institute on Aging (NIA) and the American Geriatrics Society (AGS) was held in March 2015; Robinson and coauthors described the proceedings of this conference in the Journal of the American College of Surgeons, 2015. This article is supplied as a full-text reprint accompanying some formats of SRGS.

The authors stated that frailty is understood to be a state of diminished physiologic reserves involving multiple systems, resulting in increased vulnerability for falls, disability, comorbid disease development, delirium, cognitive decline, complications of medical treatment, social withdrawal, and death. The biologic causes of frailty are multiple and include genomic instability, telomere attrition, epigenetic alterations, loss of proteostasis, deregulated nutrient sensing, mitochondrial dysfunction, cellular senescence, stem cell exhaustion, and altered intercellular communication. Robinson and colleagues noted that the detection and management of frailty is becoming an increasingly important topic for surgeons since older patients make up a significant proportion of patients undergoing surgical procedures; data cited by the authors showed that 37% of patients operated on in 2010 were 65 years or older. Additional data cited by the authors supported the interpretation that frailty is associated with adverse surgical outcomes, including prolonged length of stay, discharge to a long-term care facility, hospital readmission, surgical complications, and both short- and long-term mortality. Despite these findings, research on frailty in
surgical patients is infrequently found in surgical journals; in fact, according to the article, frailty appeared as a title word in a surgical journal for the first time in 2005.

As mentioned earlier in the overview, although there has been increasing recognition of the importance of frailty over recent years, there is still no consensus on the best means of diagnosing frailty and quantifying its severity. Robinson and colleagues explained that identifying the frailty phenotype is accomplished by assessing factors such as unplanned weight loss, muscle strength, walking speed, self-reported exhaustion, and diminished activity levels. An alternative set of assessments designed to define frailty is the accumulation of deficits method: this approach generates an index score that divides the number of deficits present (symptoms, diagnoses, abnormal laboratory values, and disabilities) by the number measured. A cartoon depicting these two approaches is included in the article and reproduced as Figure 2. The authors pointed out a relatively rapid frailty scale that has potential value as a preoperative assessment: the Frail Scale. This scale identifies frailty by assessing self-reported factors such as fatigue, ability to climb a flight of stairs, ability to walk one block, number of recent illnesses, and loss of weight; the assessment requires five minutes or less to perform and can identify a patient who is likely to have the frailty phenotype. The patient is questioned regarding fatigue,
resistance (ability to climb stairs), ambulation (ability to walk one block), illnesses (presence of one or more recent illnesses), and loss of weight. A more extensive assessment, such as the phenotypic frailty assessment (see previous discussion) can be applied in selected patients to provide baseline and ongoing measurements in patients receiving preoperative interventions to reduce the risk of frailty-associated complications.

Robinson and associates emphasized the importance of preoperative quantification of frailty. This knowledge can lead to modifications in the operative approach, use of preoperative preventive measures such as nutrition and physical therapy, modification of anesthetic care, and interventions to prevent delirium. Detailed descriptions of the potentially useful preoperative interventions will be presented in subsequent sections of the overview.

Surgical Outcomes in Geriatric Patients

The available literature on the risks of operative procedures frequently cites data suggesting that adverse surgical outcomes, including mortality and complications, increase with increasing age. This section of the overview will explore risk-adjusted mortality and morbidity for various types of procedures performed in elderly patients.

Hamel and coauthors presented data from a prospective cohort study conducted in Veterans Affairs (VA) medical centers in the *Journal of the American Geriatric Society*, 2005. The data were collected from records contained in the Veterans Affairs Surgical Quality Improvement Program. Data from nearly 27,000 patients were collected; all patients were >80 years and underwent noncardiac surgical procedures during the interval 1991–1999. Outcomes recorded included 30-day mortality and occurrence, within the first 30 days postoperatively of complications involving the wound, respiratory system, urinary tract, nervous system, cardiovascular system, as well as “other” complications. Data analysis showed that mortality risk was higher, overall, for patients more than 80 years compared with younger patients (8% vs. 3%).
However, many common operations, such as transurethral prostatectomy, hernia repair, knee replacement, and carotid endarterectomy, were performed with mortality risk of 2% or less. Complications were recorded in 20% of the older patient group and mortality risk was significantly higher for patients who developed a complication. The authors concluded that, overall, mortality risk was low for elderly patients and that many common operations could be performed with acceptable mortality risk.

It is not surprising that mortality risk for operations performed in octogenarians is linearly related to the physiologic impact of the operation. An article focusing on outcomes for patients undergoing major oncologic surgical procedures is by Finlayson and coauthors\(^8\) in the Journal of the American College of Surgeons, 2007. The authors retrospectively analyzed outcomes data from the National Inpatient Sample for patients 80 years or older who underwent resectional procedures for cancers of the lung, esophagus, and pancreas. Short-term mortality rates for the older cohort were compared with outcomes for younger patients (65–69 years). Long-term survival was determined by linking the original data to the Surveillance, Epidemiology, and End Results (SEER) database maintained by the Center for Medicare and Medicaid Services. During the interval 1994–2003, outcomes on nearly 273,000 patients were available. Short-term mortality was higher for the older cohort compared with younger patients (19.9% vs. 8.8% for esophagectomy, 15.5% vs. 6.7% for pancreatectomy, and 6.9% vs. 3.7% for lung resection). Patients in the older cohort had a significantly higher risk of discharge to a long-term care facility and low five-year survivals for all three cancer types (11% for pancreatectomy, 18% for esophagectomy, and 31% after lung resection). The authors noted that mortality rates observed in this population-based study were higher than those reported in single-institution cohort studies, and they attributed this to the fact that publication bias may favor reporting outcomes that are better than expected. They emphasized that their data are more likely to be reflective of “real-world” outcomes, and that these data can be used to facilitate discussions with patients during the preoperative decision-making process. The authors also stressed the importance of assessing comorbidity, frailty, cognitive status, and functional status to determine operative risk accurately, so that patients and families can make informed decisions. Future research designed to identify patient care processes leading to improved outcomes in older patients will be valuable.

Additional data on outcomes of major abdominal surgical procedures performed on nursing home residents was presented in an article by Finlayson and coauthors\(^8\) in Annals of Surgery, 2011. The authors queried two national databases to determine outcomes of operations for duodenal ulcer bleeding, cholecystectomy, appendectomy, and colectomy. Mortality as well as complications that necessitated the use of invasive interventions (ventilation, hemodynamic monitoring, feeding tube placement, tracheostomy, and vena cava filter placement) were recorded and compared with outcomes in noninstitutionalized patients. The data analysis showed that institutionalized patients had 2–3-fold increased mortality risk for the selected procedures compared with non-institutionalized, age-matched patients. Complications necessitating invasive interventions were observed in 18% of patients undergoing cholecystectomy and in more than half of patients operated on for bleeding duodenal ulcers. According to the authors, these data suggest that the decision to perform operations in institutionalized older patients should be considered carefully. The procedures chosen in this analysis included emergency as well as elective procedures. Preoperative interventions to improve risk (discussed later in the overview) would obviously be more likely in patients undergoing elective vs. emergency procedures. Also, it would be expected that comorbid conditions, dependency, and cognitive abnormalities would be more commonly encountered in the institutionalized patients. Nonetheless, the data serve to remind us that individualized assessment of risk and benefit are important. The data do not suggest that surgical interventions are contraindicated in this patient group; for each of the chosen procedures, more than half of the patients survived. Rather, considerations of less invasive approaches, such as embolization or endoscopic control of duodenal ulcer bleeding and endoscopic stenting of large bowel obstruction, are worthwhile to consider during discussions of operative risk in this patient group.

Additional data on outcomes of rectal cancer operations in institutionalized patients were presented by Finlayson and coauthors\(^9\) in Diseases of the Colon and Rectum, 2012. The authors obtained data from national datasets
that focused on nursing home patients. Patients residing in nursing homes who were older than 65 and who underwent proctectomy for rectal cancer with and without permanent colostomy were included in the analysis; the interval reviewed was 2000–2005. Data were available for 979 patients. Short-term mortality risk was 18% for patients with a permanent colostomy and 13% for patients who had intestinal continuity maintained; this difference was not statistically significant. One-year mortality was 40% for patients undergoing sphincter-sparing operations and 51% for patients with permanent colostomy; this difference was statistically significant. In patients who had sphincter-sparing procedures, fecal incontinence was observed in 37% of patients. Risk factors for incontinence were poor preoperative functional status, dementia, and renal failure. Of interest was the observation that nearly 25% of patients developed decubitus ulcers during the initial hospitalization for the index operation. The authors noted that their study is limited by virtue of the fact that patients who underwent temporary colostomy with subsequent revision were not included. Also, data on adjuvant therapy use were not analyzed. The authors cited prior data indicating that adjuvant therapy is infrequently used in institutionalized patients. The authors emphasized that these data contrast sharply with single-center studies that have shown good oncologic and functional outcomes in elderly patients.

This same group of investigators published data assessing functional status following operations for colon cancer in nursing home residents. These data were published in an article by Finlayson and coauthors in the Journal of the American Geriatrics Society, 2012. The authors retrospectively analyzed outcome data from two national datasets. Changes in functional status were determined using scores from the Minimum Data Set-Activities of Daily Living scale. Data were available for 6,822 patients. The analysis showed an average 3.9-point decline in the activities of daily living scale over the first year after surgery. One-year mortality was 53% and 24% of patients had sustained functional decline at one year after operation. Risk factors for functional decline were age >80 years, readmission after the index hospitalization, surgical complications, and diagnosed functional decline prior to surgery. The authors observed that patients with functional decline were more likely to die in the first year after operation, raising the possibility that functional decline was underestimated because patients were not available for the one-year assessment.

Preoperative cognitive dysfunction is an important factor related to functional status in elderly patients. The association of preoperative cognitive dysfunction and adverse outcomes of surgical procedures performed in elderly patients was the focus of a report by Robinson and coauthors in the Journal of the American College of Surgeons, 2012. The authors conducted a prospective cohort study involving 186 patients older than 65 who were undergoing an elective procedure that would require a postoperative intensive care unit (ICU) admission. Cognitive function was assessed with the standard Mini-Cog test, with impaired cognition defined as a score of three or less. Postoperative delirium was assessed with the Confusion Assessment Method for the ICU. Impaired preoperative cognitive status was observed in 44% of patients. After adjustment for various risk factors, preoperative impaired cognition was significantly associated with postoperative complications and mortality risk. The authors concluded that assessing cognitive status could improve risk assessments in elderly patients undergoing a major surgical procedure. The authors also emphasized that assessing impaired cognition is simple and straightforward using the Mini-Cog score: the patient is asked to remember three unrelated words (for example, apple, table, and penny); the patient is then asked to draw the face of a clock with hands positioned at 11:10. The patient receives two points if the clock drawing is correct and one point for each word they can recall. Defining impaired cognition as a score of three or less is a dependable method of diagnosing cognitive deficit. The authors also noted a definite relationship between impaired cognition and postoperative delirium; preoperative impaired cognition may well be a factor predictive of postoperative delirium. As observed in this study, postoperative delirium is associated with a significant risk of postoperative death and complications.

