Special Considerations in Older Surgical Patients

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Case Presentation

A 96-year-old woman with well-controlled diabetes mellitus type 2 on insulin, hypertension, gout, gastroesophageal reflux disease, hearing loss, diastolic heart failure and osteoarthritis presented for preoperative evaluation prior to scheduled left total hip arthroplasty. She reported increasing pain in her groin which has limited her functional abilities. Her review of systems was negative other than pain. She reported that her functional limitations from her hip pain have significantly impacted her life and she was becoming depressed due to her inability to engage in her prior activities. She was independent in her activities of daily living (ADLs), but had been requiring some assistance with independent activities of daily living (IADLs). Discussions were held with the patient and her daughter, and both expressed understanding that there were risks involved with surgery; however, they were willing to take the risk of complications and even death if it meant improvement in current quality of life and provides pain control.

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Introduction

Of the 51.4 million surgeries performed annually in the United States, 19.2 million (37 %) are in individuals 65 years of age or older [1, 2]. With the aging of the population, there will be continued growth in the demand for surgical services in the geriatric population, especially among the oldest old (>85 years of age) [2, 3]. Advances in technology allow surgeons to perform operations even in the most medically complex of the geriatric population with greater safety and improved outcomes [4]. However, with an increased ability to perform surgery in older adults, it is important to pay close attention to the special ethical considerations in this population including (1) appropriateness of the operation, (2) informed consent, (3) advanced directives, and (4) 30-day mortality outcomes.

Appropriateness of the Operation

Physicians are often faced with the challenge of deciding when it is appropriate to proceed with a surgical procedure in an older adult. In each patient, many complex factors can impact this decision. It is essential to consider the unique circumstances of each individual and the specific surgical procedure being considered prior to deciding if it is appropriate to operate. The patient's overall medical goals and their expectations regarding the impact of the surgery should be clearly defined preoperatively. The process of explicitly setting forth these expectations can help determine if the surgical procedure is required for and would result in the desired outcome, as well as deciding if the risk/benefit profile of surgery is acceptable to the patient [5]. For example, in an older adult with multiple medical comorbidities including severe aortic stenosis and moderately advanced dementia, a transcatheter aortic valve replacement may ameliorate cardiac symptoms but may not meet expectations of the patient/family as the concurrent dementia will continue to significantly impact functionality.

Older adults experience the physiologic effects of aging at different rates. Therefore, decisions regarding the appropriateness of surgery should not be based simply on age but should take into account the risk profile of the surgery and the individual patient's physiology, medical comorbidities, and functional status. Multicomponent preoperative geriatric assessments and measurement of frailty should be utilized to determine an individual's operative risk. Components of the assessment should include evaluation of medical comorbidities, functional ability, cognitive ability, and frailty. Frailty is defined as a state of weakness and susceptibility to stress that originates from reduced physiological reserve resulting in diminished resiliency, loss of adaptive capacity, and increased vulnerability to stressors [6, 7]. Understanding the level of frailty of each patient can be instrumental in guiding operative decisions as well as expectations regarding the postoperative course [5, 6].

While there is currently no gold standard for assessing frailty in elderly surgical patients, several studies have demonstrated that increased frailty has a negative

impact on surgical outcomes [8–11]. The two most commonly cited tools to measure frailty include the phenotypic [12] and accumulation of deficit models [13]. The frailty phenotype, described by Fried et al. [12], has five criteria: unintentional weight loss, weakness, exhaustion, slow walking speed, and a low level of activity. This definition of frailty has been studied in patients who underwent elective surgery, and increased levels of frailty were associated with an increased risk of postoperative complications, longer length of hospitalization, and a discharge disposition other than home [8]. The accumulation of deficit measure proposes that frailty is a nonspecific, age-associated vulnerability that is reflected in an accumulation of medical, social, and functional deficits which can be measured by counting an individual's health problems or deficits [13]. In the accumulation of deficit model, a patient's frailty index score reflects the proportion of potential deficits present in that specific individual [14]. Increasing number of deficits (i.e., anemia, low serum albumin level, history of falls, functional dependence, cognitive impairment, comorbidity, and mobility impairment) accounted for in a multidomain/accumulated deficit model of frailty has correlated with increased complications, six-month morality, and risk of institutional discharge among colorectal and cardiac surgery patients [11, 15].