Data on the association of advanced age with adverse outcomes following nonemergency surgical procedures was presented in an article by Gajdos and coauthors in the Journal of the American Geriatrics Society, 2013. The authors queried data from the ACS NSQIP database. Data from 165,500 patients undergoing elective
operation from 2005 to 2008 were analyzed. Analysis showed a linear relationship between age and postoperative mortality. Overall morbidity and the rates of each individual complication were also associated with age. The authors assessed “failure to rescue,” defined as death following renal insufficiency, stroke, myocardial infarction, or respiratory complications. Failure to rescue rates were also associated with increasing age; rates ranged from 35.6% to 43.3% for each of the listed complications. The authors concluded that their data were potentially helpful in assisting surgeons in deciding on the suitability of an operation in older patients.

Older patients are also at risk for peripheral vascular disease complications; a study that assessed outcomes for lower extremity revascularization in nursing home patients is by Oresanya and coauthors in JAMA-Internal Medicine, 2015. The authors examined data from the Medicare claims data file and assessed functional status using the Minimum Data Set for Nursing Homes Activities of Daily Living summary score. Data from 10,784 patients treated between 2005 and 2009 were available. The analysis disclosed that the one-year mortality for these patients was 51%. Preoperative ambulatory status was impaired in 75%, and at one year, the proportion not ambulatory was 28%; functional decline had occurred in 32% of patients at one year postoperatively. Mortality and morbidity at one year postoperatively were significantly associated with preoperative functional state, age >80 years, congestive heart failure, renal dysfunction, and emergency surgery. The authors concluded that postoperative mortality and poor functional status are significant in this patient group and that the high rate of adverse outcomes needs to be considered in the surgical decision-making process.

Operative mortality following emergency abdominal surgical procedures was investigated in an article by Rangel and coauthors in the Journal of Trauma and Acute Care Surgery, 2015. The authors conducted a single-center retrospective analysis of outcomes following emergency procedures. Surgical conditions treated included biliary tract diseases, intestinal obstruction, incarcerated hernia, mesenteric ischemia, appendicitis, and gastrointestinal bleeding. The 30-day mortality rate in this series was 16.2%, but mortality had risen to 32.5% at one year. Risk factors for late death included multiple comorbid conditions, high ASA score (4 or higher), and evidence of malnutrition. This report was presented at a plenary session of the 2014 American Association for the Surgery of Trauma (AAST) meeting. In the discussion accompanying the article, several important points were raised that need to be addressed by future research. Some of these points included developing clinical scoring systems to determine when avoiding operation is preferable, more accurate determinations of dementia risk, and data collection methods to determine if long-term mortality is a direct result of the emergency operation or a consequence of associated chronic disease.

The articles reviewed up to this point strongly suggest that assessing operative risk in elderly patients has to depend on more than just knowledge of the patient’s age and the comorbid conditions that are present; assessing cognitive function, disability, and frailty can enhance the preoperative assessment. More accurate preoperative assessments will help determine both the suitability of the chosen surgical approach and the potential value of preoperative interventions that may improve frailty and functional status, thereby potentially improving favorable surgical outcomes. In this section of the overview, we will explore the influence of frailty on surgical outcomes and potentially provide a means of quantifying this influence.

Makary and coauthors used the Fried-Hopkins frailty scale to determine the degree of frailty present preoperatively and related these findings to surgical outcomes; their findings were published in the Journal of the American College of Surgeons, 2010. Outcomes data from 594 patients aged 65 years or older cared for at a single institution over one year (July 2005–July 2006) were collected. The data showed that patients who were frail (defined as a Fried-Hopkins score of 4 or 5) and partially frail (Fried-Hopkins score of 2 or 3) were at significantly increased risk of postoperative complications and prolonged hospital lengths of stay. Adding the frailty score to standard risk scoring systems, such as the ASA score, the Lee cardiac risk score, and the Eagle score, significantly improved the predictive capacity of these scoring systems. The authors hypothesized that frailty is an indicator of diminished physiologic reserves, and that this diminished state helps explain why certain older patients do well after operation while others within the same age group do not. The authors also emphasized that the Fried-Hopkins score can be generated in 10 minutes or
less, and that the only equipment required is a hand-held dynamometer used to assess grip strength. Makary and coauthors concluded that including a frailty assessment in the operative risk assessment process has the potential to improve outcomes in older patients.

A study that focused on discharge to a long-term care facility as an adverse surgical outcome was reported in an article by Robinson and coauthors in the Journal of the American College of Surgeons, 2011; the study design was identical to that reported in an article reviewed earlier in this overview. Patients scheduled for elective procedures followed by an ICU admission were selected. The main outcome measure was discharge to a long-term care facility. The analysis involved 223 patients with a mean age of 73. Institutional discharge occurred in 30% of patients. Institutional discharge was associated with the presence of a high burden of chronic disease (Charlson score >3), anemia, hypoalbuminemia, history of fall within the prior 6 months, and cognitive dysfunction. Risk factors for institutional discharge present after logistic regression analysis included TUG test score >15 seconds on the preoperative frailty assessment and any preexisting level of functional dependence. The authors concluded that the presence of frailty characteristics was predictive of institutional discharge.

Additional studies by this same group of investigators have related the presence of frailty characteristics to postoperative mortality and morbidity risks. The first study was reported in an article by Robinson and coauthors in Annals of Surgery, 2013. The authors performed a prospective cohort study on patients 65 or older scheduled to undergo cardiac or colorectal operations. The TUG test was completed for each of the 272 patients included. The data analysis disclosed that the TUG scores were linearly related to the postoperative complication rate. The authors observed a correlation between abnormal TUG scores and a diagnosis of dependency and cognitive dysfunction in older patients, so an abnormal score suggests potentially adverse changes in more than one frailty domain. The authors also noted that the main advantage of the TUG test is that it does not require special equipment and can be completed in a short period. This article was presented at a plenary session of the 2013 American Surgical Association meeting. In the discussion that accompanied the article, several important questions were asked: one discussant asked why this test was chosen over other tests such as slow walking speed. The author responded that the TUG test may provide additional insights into the degree of frailty because it assesses walking speed as well as lower extremity strength. During the discussion, the authors emphasized that the TUG test did not reach a sufficient accuracy as a predictor of adverse outcomes. Of note is the fact that other risk calculators have also performed poorly in older patients.

In another study, this group of investigators assessed the use of multiple frailty assessments to predict postoperative complications and reported their findings in an article by Robinson and coauthors in the American Journal of Surgery, 2013. The multiple assessments utilized included the Katz score, which measures independence in activities of daily living, the TUG test score, the Charlson comorbidity index, the Mini-Cog test of cognitive function, poor nutrition as evidenced by anemia and hypoalbuminemia, and the history of recent falls. Patients were assessed at 30 days prior to the planned operation and were characterized as nonfrail (0–1 trait present), prefrail (2–3 traits), and frail (4–7 traits). The analysis showed that patients undergoing cardiac or colorectal procedures who were deemed frail developed surgical complications in more than 50% of patients. Twenty-one percent of nonfrail patients developed at least one complication and 40% of prefrail patients developed a complication. The authors concluded that combining the frailty assessment with other risk assessments improved the ability of clinicians to fully inform patients of risks and benefits of surgical procedures.

Another article reported an assessment of the relationship of frailty to hospital and six-month health care costs in older patients undergoing colorectal procedures. The article is by Robinson and coauthors in the American Journal of Surgery, 2011. Sixty patients scheduled to undergo colorectal procedures were included. Patients determined to be prefrail or frail were at significantly higher risk for increased costs of the index hospitalization and for increased health care-related costs over the six-month interval following the operation.
Additional data supporting a relationship between frailty and adverse surgical outcomes was presented in an article by Hewitt and coauthors\(^2\) in the *American Journal of Surgery*, 2015. The authors used the Canadian Study of Health and Aging Clinical Frailty score to assess frailty in patients admitted to three surgical units. The Canadian frailty score is a seven-point assessment that is determined from observation of the patient and an abbreviated review of medical records. The score assesses fitness, clinical status of comorbid diseases, anddependency. The assessment was conducted preoperatively on 325 patients with an average age of 77.3. The analysis showed that 28% of patients were mildly, moderately, or severely frail. Increasing degrees of frailty were associated with an increased hospital length of stay and a significantly increased risk of 90-day mortality.

Farhat and coauthors\(^2\) queried the ACS NSQIP database and gathered data on outcomes of patients 60 years and older who underwent emergency general surgery operations from 2005 to 2009; the findings were reported in the *Journal of Trauma and Acute Care Surgery*, 2012. The cohort consisted of 35,334 patients. The study used a modification of the Canadian Study on Health and Aging frailty assessment. This assessment relayed data mostly on comorbid conditions, but also evaluated the cognitive function and dependency status of the included patients. The data analysis showed that increasing frailty was the most important factor associated with postoperative morbidity and mortality in this patient group. The authors stressed that detailed assessment of frailty is difficult in emergency surgery situations and this factor was the main reason they chose to use a modified frailty scoring system that emphasized the status of comorbid conditions. The addition of items that would identify cognitive decline and dependency served to select the frailest patients who are at highest risk. One potential disadvantage of this approach is that it would require access to past medical records that may not be obtainable if the patient presents to an acute care surgery facility that is not located near the patient’s home. This report was the focus of a plenary session presentation at the 2011 AAST meeting. In the discussion that accompanies the article, a primary focus topic was the importance of geriatric specialists’ participation in acute care surgical teams that care for older patients. Discussants also noted that infection is an increasingly common postoperative complication in older patients, and that future research would need to investigate new ways of predicting risk of postoperative infections.

### Perioperative Management of Geriatric Patients

The articles reviewed in this section of the overview describe approaches to perioperative care that may be particularly helpful in managing older patients with multiple comorbid conditions. The first article reviewed is by Oresanya and coauthors\(^2\) in *JAMA*, 2014. The authors conducted a systematic review of the literature relevant to the preoperative evaluation of older patients. They were able to identify 54 acceptable articles, which varied in the accuracy of operative risk prediction using various risk assessment instruments. The authors concluded that, where possible, preoperative assessments using accepted evaluation methods should be conducted to determine cognition status, ability to perform activities of daily living, and nutritional status. Medications should also be evaluated and, if need be, adjusted. After making these assessments, it is critical to have a realistic discussion of potential risks and benefits of surgery with each patient.

McGory and coauthors\(^2\) analyzed the results of an effort to develop quality indicators that could be used to determine the effectiveness of care for geriatric patients in *Annals of Surgery*, 2009. This article is supplied as a full-text reprint accompanying some formats of *SRGS*. The authors conducted a systematic review of available literature and interviewed experts in geriatric quality assessment. They utilized the RAND/UCLA appropriateness methodology and identified 96 quality indicators. After the analysis, the authors determined that 91 of the 96 indicators were appropriate to gauge the quality of geriatric surgical care. The selected criteria included evaluations of comorbid conditions, assessments of laboratory screening values,
such as hemoglobin levels, renal function assessment, and albumin level. History and physical examination, as well as reviews of medical records, were used to assess nutrition, pulmonary function, presence of diabetes mellitus, cardiac disease, tobacco use, and alcohol use; based on these findings, interventions such as smoking cessation could be selected. Additional quality indicators emphasized testing to determine the presence of abnormalities specific to elderly patients, such as cognition, nutritional problems, and dependency, as well as assessing drug use to identify medications that might affect postoperative recovery or cause potentially harmful interactions and documenting discussions held between caregivers and patients to ensure that adequate patient-centered decision processes were in place. Intraoperative indicators included careful temperature control and avoidance of razor shaving for hair removal. Postoperative indicators focused on managing comorbid conditions, goal-directed fluid therapy, and specific approaches to provide optimum care for patients with hearing impairment, visual problems, and/or who require dentures. Specific indicators targeted care of central venous catheters, bladder catheters, pain control issues, and procedures performed on an ambulatory basis in elderly patients. The authors found that nearly 30% of the included indicators were not present in quality indicator groups used for nonelderly patients.

The importance of managing multiple medications in elderly patients led to the publication of the updated *Beers Criteria for Potentially Inappropriate Medication Use* by the American Geriatrics Society in 2012. An article that provided recommendations for the effective use of these criteria was by Steinman and coauthors in the *Journal of the American Geriatrics Society*, 2015. This article is supplied as a full-text reprint accompanying some formats of *SRGS*. The article emphasized that the medications listed in the Beers Criteria document should be viewed as “potentially inappropriate,” not necessarily “actually inappropriate.” There will be situations where drugs deemed dangerous in the document are actually indicated for use in geriatric patients. The authors also stressed the need to review caveats and guidance included in the Beers Criteria document before discontinuing the use of a particular drug. The authors recommended that if a drug is identified as potentially harmful, a suitable alternative should be sought. Readers are encouraged to review all of the recommendations in this article.

Harari and coauthors described the design and effectiveness of an evidence-based comprehensive preoperative assessment program for older patients in *Age and Ageing*, 2007. The authors evaluated practices in place prior to development of the program. They found high levels of comorbidity, little evidence of preoperative multidisciplinary discussion, and multiple preventable postoperative problems that often delayed discharge. After implementing the comprehensive geriatric preoperative assessment program, there were significantly fewer instances of pneumonia or delirium in postoperative patients. The frequency of pressure ulcer development decreased and there were fewer instances of inadequate pain control, delayed mobilization, and inappropriate use of bladder catheters. Average length of stay was reduced by more than four days, and there were significantly fewer delayed discharges. The authors concluded that a multidisciplinary, evidence-based approach to the preoperative evaluation and perioperative management of older surgical patients was associated with improved outcomes and appeared to be cost effective.

A randomized trial that sought to quantify the value of a special care unit designed to improve functional outcomes in geriatric patients was described in an article by Landefeld and coauthors in the *New England Journal of Medicine*, 1995. The reported study randomly assigned 651 patients to receive either usual care or care in a specialized unit designed to improve independence, mobility, and the ability to perform activities of daily living. The endpoints analyzed were degrees of improvement in performing daily living and the proportion of patients discharged home. The data showed that 24 patients in each group died while receiving care. In the specialized unit care group, 34% of patients were either much better or better at performing daily living at the time of discharge. In the usual care group, 24% of patients were either much better or better; this difference was statistically significant. Discharge to a long-term care facility occurred in 14% of patients in the specialized unit care group, compared with 22% of patients who received usual care; this difference was also
statistically significant. The authors concluded that the specialized unit was effective in improving elderly patients’ functional status.

There is an increase in reported data supporting the effectiveness of a multidisciplinary approach in caring for geriatric patients who require a surgical procedure. An example of one such program was presented in an article by Walke and coauthors\(^2\) in the Journal of the American Geriatrics Society, 2014. The article described a program involving several surgical specialties located at a VA Medical Center in Connecticut; a physician specializing in geriatrics, an advanced practice geriatrics nurse, and a geriatrics pharmacist support this program. Under ideal circumstances, the patient is seen and evaluated by the geriatric specialty team preoperatively and is followed postoperatively by the team. The article reported data on 211 patients enrolled in the program. Preoperative evaluation was completed in 31% of patients. Of the group seen preoperatively, 62% were followed postoperatively. The data showed that patients seen preoperatively by the geriatrics specialty team were significantly more likely to be discharged home than patients seen only postoperatively. The authors concluded that co-management of geriatric surgical patients was feasible and could potentially produce improved postoperative outcomes.

This same group of investigators published an article describing a program designed to provide optimal postoperative support for geriatric surgical patients after discharge home; the article is by Tackett and coauthors\(^3\) in JAMA-Surgery, 2014. The program included a specific preoperative evaluation that assessed cognitive function and the ability to perform daily living activities. Home visits were conducted to identify potential home safety issues; home safety equipment and/or specific dementia/delirium prevention measures were provided as needed. A specific frailty assessment was also used in each patient. The data showed that 58 of 64 patients who participated fully in the program were able to be discharged home postoperatively and successfully completed recovery at home. The authors concluded that a co-management program designed to improve home recovery in geriatric surgical patients was feasible and effective.

Articles previously reviewed in this issue of SRGS have clearly documented the association of frailty, comorbid conditions, cognitive decline, and dependency with adverse outcomes following surgical procedures in older patients; however, are there useful preoperative interventions that can be used in nonurgent situations to reduce the risk of adverse outcomes? This section of the overview will review articles that address this important question by providing data on potentially useful preoperative measures.

Hulzebos and coauthors\(^4\) described a single-blind randomized trial in JAMA, 2006, that evaluated the effectiveness of an intensive inspiratory muscle-training program in patients scheduled to undergo coronary artery bypass procedures; these patients were determined to be at high risk for pulmonary complications based on a standardized risk-scoring scale. The risk scoring system awarded points for age >70 years, documented cough and expectoration, diagnosis of diabetes mellitus, tobacco use, diagnosis of COPD, and presence of obesity. Additional points were awarded for abnormal pulmonary function studies. The intervention included incentive spirometry, training in breathing cycle techniques, and forced expiration training. The preoperative training was performed daily for two weeks. A standard scoring scale was used to measure muscle strength increases and postoperative pulmonary complications. Data analysis showed that intensive preoperative inspiratory muscle training reduced postoperative pulmonary complications by nearly 50% (18% vs. 35%). This reduction was statistically significant. Hospital length of stay was reduced by one full day in the intervention group, and this reduction was also statistically significant. The authors emphasized the importance of quantifying pulmonary complication risk prior to implementing the training program; only 1.4% of patients in the low-risk group developed pulmonary complications. The reduction in complications might not have been evident if risk stratification not been done. The authors noted that their study was limited for two reasons: a single team of physical therapists performed the training, and there was a risk of Hawthorne effect since caregivers were not blinded to the intervention being performed. Nonetheless, the data suggest that preoperative muscular training is potentially valuable.

A systematic review of available literature evaluating the merits of preoperative exercise therapy on postoperative complications was presented in an article by Valkenet and coauthors\(^5\) in Clinical Rehabilitation, 2011. Eighteen
acceptable studies were identified that analyzed the effect of preoperative muscle training on postoperative complications after cardiac, abdominal, and joint replacement procedures. The results showed that pulmonary complications after cardiac or abdominal procedures were significantly reduced by preoperative muscle training. Since pulmonary complications were unusual after joint replacement therapy, there was no effect of muscle training in this group of patients. The authors recommended that muscle training be used in patients who are at high risk for pulmonary complications following cardiac or abdominal operations.

Additional data on preoperative muscle training was presented in a Cochrane Collaboration systematic review by Hulzebos and coauthors.[32] The review identified eight randomized controlled trials. The data analysis showed that preoperative muscle training was effective in reducing pulmonary complications following elective cardiac procedures. Some important outcomes, such as prolonged ventilation, pneumothorax, and operative mortality, were not affected by the intervention.

A review article by Hoogeboom and coauthors[33] presented strong evidence supporting the use of preoperative and postoperative exercise therapy to reduce pulmonary complications after cardiac surgical procedures in Current Opinion in Anesthesiology, 2014. The authors also observed circumstantial evidence that supported preoperative and postoperative exercise therapy for patients undergoing abdominal and, possibly, joint replacement procedures.

The benefits of combined preoperative interventions to improve postoperative recovery after colorectal cancer procedures were reported in an article by Li and coauthors[34] in Surgical Endoscopy, 2013. The authors used a “before and after” study design. The study group consisted of 42 patients with a mean age of 66. The intervention consisted of preoperative exercise therapy, nutritional counselling, protein supplementation, and anxiety reduction therapy. The authors used standard tests to measure two endpoints: postoperative walking distance and quality of life. The results observed in the intervention participants were compared to a group of 42 patients operated on prior to implementation of the program. The intervention significantly improved postoperative walking distance and quality of life. At one-month postoperatively, 81% of the patients in the intervention group considered themselves “recovered,” compared to 40% of the patients who did not participate in the intervention program.

Additional data supporting combined interventions to improve frailty were presented in an article by Ng and coauthors[35] in the American Journal of Medicine, 2015. The trial included 151 prefrail and frail community-dwelling elderly patients. Patients scheduled to undergo surgery were not involved in this trial, but the study did show that a combination approach including nutritional therapy, cognitive training, and exercise carried out over a six-month interval effectively reduced standard frailty scores.

Education & Training in Geriatric Care

Currently, more than one-third of general surgeries involve elderly patients, and this proportion is increasing. Recognition of the increasing proportion of elderly surgical patients has stimulated an interest in improving the education and training for surgeons who will be called upon to care for older patients. An example of one effort to provide valuable educational materials for surgeons is the Geriatric Surgery Pilot Project, developed as a joint effort of the ACS NSQIP program and the AGS. This program has produced a best practices document focusing on the preoperative evaluation of the geriatric patient[1] and was discussed in Volume 41, Number 5 of SRGS. A second best practices document[36], also developed by the Geriatric Surgery Pilot Project, will be published soon in the Journal of the American College of Surgeons and will provide guidance for surgeons relevant to the perioperative care of the geriatric patient. Readers are encouraged to watch for the publication of this new document.