A comprehensive preoperative assessment that includes clarification of goals, review of medical comorbidities, evaluation of physical and cognitive function, and frailty assessment can help to determine if a specific surgical procedure is appropriate in a given patient. In addition, the identification of factors associated with specific operative complications and a management plan to minimize these risks can be implemented. For example, a comprehensive assessment might determine that a functionally independent, cognitively intact 95-year-old could undergo surgery with a lower risk than a 65-year-old suffering from symptomatic congestive heart failure and moderate dementia. Based on the results of the comprehensive preoperative assessment, the goals for the surgery and aggressiveness of the procedure can be modified to match the actual physiologic capacity of the patient. Sometimes, a large surgery is not needed to obtain the desired outcome, and a modified or shorter procedure, with lesser surgical insult, can be undertaken to reduce the risk of adverse outcomes. In other cases, the decision may be made to forgo surgery and focus on medical management given the overall goals, medical complexity, functional impairment, or frailty of the patient. However, understanding when modifying or forgoing a surgery is appropriate can only be achieved when a clear understanding of the patient's individual physiology and goals is achieved.

Informed Consent

Clinical communication with patients in the form of informed consent is necessary prior to surgery. Informed consent is the process by which component adults make voluntary decisions following the disclosure of relevant information including review of the medical decision, discussion of the proposed procedure, and disclosure of risk, including any potential complications or disabilities that might occur as a result of the intervention. Additionally, the risks and benefits of

not undergoing the procedure should be discussed. There are five identified benefits of informed consent: (1) protecting the patient's right of self-determination, (2) engaging the patient in their health care, (3) enhancing the physician-patient relationship, (4) encouraging physicians to thoroughly review the patient's therapeutic options, and (5) reducing discontent and ligation when there are complications [16].

The full process of informed consent can be challenging to accomplish in the older patient population due to interactions between complex medical comorbidities, cognitive issues, and social barriers. Complications are common in older adults undergoing surgery, and possible adverse effects and future disabilities that may result should be clearly understood prior to proceeding with any procedures [17]. Surgical patients often display suboptimal understanding of the risks and benefits of their upcoming surgery. In a survey of 1,034 preoperative patients, with a mean age of 54.8 years, 13 % did not meet the standards for informed consent [18]. Additionally, this study found that socioeconomic factors including language (non-English) and educational level (lower education) place patients at higher risk for decision-making deficits [18]. Oftentimes, patients do not engage in a thorough discussion of their treatment preferences regarding advanced care planning, particularly preferences about how aggressively care should proceed in the event of significant complications [19]. Therefore, when obtaining preoperative informed consent in older adults, it is critical to ensure that patients have a clear understanding of the limitations of the procedure, complications that might occur, and possible impacts the procedure and resultant complications are anticipated to have on their function and quality of life in the future.

Ensuring that an individual has decision-making capacity is a prerequisite to obtaining legally and morally informed consent for a surgical procedure. Decision-making capacity should be evaluated based on an individual's ability to make a specific medical decision, not their ability to make all general medical decisions. Decision-making capacity describes an individual's ability to understand and utilize information about the proposed treatment options to make a choice that is congruent with their values and preferences. Cognitive decline, with or without meeting the diagnostic criteria for a major neurocognitive disorder, is a significant concern among elderly patients and can complicate the decision-making process [20]. In most cases, the care team can make the proper judgment regarding a patient's decision-making capacity from conversations with the patient regarding their medical situation and possible treatment options. In cases where decision-making capacity is less clear, formal mental status testing can help determine whether a patient is capable of making this type of decision. The Mini-Cog, a brief cognitive screen that tests memory and executive function, can be helpful in determining if the patient has impaired cognitive function [21]. The Mini-Cog is highly sensitive and has advantages over many other formal tests of cognition as it is brief (3–4 min to administer), can be performed by nonphysicians, lacks a language or educational bias, evaluates for the presence of executive dysfunction, and has been used for preoperative assessment [21–23]. However, there is no gold standard for the best cognitive

evaluation tool, and the score on a standard examination does not dictate a conclusion about capacity but simply serves as an important data point when making a capacity assessment.