A description of the Geriatric Surgery Pilot Project was provided in an article by Robinson[37] in the Bulletin of the American College of Surgeons, 2014. The author cited data supporting the need to increase surgeon knowledge of geriatric care and to gather data on processes and outcomes relevant to geriatric patients. To accomplish this, NSQIP has added specific variables to their database that
will assist in risk calculations and developing outcomes analyses. The preoperative variables include an estimate of baseline functional status, use of mobility aids, history of prior falls, and history of dementia. Additional preoperative variables include an estimate of cognitive status and determination of whether the patient was admitted from hospice care. Postoperative occurrences that will be included in the database will document pressure ulcers, delirium, and the institution of a do not resuscitate order during hospitalization, as well as estimates of fall risk at discharge, functional health status at discharge, need for a mobility aid at discharge, and discharge destination. Data on palliative consultation usage will also be gathered. With these new data points, NSQIP is positioned to provide data-driven educational and quality improvement guidance to achieve optimum care of older surgical patients.

An article that provided a description and an assessment of the impact of a dedicated geriatric surgery educational effort for surgical residents in a single academic program is by Barbas and coauthors in Gerontology and Geriatrics Education, 2014. The authors began by citing data supporting the effectiveness of dedicated geriatric educational programs during residency training. They noted that most of these programs have been organized in internal medicine and emergency medicine training programs. A significant amount of evidence supports the idea that educational efforts definitely improve a resident’s knowledge of geriatric care. Prior to the formal development of a geriatric care program for surgical residents, the residents were surveyed to assess attitudes regarding elderly patient care and to determine residents’ perception of the educational topics that would be most pertinent to the curriculum. Based on these results, the curriculum was designed and consisted of 16 sessions, with faculty serving as moderators and lecturers. The session topics included preoperative evaluation of cardiac, pulmonary, and renal function, diabetes management, reviews of the perioperative management of anticoagulation, and important postoperative events, such as myocardial infarction, pneumonia, renal failure, and cardiac arrhythmias. There were also sessions specifically dedicated to care of elderly patients in the ICU, palliative care plan development, and transition to a long-term care facility. Another survey conducted two years after the program’s implementation assessed resident and faculty perceptions of the effects of the program. Residents expressed increased levels of comfort in managing geriatric surgical patients, and noted specific gains in their abilities to manage the resources necessary to properly for older patients. In addition, faculty, surgeons, and non-surgeons observed that the multidisciplinary care of older patients had improved. The authors concluded that developing a dedicated geriatric surgery curriculum in a surgical residency program was both feasible and effective.

The American Board of Surgery has also recognized the need to improve surgeons’ geriatric care during residency. Proposed geriatric surgical care competencies that could be acquired during resident training were described in an article by Bell and coauthors in the Journal of the American College of Surgeons, 2011. This article is supplied as a full-text reprint accompanying some formats of SRGS. The authors emphasized the physiologic patterns that are commonly encountered in elderly patients, but significantly different from physiologic patterns encountered in younger patients. It was also noted that there has been relatively little specific geriatric education provided for residents, even though patients receiving specialty care in cardiac surgery, orthopedic surgery, ophthalmology, and neurosurgery are predominantly elderly. As mentioned previously, elderly patients undergo more than one-third of the general surgery operations performed in the United States, and this proportion is increasing.

Bell and colleagues made specific reference to the educational effort begun in 1995 by the AGS with sponsorship from the Robert Wood Johnson Foundation and noted that important professional societies like the ACS and the American Medical Association have endorsed this effort. As a result of a consensus development conference, differing physiologic patterns of elderly patients vs. younger patients were identified, and specific competencies were recommended in such areas as atypical presentations of diseases, medication management, assessment and management of cognitive disorders, management of nutrition, and the importance of patient counseling for informed consent as well as informed refusal. The importance of interdisciplinary care was stressed and specific competencies relevant to preoperative, intraoperative, and postoperative care were identified. Readers are encouraged
to review these competencies to help guide self-education as well as develop educational programs for trainees and practicing surgeons.

**Injury Management in Geriatric Patients**

A single article describing an effort sponsored by the AAST to characterize and chart a course for improving elderly trauma patient care is by Kozar and coauthors in the *Journal of Trauma and Acute Care Surgery*, 2015. This article is provided as a full-text reprint accompanying some formats of SRGS.

In their article, Kozar and colleagues highlighted the Presidential Address given by Dr. Robert Mackersie at the AAST’s 2013 meeting. Dr. Mackersie emphasized the importance of the increase in injured elderly patients and pointed out that relatively scant data is available to guide surgeons in planning and executing optimum care plans for these patients. In response, the AAST organized the Geriatric Trauma Committee. Kozar and colleagues presented a status report relevant to the committee’s efforts and comprehensive strategy recommendations for improving care in elderly injured patients. The committee conducted two association membership surveys. Primarily, respondents of the first survey felt that many elderly trauma patients were undertriaged, resulting in many patients who could benefit from trauma center care not having access to that care—especially care in centers where multidisciplinary teams, including geriatric specialists, were available to provide care. Most respondents also felt that an appropriate definition of an elderly injured patient who would benefit from trauma center care should include age and assessments of injury severity and comorbid disease.

In addition to triage, survey respondents felt that major areas needing attention included the development of team-based care protocols for elderly trauma patient care; they noted that such protocols had been developed to care for injured children, and that notable improvements in children’s trauma care had resulted from this approach.

Respondents observed gaps in care (and the need for protocol development and outcomes collection data efforts) in the areas of delirium management and posthospitalization rehabilitation program development. Additional areas identified by the committee included medication management and provision of optimum end-of-life care.

Efforts are ongoing by the committee to develop protocols, test these protocols, gather data on outcomes, and disseminate this knowledge through scientific publications and formal educational courses.

**Palliative Care of Surgical Patients**

Palliative care is often assumed to be a pattern of care to prepare a patient with an incurable disease for a “good death.” Hospice care, in which patients with incurable disease are treated with an aim to improve levels of comfort and quality of life as death approaches, is an important component of palliative care; however, there are other palliative approaches in which surgeons can be important participants. In this section of the overview, articles will be reviewed that deal with surgical procedures that are useful for palliation, as well as features of palliative care that surgeons can use for optimum control of symptoms and quality of life for patients with diseases that cannot be cured.

**General Aspects of Surgical Palliative Care**

A classic article describing the historical origins of palliative care and the potentially valuable role of the surgeon in caring for end-of-life patients is by Dunn and Milch in the *Journal of the American College of Surgeons*, 2001. The authors noted that in parallel with the advances in medical technology that have made it possible to prolong life for most medical conditions, the hospice movement developed a philosophy promoting relief of suffering in patients with terminal illness. The 1990 World Health...
Organization definition of palliative care focused on care of patients with malignant disease; the definition states that palliative care is “the active and total care of patients whose disease is not responsive to curative treatment. Control of pain and other distressing symptoms, and of psychological, social, and spiritual problems is paramount. The goal of palliative care is achievement of the best quality of life for patients and their families. Many aspects of palliative care are applicable earlier in the course of the illness in conjunction with anticancer treatment.” The authors noted that substitution of the word illness for anticancer would expand the perceived scope and effectiveness of palliative care. They emphasized that examinations of noncancer surgical conditions, such as severe trauma, suggest that the concept of cure, for some surgical conditions, is a hope-sustaining myth. Because of the applicability of palliative care to many surgical conditions, the authors recommended that palliative care be further defined as care that strives to maintain the integrity of the quality of life for the ill person and the family through the course of a serious or incurable illness. They further stressed that surgeons are in a unique position to contribute positively to the care of such patients. Failure to recognize the need for and benefits of palliative care can lead to lost opportunities for relief of suffering and personal growth of the patient and the surgeon.

The focus of surgical care has traditionally been to provide a safe procedure with low mortality and morbidity rates. The emergence of palliative care as an important component of surgical practice has led to an increased awareness of the vital part that palliative care plays in a patient-centered surgical practice—but gaps remain. An article that examined the frequency of palliative care plans in surgical patients cared for within the VA Health System is by Olmsted and coauthors in JAMA-Surgery, 2014. The authors used available VA databases and found adequate data on more than 191,000 patients cared for between 2008 and 2012, and who died during hospitalization. Patients were deemed to be “surgical” if they had undergone a surgical procedure within the year prior to death. This definition identified more than 42,000 patients. Endpoints were receipt of palliative or hospice care and the time from admission to implementation of palliative or hospice care. Compared with nonsurgical patients, surgical patients were significantly less likely to receive palliative or hospice care. Of interest was the observation that patients receiving palliative or hospice care had longer survival durations compared with nonsurgical patients or surgical patients who did not receive palliative or hospice care. The authors concluded that palliative care was not adequately utilized and that increasing its utilization would possibly lead to improved outcomes.

Several of the fundamental principles of palliative care were outlined in an article by Krouse and coauthors in the Journal of the American College of Surgeons, 2004; this article provides a statement of the principles of palliative care as proposed by the Surgical Palliative Care Task Force of the ACS. The authors described three important aspects of palliative care: “Active palliation” is defined as investigations and treatments that modify, but do not cure, the disease, including diagnostic procedures, operations, and medical therapy; “Comfort palliation” seeks to use noninvasive interventions to relieve distressing symptoms, and can include psychologic support, spiritual support, relaxation therapy, or grief counseling; “Urgent palliation” is used when symptoms suddenly go out of control. In this setting, large doses of opioids and sedatives may be necessary. When urgent symptom control is needed, the concept of “double effect” is applicable—this concept acknowledges that the process of symptom relief may require dosages that can theoretically hasten death. Recognition of the “double effect” permits relief of symptoms without the potential for assigning the action as “euthanasia.”

Surgeons and other caregivers are continually striving to provide processes of care that are supported by available evidence. An article describing a systematic review of the literature relevant to palliative care interventions in critically ill patients is by Aslakson and coauthors in the Journal of Palliative Medicine, 2014. The authors were able to identify 37 articles of acceptable quality that evaluated palliative care intervention applied in the ICU. A total of 30 interventions were analyzed. The analysis showed that consistent provision of palliative care consultation services resulted in shorter lengths of stay in the ICU and in the hospital, but the data were of low quality due to heterogeneity. Integrative approaches to palliative care (inclusion of palliative care resources within the ICU team) were less effective at reducing length of
stay. Neither approach had a significant effect on patient or family member satisfaction. The authors emphasized that caregiver belief that palliative care consultation will lead to early patient death and represents “giving up” is a significant barrier to providing consistent palliative care and producing high quality data relevant to the effectiveness of palliative care in the ICU.

A review article that describes the elements and conduct of effective palliative care is by Kelley and Morrison in the New England Journal of Medicine, 2015. This article is supplied as a full-text reprint accompanying some formats of SRGS. The authors opened their review by pointing out the differences between palliative care and hospice care. Palliative care is a multidisciplinary effort to improve quality of life for patients of any age and their family members during the experience of a serious illness. This system of care strives to effectively manage symptoms such as pain and nausea and to provide effective communication of options and potential outcomes. Provision of emotional and spiritual support for the patient and family are important components of palliative care. Hospice care, by contrast, uses similar sets of interventions to improve quality of life for patients with incurable illnesses that will soon have a fatal outcome. The authors noted that hospice care is tightly regulated by government and nongovernment insurance entities—patients qualify for hospice care only if they have an expected survival of six months or less. Hospice care also differs from palliative care in that most hospice care is delivered in the patient’s home or in a long-term care facility, while palliative care is most commonly delivered in hospitals and clinics, as well as long-term care facilities. Kelley and Morrison listed the primary domains of palliative care. These include using a multidisciplinary team approach, achieving adequate symptom control, attention to emotional and psychological aspects of care as well as spiritual concerns, careful attention to patient goals and preferences, being conscious of important cultural aspects of care, and providing hospice care as soon as there is evidence that death is imminent. The authors also provided clear descriptions of the elements of effective palliative care in various locations, and readers are encouraged to review this material.

The authors concluded their article by noting key gaps in medical knowledge about the optimum structure of palliative care, as well as a lack of evidence that strongly supports its effectiveness. They emphasized the need for additional research funding to conduct essential, high-quality studies. Educational needs are important also; a common misconception among physicians is that palliative care is only used at the end of life. Kelley and Morrison added that this education is particularly important because there is increasing recognition of the potential value of palliative care among patients and families, with the majority of patients responding to surveys with positive perceptions of palliative care and statements that they would want this type of care for themselves and for loved ones.

A systematic review of the literature on available advance care planning decision aids that could be used by surgeons to help improve perioperative decisions is by Aslakson and coauthors in the Journal of Comparative Effectiveness Research, 2015. The authors identified 39 eligible articles. Research was primarily performed in ambulatory centers. None of the studies focused on surgical patients, but the authors felt there was a high likelihood that the results of the studies were generalizable to surgical patients. Formats of the decision aids included video, web-based, and paper-based presentations. The offerings described the medical problem being treated (for example dementia, COPD, end-stage renal disease) and provided education designed to help patients and families understand the condition and the means available to provide treatments that could improve quality of life. There were no head-to-head comparisons of the various formats. The authors noted that it is likely that the decision aid formats would need to be adapted to the environments where the information was being presented and to the characteristics of targeted patient groups. The authors recommended that surgical decision aids include descriptions of medical interventions that might be necessary postoperatively, especially in the ICU, so that patient preferences could be assessed and adequately discussed in order to develop a coherent care plan.

A second review article that focused on in-hospital interventions that can be used to relieve common distressing symptoms encountered in patients with advanced
nonsurvivable conditions is by Blinderman and Billings in the New England Journal of Medicine, 2015. The article provides clear descriptions of both useful and potentially harmful interventions along with current guidelines. Readers are encouraged to review this material.

An article by Nabozny and coauthors in Annals of Surgery, 2015 assessed attitudes of elderly adults and surgeons concerning effective methods for making high-stakes decisions. The authors showed a video presentation to focus groups of elderly adults and surgeons that depicted a process of decision-making for a patient considering a major surgical procedure. Responses from both focus groups were evaluated using standard analytic methods. The authors stated that research leading to an optimum decision process for surgical procedures performed in elderly patients is important because available data indicate that 25% of Medicare beneficiaries will undergo a surgical procedure during the last year of life. In addition, a clear understanding of potential outcomes is critical because a significant proportion of older patients suffer complications, resulting in prolonged ICU and hospital stays. Quality of life after discharge from the hospital is often adversely affected by these complications. Understanding the potential trajectories of recovery will potentially assist patients in making decisions about care. The authors added that most preoperative discussions between patients and surgeons are framed in the context of informed consent, which has been shown to perform poorly as a decision aid.

The responses to the questions posed after the focus groups viewed the video presentation were interesting. Elderly adults consistently indicated that an independent and high quality-of-life existence was their highest priority; however, when confronted with the decision to choose a surgical procedure or palliative care, the decision became a choice between life or death or a choice of how to die. This group felt strongly that it was necessary to choose life over death and thus would choose to have the surgical procedure. They often felt that choosing palliative care was to choose death over life and saw this avenue as a betrayal of family and religious beliefs. They often thought that it was “better to die trying.” Surgeons, by contrast, highly valued quality of life and felt that they would not offer an operation that they felt would result in prolonged disability and poor quality of life. The authors noted that surgeons need to be aware of the frequent presumption by patients that death would occur in the operating room while under anesthesia. An important component of patient education needs to include education that death after a high-risk procedure more frequently occurs after a prolonged, painful, and debilitating ICU or hospital stay. In a significant number of patients, death occurs after a significant interval of poor quality of life following discharge. These facts need to be conveyed to the patient and family in a clear but compassionate manner. To help the patient understand these facts, surgeons can use the services of palliative care specialists, ethicists, chaplains, and other resources. Aligning personal preferences with treatment decisions is very difficult in acute settings where rapid decisions were necessary. The authors recommended that surgeons use all available resources and prepare themselves for these discussions so that improved care decisions can be made.

The palliative care triangle approach to surgical care decision-making is a potentially valuable means of aligning patient and family perceptions, values, and preferences with realistic expectations of surgical outcomes. A research study assessing outcomes of care of patients undergoing palliative operations for advanced cancer was reported by Miner and coauthors in Archives of Surgery, 2011. The authors noted that the palliative care triangle method was originally used to explain high levels of patient and family satisfaction with palliative surgical procedures despite poor traditional outcomes. The triangle method was also used to clarify decision processes used by experienced surgeons to select patients for palliative surgical procedures. The triangle dynamics provide a means to understand patient complaints, values, and emotional support, while conversations are undertaken to describe potential benefits and risks of a surgical procedure. Published outcomes data help the patient and family understand potential trajectories of recovery and the chances for improved quality of life. The conversations used during the triangle interactions actively seek to identify and dispel unrealistic understandings and expectations potentially harbored by patients, family members, and surgeons. In this study, decision-making conversations were held on one or two occasions and involved surgeons, patients, and
family members. Surgeons confirmed that the triangle methodology had been used prior to patient inclusion in the study. Compared to patients treated without use of the triangle methodology, the study patients showed higher rates of symptom resolution (91%) and fewer postoperative complications. Overall survival improved in study patients, compared to patients treated without use of the palliative triangle method. The authors concluded that the palliative care triangle method was useful and associated with improved patient decision-making and surgical outcomes. The authors reported that they had introduced formal educational programs to provide palliative care triangle training for residents and attending surgeons in their institution.

The Concept of Futility

Surgeons face situations where no therapeutic intervention has a realistic chance of success for a particular patient. Another type of futility challenge emerges when a patient or a family member requests a treatment or intervention that has no realistic chance of benefitting the patient. An article that described an effort by the Critical Care Committee of the AAST to determine surgeons’ perceptions of and attitudes relevant to the concept of futility is by Maerz and coauthors in the Journal of Trauma and Acute Care Surgery, 2015. The article reviews material presented at the 2014 AAST meeting. The authors opened the article with a consideration of the medical definitions of futility: futile interventions were those deemed unlikely to produce any significant patient benefit. However, the determination of futility involves a single patient at a single point in time and, therefore, the above definition cannot be applied globally. The authors also noted that futility means different things to different people. For this reason, perceptions of futility are likely to differ significantly when attitudes of surgeons, patients, and family members are considered.

This understanding of the difficulty in pinpointing a global definition of futility has led some scholars to recommend that futility not be used as a medical term. An essay on this topic was presented by Nair-Collins in the Journal of Medical Philosophy, 2015. The author pointed out that the concept of futility has been used to justify unilateral decisions by health care providers to withhold treatments and/or information about treatments from patients. In the author’s opinion, which he supported with information from several other publications, this practice breaches the ethical contract that a physician has with a patient in that it denies the patient’s right to autonomy. The author argued that since the health care professional is the only source of life-sustaining interventions in society, and since, in large measure, they gained access to those means to sustain life because of resources provided by that society, they are bound to the ethical treatment of their patients. Nair-Collins went on to contend that decisions regarding futility need to be made with consideration of the overlapping consensus of patient goals, family member attitudes, and the moral values of society. Consideration of all of these factors led Nair-Collins to conclude that it is appropriate for health care professionals to make judgements about futility, but if an intractable disagreement between the caregiver and the patient/family develops, the wishes of the patient/family should probably determine the decision to use or refuse an intervention. This opinion provides strong support for the use of clear and compassionate discussions between multiple caregivers and patients/families regarding intervention choices. These discussions are critical components of palliative care planning and can help avoid disputes about futility.

Maerz and coauthors emphasized the importance of differentiating between the effect of a treatment and the benefit of a treatment. They noted that the effect of a treatment was limited to the part of the body where the treatment was applied, while benefit applied to the patient as a whole. A unique challenge for the trauma/acute care surgeon is that decisions regarding futility frequently need to be made in situations when the patient is unable to state their preferences. Developing an effective approach to the family or surrogates in this setting is crucial to success.

Maerz and colleagues next discussed results of a survey they conducted. Ninety-four percent of survey respondents felt that futility could be determined. Cited parameters included presence of severe neurologic disability, severe comorbid conditions, and acute organ failure. The survey results showed that most respondents had encountered one to five instances of futility within the previous year. Discussion regarding do not resuscitate orders was employed within the first 24 hours after ICU
admission by 62% of respondents. Of concern was the fact that slightly more than half of the respondents indicated that palliative care consultations were not usually implemented unless the patient or family requested the consultation, the prospect of imminent death was recognized, or when disagreement regarding goals of care was anticipated. The decision by the patient/family to institute comfort measures only was another reason for consultation.

One important setting where strategies to manage futility emerge is when potentially inappropriate treatments are requested. A policy statement from a group of professional organizations regarding this problem in critical care units was published by Bosslet and coauthors in the *American Journal of Respiratory and Critical Care Medicine*, 2015. This article is provided as a full-text reprint accompanying some formats of *SRGS*. The first recommendation in this statement was that health care institutions should design and implement strategies to prevent intractable disputes regarding use of treatments or interventions. Additional recommendations were that the term “potentially inappropriate” be used to describe the treatment or intervention in question—and that this term be used instead of “futility.” Early involvement of expert consultants was also recommended for situations where an inappropriate care dispute was anticipated. The statement advised clinicians to explain and advocate with patients/families to promote the use of appropriate treatments and interventions, and stressed that intractable disputes should be managed by a fair process designed and implemented by the health care institution. The final recommendation was for the medical profession as a whole to lead public engagement efforts and advocate for policies and legislation defining inappropriate interventions, as well as processes to prevent their usage.

**Palliative Care of Cancer Patients**

Surgical procedures are often indicated for relief of symptoms and improvement of quality of life in patients with incurable cancer. In this section of the overview, we will review articles relevant to this topic. A discussion on managing malignant colon obstruction was presented in Volume 41, Number 5 of *SRGS*, and readers are encouraged to review this content.

One cause of intestinal obstruction in patients with cancer is peritoneal carcinomatosis. An article presenting data on the use of palliative surgical procedures for this condition is by Paul Olson and coauthors in *JAMA-Surgery*, 2014. The authors conducted a systematic review of available literature. Article quality was determined using a standard systematic review scoring system; this review identified 108 articles that met acceptable quality standards. Articles were published between 1977 and 2008. Data analysis showed that outcomes varied significantly. Symptom improvement with resumption of diet and improved quality of life with discharge home occurred in 32%–87% of patients. Mortality was significant and varied from 6% to 32%; re-obstruction occurred in 6%–47% of patients. Readmission to hospital was observed in up to 44% of patients and reoperation was necessary in 2%–15% of patients. Overall survival was less than one year in most patients; readmission to hospital consumed a significant portion of patients’ remaining lives. The authors acknowledged that a significant limitation of their study was that the data sources were spread over more than three decades. Improvements in medical and surgical therapies for peritoneal carcinomatosis occurred over this interval, and much of the variability in outcomes could be due to changing approaches. For example, the authors cited data supporting equivalent success rates in ameliorating symptoms of bowel obstruction in patients with peritoneal carcinomatosis using nonoperative approaches. These data began to emerge around the midpoint of their review interval. Despite this limitation, the authors concluded that surgical procedures to relieve intestinal obstruction are feasible and often successful in this patient group, but at the cost of significant mortality and morbidity risks.

Surgical resection to achieve local-regional control of malignancy is occasionally necessary, especially for skin, soft tissue, or breast malignancies with necrosis or ulceration. An article that described a single-institution retrospective experience was by Blakely and coauthors in *Annals of Palliative Medicine*, 2015. Experience with 31 resections to achieve local-regional control was reported; most patients had soft tissue (sarcoma, melanoma, squamous cell) or breast tumors. Resections of tumors of the trunk were performed in more than half of the patients and the remaining procedures were for extremity or head
An article by May and coauthors in the Journal of Clinical Oncology, 2015 examined the effectiveness of palliative care team consultation on outcomes of care in patients with advanced cancer. This was a prospective observational study involving 969 patients with a diagnosis of advanced cancer admitted to five hospitals over the course of four years. Palliative care consultation was done in 256 patients and the remainder had customary care. The patients who had palliative care consultation had cost data gathered, and costs were stratified by time of initial consultation. The data analysis showed that earlier palliative care consultation was associated with cost savings of more than $1000.00/admission; consultations achieved within two days of admission led to cost savings of more than $2000.00 per admission. The cost savings were due to reduced overall length of stay and a reduced number of in-hospital tests and procedures. The authors cited additional data that have shown improved survival and quality of life in patients with advanced cancer who received formal palliative care team consultation. This study’s conclusion was that early palliative care consultation was valuable for patients with advanced cancer.

Spinal cord compression due to metastatic malignancy is a serious and potentially very disabling complication of advanced malignant disease; a Cochrane Collaboration systematic review of the literature on this topic is by George and coauthors in the Cochrane Library, 2015. The authors noted that interventions for spinal cord compression due to metastatic cancer include single-dose radiation therapy, multiple dose radiation therapy, surgical decompression (with or without radiation), and corticosteroid therapy. This systematic review updated a previous publication. The current review added data from seven prospective randomized trials. The data analysis showed that patients with stable spines and expected survival of less than six months benefit as much from one dose of radiation therapy (8 Gy) as from multiple doses. Data on controlling local tumor recurrence are not of sufficient quality to determine the comparative effect of one vs. multiple doses of radiation for this condition. For this patient group, laminectomy followed by radiation therapy offered no advantage over radiation alone. Laminectomy was most valuable in patients younger than 65 years who were ambulatory, had one area of compression, and/or

and neck tumor sites. The most common indications for operation were pain and bleeding. Symptom recurrence during follow-up (minimum 60 days) occurred in 16% of patients. Short-term mortality was 3.2% and morbidity (wound complications, pneumonia) occurred in 29% of patients. The authors concluded that resection for local-regional control was feasible and effective. Careful patient selection was an important feature of their approach; most of the severe disabling complications occurred in patients requiring complex wound reconstruction, and the authors emphasized that complications can be avoided by selecting patients at low risk for wound complications.

Emergency operations for intestinal obstruction or perforation are sometimes required in patients with advanced, incurable malignancies. An article reviewing national experience with this problem is by Cauley and co-authors in the Journal of Trauma and Acute Care Surgery, 2015. The authors reviewed data from the ACS NSQIP database and reported outcomes on 875 patients who underwent operations for intestinal perforation or obstruction from 2005 to 2012. Operations for perforation were performed in 499 patients and procedures for obstruction were performed in 376 patients. In patients operated for perforation, 30-day mortality was 34%; complications occurred in 67% of patients and more than half of the patients were discharged to a long-term care facility. Risk factors for mortality after adjustment of risk using linear regression included renal failure, sepsis, and preoperative dependent status. Patients operated for obstruction had a 30-day mortality risk of 18% and complications were observed in 43% of patients. Discharge to a long-term care facility occurred in 60% of patients. Risk factors for mortality in this group were respiratory and cardiac complications postoperatively. The authors noted that only 4% of patients had living wills or do not resuscitate orders; this observation suggests that improved communication with patients and families, including use of palliative care teams to clearly outline prospects for recovery and quality of life improvement, would be useful in caring for these patients. The authors also noted that measures to prevent respiratory and cardiac complications in patients with intestinal obstruction would potentially be helpful in improving outcomes in this patient group.
were paralyzed for less than 48 hours. Data were not strong enough to support a recommendation for or against corticosteroid therapy.

Cordeiro and coauthors\(^{58}\) attempted to determine risk factors predictive of outcome for malignant ureteral obstruction treated with urinary diversion. The article was published in the *British Journal of Urology-International*, 2014. The authors prospectively collected clinical and laboratory data on 208 patients who underwent urinary diversion with either ureteral stenting or percutaneous nephrostomy over a two-year interval in a single institution. The study cohort included 208 patients. Over the course of the study interval, 164 patients died. Death during the initial hospitalization occurred in 21% of patients. Survival was equivalent for both methods of urinary diversion. Risk factors for mortality were more than four events related to malignancy (foci of metastatic disease, ascites, pleural effusion) and decreased functional status as evidenced by an Eastern Cooperative Oncology Group (ECOG) score of >2. A mortality prediction scoring system was developed. Favorable patients were defined as patients with no predictive factors, intermediate risk patients had one risk factor, and unfavorable patients had two risk factors. One-year survival in the favorable group was 44% and one-year survival in the intermediate and unfavorable groups was 15.5% and 7.1%, respectively. The authors noted that one-month survival was more than 90% in the favorable group. The authors argued that their risk scoring system may help caregivers counsel patients regarding outcomes of treatment, and emphasized that the diversion failure rate is higher with ureteral stenting that with percutaneous nephrostomy. Successful diversion seems to improve quality of life for patients even if short- and medium-term survival is low.

**Palliative Care of Trauma Patients**

Palliative and end-of-life care have not been an integral part of trauma care in large measure because of the mindset of most trauma-care surgeons: rapid diagnosis, resuscitation, and curative treatment. The single article reviewed in this section of the overview provides perspective on the value of palliative care for injured patients. The article is by Cocanour\(^{59}\) in the *Journal of Trauma and Acute Care Surgery*, 2015, and is a rendition of Cocanour’s Presidential Address to the 2015 annual meeting of the Western Trauma Association.

Cocanour acknowledged that despite the best efforts of trauma care providers, more than 10% of injured patients die. The main risk factors for mortality are advanced age and high-injury severity scores. A large proportion of end-of-life decision-making for these patients is the responsibility of family members or surrogate representatives because many patients are not conscious and cannot participate in the decision-making process. These facts are the basis of the main challenges faced by family members and health care professionals seeking to provide the best quality-of-life and survival outcomes. Often, conflicts occur because different family members have different care goals. Many family members of critically injured patients will even exhibit symptoms of post-traumatic stress disorder, and this contributes to the challenges faced by them and by caregivers. Additional challenges arise because of the increasing number of elderly patients who are victims of injury. The burden of comorbid disease, cognitive decline, malnutrition, and dependency makes caring for these patients complex and difficult. Cocanour related personal experiences that have aided her in concluding that end-of-life care is an important component of trauma care: in one important instance involving a woman known to the author, a member of her family sustained a severe cervical spinal cord injury; in advance of this injury, this family member had prepared an advance directive. Cocanour revealed that the family member had expected to have difficulty convincing caregivers that this advance directive was an indicator that the patient would not want to live dependent on a ventilator and unable to ambulate. Instead, when the trauma care team agreed with the directive and extubated the patient (who was able to communicate his farewell to his family members), there was clear satisfaction among family members and a sense of true progress in care maturation among the trauma team members. Cocanour cited data supporting the use of an early, multidisciplinary clinical intervention that can be applied to all patients admitted to an ICU. This six-step program consists of early psychosocial support for the patient and the family, an interdisciplinary palliative care assessment within 24 hours of admission, a family meeting with caregivers within 72 hours of ad-
mission, development of a comprehensive palliative care plan, implementation of a palliative care standing order for patients with incurable illness when death is imminent, and incorporation of palliative care quality measures into ICU quality improvement plans.

As emphasized previously in this overview, a key element in successful palliative care is adequate communication among caregivers and between caregivers, patients, and families. There are many barriers to effective communications. For caregivers, these include time constraints, inadequate education of surgeons and other caregivers, and a belief that patients and families do not want to discuss the possibility of death. Important patient variables affect communication as well: these include ethnicity, religious issues, cultural characteristics, availability of family support, and functional status. Cocanour noted that diagrams may be particularly helpful when discussing options with patients; this finding was also explored in our review of the article by Zipkin and coauthors in Volume 41, Number 5 of SRGS.

The approach chosen by caregivers in conversations with patients/family members regarding palliative care interventions is important as well. In a recent opinion piece, Obendorfer and coauthors suggest that the focus of the exchange may be most supportive of patients and families if the discussion is framed around “what should be done” rather than “what can be done.”

Cocanour concluded her article by encouraging trauma care specialists to recognize the need for end-of-life and palliative care in trauma surgical practice. She urged trauma surgeons to educate themselves in communications skills and to include such education in their teaching programs. A renewed effort to recognize and promote shared decision-making was another point she stressed. Inclusion of these activities and skills will serve to improve the outcomes separate from simple rates of mortality and morbidity that are also important to surgeons and patients.

**Palliative Care of Transplant Patients**

It is inevitable that patients requiring organ transplants will wait until a donor and an organ become available. For patients needing a kidney transplant, dialysis provides a means of preserving quality of life until the transplant can occur. Adequate support devices are not universally useful for patients requiring heart, lung, and liver transplants. The basic disease process will often progress while the patient is awaiting transplantation and many patients will succumb to their underlying disease while awaiting transplantation. These facts suggest that incorporation of palliative care plans into the care of these patients would be beneficial. A systematic review of the literature that sought to identify potential effective palliative care measures for heart transplant patients is by Myhandirange and coauthors in *Current Opinion in Supportive Patient Care, 2015*. Key findings of this analysis were that there was insufficient incorporation of palliative care plans in the routine management of patients awaiting cardiac transplantation. Early incorporation of team-based palliative care was found to have significant benefit for patients with heart failure. As noted in other sections of the overview, improvement in educational efforts to achieve optimum communication between caregivers, patients, and families is essential. Palliation of symptoms such as pain, dyspnea, cognitive decline, depression, and malnutrition are critical to the overall success of transplant patient care and need to be included, even in patients who may have shorter organ wait times.

Fowler and coauthors in *Pediatric Transplantation, 2015* focused on the development of team-based palliative care programs for pediatric transplant patients. The authors noted important gaps in current approaches to palliative care planning in pediatric transplantation programs. For example, there was little knowledge of the optimum timing for beginning palliative care. The authors also revealed that, often, palliative care interventions were only implemented very near the time of death and, because of this, those interventions were often ineffective. The authors recommended that palliative care team involvement begin before clinical deterioration of the patient. Implementation of palliative care team consultation as part of the process prior to listing the patient as a transplant candidate also has potential value. Lastly, the authors stressed the importance of providing emotional support to both the transplant team members and the members of the palliative care team during the difficult discussions that are necessary for palliative care efforts to be successful.
Outcomes of Palliative Care in Surgical Patients

For patients who need palliative and end-of-life care, typical outcome measures used in surgical care research, including short- and long-term mortality and morbidity, have limited application. In this section, we will review articles that focus on appropriate outcome measures for palliative care and contributions that have begun to document the value of palliative care interventions in surgical patients.

Badgwell and coauthors performed a prospective analysis of outcomes for intestinal obstruction management in patients with advanced cancer in the *Journal of Palliative Medicine*, 2014. Fifty-three patients were enrolled. Patients reported measures of quality of life and treatment satisfaction using standard assessment surveys, but these could not be evaluated because only a few patients (36%) were able to complete the surveys (probably because of illness severity); however, objective clinical outcomes measures were obtained in all 53 patients enrolled in the study. The study group was nearly equally divided among patients with gastric outlet obstruction, patients with small intestinal obstruction, and patients with colon obstruction. Mortality at 30 days after discharge was 34%. Symptom improvement was documented in 77% of patients and 75% of patients were able to tolerate a normal diet at the time of discharge. Discharge to home was achieved in 85% of patients. Clinical associations of interest included the observation that symptom improvement was more common in colon obstruction. This is possibly because single points of obstruction are common and endoscopic stenting can be used to achieve symptom improvement. Noncolorectal cancer diagnosis negatively influenced patient quality of life, as assessed using the “30 good days” criterion. Ability to tolerate a diet was associated with performance status (evaluated by the ECOG scale); patients with no recent history of chemotherapy were more often able to tolerate a diet. The authors concluded that these outcome measures were relatively easy to obtain and had potential value for palliative care research.

An opinion piece on the use of patient-centered outcomes measures for the evaluation of palliative care interventions is by Schwarze and coauthors in *JAMA-Surgery*, 2014. The authors stated that public reporting requirements that include 30-day mortality rates have encouraged health care systems to focus on these outcome measures. This metric fails to account for patients who might choose a high-mortality risk procedure for a chance at improved quality of life; it also penalizes patients who may choose death over a prolonged painful recovery. The authors cited alternative measures that are available, such as prolonged ICU stay and prolonged ventilation; however, these data are not captured routinely in health care systems. Patient-reported outcomes such as pain level and ability to eat a normal diet can also be useful in evaluating quality of care, but likewise, are not routinely recorded. The authors recommended the development of outcomes lists that include items that are important to the patient, such as pain level, presence of nausea, and whether the goals agreed upon at a preoperative family conference were achieved. Schwarze and coauthors argued that this set of outcome measures is important because patients sometimes proceed with surgery because they are not fully aware of alternatives. For these reasons, including outcomes that are valuable to patients and, for palliative care, outcomes that focus on processes of care, have great potential to help determine quality of care and identify pathways for quality improvement.

An important outcome of palliative care is symptom improvement. Badgwell and coauthors evaluated this outcome in a group of patients with advanced cancer managed with palliative care consultation; this article was published in the *Journal of Surgical Oncology*, 2013. The authors conducted a retrospective review of medical records to determine outcomes in 202 patients seen over a three-year interval in a single institution. All patients had advanced cancer and the acute problems requiring management included intestinal obstruction, gastrointestinal bleeding, intraabdominal inflammatory problems, and wound complications. Symptom improvement occurred in at least 60% of patients, regardless of treatment approach, after palliative care consultation. The largest proportion of patients experienced symptom improvement when surgical procedures specifically designed to remedy the most distressing symptoms could be done successfully. The authors noted that symptom recurrence was observed in 25% of patients and new symptoms requiring additional...
management occurred in 29% of patients. The authors cited additional studies indicating the effectiveness of palliative care plans combined with selected surgical procedures to obtain symptom improvement, and several reports showed frequencies of symptom improvement exceeding 90%. The authors emphasized the importance of careful patient selection in these trials and stressed that careful selection of candidates was closely associated with superior outcomes. The authors concluded that palliative care consultation and nonoperative or operative management resulted in symptom improvement in the majority of patients, but that additional prospective randomized trials are necessary to determine which processes of care are associated with the best outcomes.

Another important outcome of palliative care is family satisfaction. An article by Sadler and coauthors in *PLOS-One*, 2014 pointed out that the families of patients receiving end-of-life care in a hospital, with death occurring prior to discharge, are rarely included in patient satisfaction surveys. In order to obtain data on levels of satisfaction, the authors conducted a mail survey using a standard survey instrument designed to assess patient and family satisfaction. The survey was mailed to 275 valid addresses and the survey response rate was 33%. Of the responses, 67.4% were very satisfied or satisfied with end-of-life care. Interestingly, 70% of respondents felt that the patient did not die in their preferred location, and that they would have been more satisfied if the patient had been cared for at home or in a regular hospital room, instead of in the ICU. Family members who felt the patient died in a preferred location were nearly twice as likely to be satisfied with care, compared to family members who felt the patient did not die in a preferred location. Factors identified for quality improvement included communication effectiveness, shared decision-making, and symptom management.

The importance of effective communication has been emphasized repeatedly in articles relevant to palliative care. Fawole and coauthors presented a systematic review of a quality improvement initiative in the *Journal of General Internal Medicine*, 2013; this article focused on communication during care of patients with advanced illness. This article is provided as a full-text reprint accompanying some formats of SRGS. The authors identified 20 studies of sufficient quality for inclusion in the systematic review. The most effective quality improvement initiatives were those that focused on regular family meetings, designated palliative care teams, and ethics consultations. The authors concluded that specific quality improvement activities geared towards improving communication and providing consultation services were very likely to improve patient and family satisfaction and use of health care resources.

One situation where effective communication is likely to improve patient-surgeon relationships and engender trust is when unexpected postoperative complications occur. An article that presented data on this topic is by Regenbogen and coauthors in *Surgery*, 2014. Using data from the SEER database for a single state and a single metropolitan area, the authors identified patients who had undergone surgical procedures for colorectal cancer. A mail survey was sent to identified patients. Over a 14-month interval, more than 1,200 patients were identified and surveyed. The response rate was 54%. Of this group, 25% experienced procedure complications. Overall, significantly fewer patients with complications expressed a high level of trust in their surgeon. When effective communication was documented, however, trust was reduced in only 4% of respondents. If communication was deemed poor, trust was reduced in 50% of respondents. The authors concluded that their data supported the importance of effective communication as a means of engendering trust in the surgeon-patient relationship.

As mentioned earlier, we reviewed an article by Zipkin and coauthors in *Volume 41, Number 5 of SRGS* that provided data supporting the use of diagrams in physician-patient conversations about treatment risks. The data confirmed improved communication levels and improved patient understanding when diagrams are used. Data from a study of the use of diagrams during conversations about difficult surgical decisions were presented in an article by Kruser and coauthors in the *Journal of the American Geriatrics Society*, 2015. Interviews were conducted with elderly adults as well as with surgeons from academic and private practice. The diagram tool was evaluated using standard decision-aid scales. Thirty-seven elderly adults and 17 surgeons participated. The tool evaluated was the “best case-worst case” diagram. This diagram uses two vertical bars to represent two treatment
options. A star at the upper end of the bar represents the best-case outcome and a dark square at the bottom of the vertical bar represents the worst-case outcome. The length of the bar represents the range of outcomes and the surgeon draws an oval on the bar at the point where they believe the most likely outcome is located. The events the patient may experience that characterize the most likely outcomes are described with attention to clear communication. An example of the diagram is included as an illustration in the article and this illustration is reproduced as Figure 3. Overall, the study participants approved of the diagrammatic approach, and felt it established a clear choice, presented appropriate context, and encouraged deliberation. The elderly adults provided some critiques of the diagram, and the most common concern of this group was that the technical features of the operation were not described in sufficient detail; surgeons agreed that there was a significant risk of omitting important details that would contribute to more informed decision-making. The authors concluded that the best case–worst case scenario had potential value as a means to improve communication and provide decision support for surgeons and patients trying to arrive at a satisfactory solution for a difficult clinical problem.

The final article reviewed in this section of the overview described a randomized controlled trial comparing a structured preoperative conversation regarding the surgical procedure, anticipated positive and negative outcomes, and use of decision support with usual care. Conversations were conducted during the patients’ visits to the preoperative evaluation and testing center of a single tertiary care academic center. The data were presented in an article by Cooper and coauthors in the Journal of Palliative Medicine, 2014. Seventy-nine eligible patients were identified, but only 13 completed the protocol, with eight randomized to the structured conversation. The most common reason for declining to participate was lack of time. Seven out of eight patients reported that the conversation was useful in preparing them for the postoperative recovery. Of family members, 6 out of 8 felt the conversation was helpful in preparing them to be a more effective surrogate. The authors concluded that the structured conversation had potential value for the preoperative preparation of patients. They also stressed that the perception of time limitations needed to be dealt with to improve participation.

**Palliative Care Education & Training**

Increased recognition of the importance of palliative care education for health care providers at all levels of training has stimulated action by professional organizations such as the ACS. An article describing the efforts of the ACS (especially the Palliative Care Task Force organized by the college) was described in an article by Dunn in Annals of Palliative Medicine, 2015. Dunn noted that the ACS responded to the fact that surgical organizations were largely absent from the palliative care discussions that began on a national level in the 1990’s; the ACS published a statement of principles on end-of-life care in 1993 and updated it in 2005. The important points of these principles included respect for the dignity and autonomy of patients, surrogates, and families, as well as a requirement to honor the right of the patient to choose the treatment employed. Clear and thorough discussion was another principle, along with emphasis on controlling pain and anxiety, and the importance of a team approach to palliative care. The author also noted that a grant from the
Robert Wood Johnson Foundation to the ACS enabled the formation of a Palliative Care Workgroup; this group sponsored a series of articles on the role of surgery in the provision of palliative care, and these articles were published in the *Journal of the American College of Surgeons*. The need for education and training in palliative care was also recognized, and the ACS worked to facilitate ways for surgeons to obtain formal training in palliative care. Additional educational efforts included presentations on palliative care topics at the annual ACS Clinical Congress that involved nonsurgeon palliative care specialists, ethicists, and other experts. Dunn concluded that the ACS' involvement in promoting and facilitating palliative care by surgeons is a long-standing and ongoing commitment of the organization.

An article by Larrieux and coauthors examined gaps in education relevant to palliative care in hepatobiliary surgery fellowships in *Annals of Surgical Oncology*, 2015. The authors conducted a survey of hepatobiliary surgery program directors to determine whether palliative care education and training was provided and if there were adequate resources available to make this education available to trainees. There was a 70% response rate to the survey. The data showed that only 60% of programs offered formal training in palliative care topics such as pain control, delivering bad news, and discussions of prognosis. Basic communication skills were taught in 58% of programs and 43% offered training in conducting family conferences. Of interest was the observation that resources for teaching palliative care topics were apparently available. Palliative care specialists were available to 100% of the programs and 42% of programs had faculty members with recognized expertise in palliative care. The authors concluded that palliative care education was inadequate in hepatobiliary surgery fellowships, despite the availability of resources to provide this education.

An article by Parikh and coauthors described a simulation-based educational effort in palliative care for medical students during a surgical clerkship in the *Journal of Surgical Research*, 2015. The educational offering consisted of providing written material for module preparation. Simulated objective structured clinical examinations were prepared using trained simulated patients and patients’ family members. The cases included a discussion of do not resuscitate orders with a patient awaiting an organ transplant, a discussion of goals and potential outcomes of treatment with a simulated patient with metastatic pancreatic cancer, along with the patient’s wife, and a family conference concerning a patient with severe traumatic brain injury. Standard scoring systems were used to quantify levels of physician trust, communication skills, and physician empathy. Analysis of gathered data indicated that student performance was linearly related to physician trust and communications skills, but not with empathy scores. Student responses to the educational offering were positive. The authors concluded that the palliative care module could be successfully incorporated into the surgical clerkship and that students and faculty felt that the offering was helpful in assisting them in developing skills in palliative care.

Because of the importance of communication among caregivers and between caregivers and patients, it seems intuitive that training in communications skills would be important. An article discussing a needs analysis and the development of a communications skills course for surgical residents is by Falcone and coauthors in the *Journal of Surgical Education*, 2014. The authors prospectively evaluated educational modules developed for junior and senior surgery residents. The modules for the junior residents was an objective clinical examination using trained patient actors that involved discussing operative risks and breaking bad news; senior resident modules involved discussing goals of care and transition of comfort measures only. Residents completed self-evaluations that focused on the learning experience, comfort with the situations presented, and self-confidence developed during the learning experience. The trained patient actors evaluated the students using standard communication skills checklists. Interestingly, junior residents scored higher on communication skills than senior residents. Because the content of the clinical examination cases differed significantly, an actual difference in skill levels cannot be assumed. The evaluations by residents, faculty, and patient actors confirmed that continually making progressive educational efforts to develop communication skills throughout the resident training experience would very likely be beneficial.
I hope that you have found the information reviewed in this issue valuable to your practice. The next issue of SRGS will review articles relevant to the fields of surgical ethics, patient safety, and the business of medicine. Please join us for the review of these articles.

Thanks for reading SRGS!

Lewis Flint, MD, FACS
Editor in Chief


References | GERIATRICS & PALLIATIVE CARE


References


1. Which of the following is a component of the frailty phenotype?
   a) History of diabetes mellitus
   b) Cigarette smoking
   c) Disordered balance and mobility
   d) Chronic obstructive pulmonary disease
   e) Family history of colorectal cancer

2. According to data published by Fried and coauthors, which of the following is a risk factor for frailty?
   a) Male gender
   b) Hispanic ethnicity
   c) Lower educational level
   d) Having more than 3 siblings
   e) Cholecystectomy prior to age 50

3. When considering a surgical procedure, which of the following is the most important consideration for an elderly patient?
   a) Risk of infection
   b) Fear of functional or cognitive decline
   c) Risk of ICU admission
   d) Concern over the cost of the procedure
   e) Fear of inadequate pain control

4. Abnormal grip strength has been recommended as a valid test for frailty. Frailty is present in male patients if grip strength is which of the following?
   a) <30 kg
   b) >5 kg
   c) <10 kg
   d) >35 kg
   e) <50 kg

5. According to information presented in the discussion of frailty at the meeting of the Association of VA Surgeons, which of the following intraoperative practices are useful in reducing operative risk in frail patients?
   a) Maintaining room temperature above 80 degrees Fahrenheit
   b) Scheduling procedure prior to noon
   c) Use of absorbable sutures
   d) Use of regional anesthesia
   e) Use of chlorhexidine-alcohol skin preparation

6. According to data presented in the article by Robinson and coauthors, surgical articles on frailty are relatively unusual. The first article with the word “frailty” in the title appeared in a surgical journal in which year?
   a) 2013
   b) 1998
   c) 2000
   d) 1987
   e) 2005

7. The diagnosis of frailty is accompanied by all of the following abnormalities except which one?
   a) Genomic instability
   b) Loss of leucocyte maturation
   c) Telomere attrition
   d) Loss of proteostasis
   e) Mitochondrial dysfunction
8. According to data presented by Hamel and coauthors, which of the following procedures is consistently associated with mortality rates of less than 2% in patients 80 or older?
   a) Lumbar discectomy
   b) Emergency repair of hip fracture
   c) Carotid endarterectomy
   d) Nissen fundoplication
   e) Lower extremity revascularization

9. Five-year survival for pancreatectomy for cancer is which of the following in patients 80 or older?
   a) 60%
   b) 76%
   c) 8%
   d) 11%
   e) 31%

10. The use of preoperative intensive inspiratory muscle training reduces the frequency of respiratory complications in elderly patients undergoing coronary artery bypass. The reduction is which of the following?
    a) 20%
    b) 92%
    c) 50%
    d) 39%
    e) 72%

11. According to data from the Veterans Affairs health system, the use of palliative care plans following operations performed on patients with incurable disease is associated with which of the following benefits?
    a) Higher rate of nursing home placement
    b) Longer survival duration
    c) Lower wound infection rate
    d) Fewer urinary tract infections
    e) Better pain control

12. Which of the following differentiates palliative care from hospice care?
    a) Palliative care is never offered to children
    b) Hospice care is always conducted in-hospital
    c) Palliative care is only useful for patients with cancer
    d) Palliative care is used in patients with serious, but not necessarily fatal, illnesses
    e) Hospice care is not used in patients with neurologic disease

13. The proportion of Medicare beneficiaries who will undergo a major surgical procedure in the last year of life is which of the following?
    a) 38%
    b) 77%
    c) 25%
    d) 9%
    e) 2.4%

14. According to data presented in the article by Miner and coauthors, symptom improvement in patients managed according to the palliative care triangle methodology was which of the following?
    a) 91%
    b) 21%
    c) 36%
    d) 8%
    e) 3.6%

15. According to survey results published by Maerz and coauthors, discussions concerning do not resuscitate orders were used within the first 24 hours after ICU admission by which proportion of respondents?
    a) 10%
    b) 4.2%
    c) 89%
    d) 62%
    e) 29.5%
16. The article by Bosslet and coauthors recommends that in discussions with patients and families, when inappropriate interventions are requested, the term “futility” should be replaced with which of the following?
   a) Useless
   b) Unnecessary
   c) Potentially inappropriate
   d) Harmful
   e) Contraindicated

17. Resection to achieve relief of pain and/or bleeding in soft tissue tumors that are incurable is associated with a short-term mortality risk of which of the following?
   a) 28%
   b) 50%
   c) 11%
   d) 39%
   e) 3.2%

18. Thirty-day mortality in patients with incurable malignancy who require operation for intestinal perforation is which of the following?
   a) 8%
   b) 34%
   c) 78%
   d) 17%
   e) 1.5%

19. According to data presented by May and coauthors, use of palliative care consultation within the first 48 hours after hospital admission in patients with advanced cancer was associated with which of the following average cost savings?
   a) $250
   b) $8,000
   c) $1,000
   d) $2,000
   e) $12,000

20. In patients with spinal cord compression from metastatic cancer who have stable spines and a life expectancy of six months or less, which of the following is the most effective treatment?
   a) Single-dose radiation therapy
   b) Laminectomy alone
   c) Laminectomy plus single dose radiation therapy
   d) Multiple-dose radiation therapy
   e) Laminectomy plus corticosteroid therapy

The following four questions are required by the American College of Surgeons for accreditation purposes. You must complete these four questions before submitting your answers.

21. This issue met the stated learning objectives.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

22. The content was relevant to my educational needs and practice environment.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

23. There are potential barriers to incorporating what I have learned from this issue into my practice.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree

24. The content was fair, objective, and unbiased.
   a) Strongly agree
   b) Agree
   c) Neutral
   d) Disagree
   e) Strongly disagree
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   Steinman MA, Beizer JL, DuBeau CE, Laird RD, Lundebjerg NE, Mulhausen P
   This article supplies useful interpretations of the guidance provided in the Beers criteria list.

2. Frailty for Surgeons: Review of a National Institute on Aging Conference on Frailty for Specialists...45–54
   Robinson TN, Walston JD, Brummel NE, et al.
   This review explains the value and techniques of clinical assessments of frailty.

3. Developing quality indicators for elderly surgical patients...55–64
   McGory and coauthors list pertinent and achievable quality metrics that are applicable to the clinical care of older patients.

4. Injury in the aged: Geriatric trauma care at the crossroads...65–77
   This article provides important perspectives on the increasing proportion of elderly patients who sustain injuries. The authors emphasize the need to refine triage criteria to make certain that injured patients who can benefit from care in a trauma center are delivered to the appropriate center.

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   Kelley AS, Morrison RS.
   This article is a clear but detailed review of the important aspects of palliative care.

6. A systematic review of communication quality improvement interventions for patients with advanced and serious illness. ...87–94
   Fawole OA, Dy SM, Wilson RF, et al.
   Data continues to emerge supporting the value of high-quality communication as a component of the care of patients with advanced disease. Excellent communication between caregivers and patients/families is a critical component of successful care of this patient group. This article provides guidance for the development of quality improvement interventions to improve communication.

7. An Official ATS/AACN/ACCP/ESICM/SCCM Policy Statement: Responding to Requests for Potentially Inappropriate Treatments in Intensive Care Units...95–107
   Bosslet GT, Pope TM, Rubenfeld GD, et al.
   Bosslet and coauthors provide valuable perspectives on the management of requests for potentially inappropriate treatments in critically ill patients.

8. Proposed competencies in geriatric patient care for use in assessment for initial and continued board certification of surgical specialists...108–115
   Bell RH, Jr., Drach GW, Rosenthal RA.
   This article offers a list of desirable competencies for surgeons who will provide care for older patients.
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