When having informed consent discussions, it is also helpful to engage a patient's surrogate and/or family member in the conversation. As patients may lose decision-making capacity at some point after surgery, conversations between the patient and surrogate prior to the surgery regarding preferences for medical treatment and goals of care are helpful to inform surrogates of patient preferences and improve appropriateness of care in cases where surrogates must assume the role of decision-maker.

If a patient is deemed unable to provide informed consent, then their surrogate decision-maker would be the appropriate individual to make decisions regarding any proposed surgical treatments. It is important to ensure that the surrogate decision-maker understands that decisions should be based on their best knowledge of the patient's expressed wishes and values, not what their personal wishes would be in the same situation. If the patient's wishes and values are not known, the surrogate decision-maker should be guided to make decisions based on what would be in the best interests of the patient. In situations where surrogates are making decisions regarding care, they should be provided with all available details regarding diagnosis, prognosis, and alternative treatments as if they were themselves the patient.

Ideally, documentation of an identified surrogate who was chosen when the patient had capacity to do so should be available. If there is not a designated surrogate, the rules regarding surrogate decision-makers for health care should be reviewed for the state in question. In many cases, family members will be able to take on the role of surrogate, or a guardian may need to be designated.

Do Not Resuscitate and Surgery

A do-not-resuscitate (DNR) order is a legal medical document that reflects an individual's desire to decline resuscitation efforts. Older adults may choose to forgo certain resuscitative procedures because they do not want to accept the possible burdens associated with them. These burdens may be related to either the resuscitation attempt itself or a decline in cognitive and functional capacity following the resuscitation attempt. In the early 1990s, following the passage of the Patient Self-Determination Act which requires facilities receiving Medicare or Medicaid funding to inform patients about their right to refuse medical treatment and the use of advanced directives on admission [24, 25], the American Society of Anesthesiologists, the American College of Surgeons, and the Association of Operating Room Nurses published guidelines declaring that patients with DNR orders should have these reevaluated for the perioperative period. Failure to respect a patient's wishes regarding resuscitation would constitute a violation of the moral and legal right to self-determination [26, 27]. Therefore, a clear and open conversation regarding a patient's wishes around resuscitative efforts and expectations

during the pre-, intra-, and postoperative period should occur prior to proceeding with any surgical interventions.

Barriers to Perioperative DNR

Maintaining a DNR order in the operating room is often met with criticism by medical providers as they view the desire to receive surgical therapy as inconsistent with the desire to withhold resuscitation efforts if indicated. Furthermore, a DNR order can be interpreted as a signal that the patient is unwilling to undertake the burdensome interventions and recovery period inherent in high-risk procedures and necessary to achieve the desired surgical outcome. From an anesthesia perspective, resuscitation procedures such as intubation and use of critical care intravenous medication/drips are a standard part of operative care. However, a partial reversal of a DNR order is feasible. This would allow for the administration of regional or general anesthetic treatment while withholding resuscitative measures including chest compressions and/or cardioversion in accordance with patient preferences.

The cause of death has also been a point of controversy in the discussion of perioperative DNR orders. While providers generally understand and accept that patients die from underlying disease, many find it unacceptable to allow an individual to die, without resuscitative efforts, from iatrogenic causes such as anesthesia or surgical complication. In a survey of 2,100 randomly selected vascular, neurologic, and cardiothoracic surgeons conducted in 2010, 912 (54 %) reported that they would decline to operate on patients who have an advance directive limiting postoperative life-supporting therapy [28]. The results of this survey raise a serious question about whether it is ethically permissible for surgeons to decline to operate in individuals who have an advance directive restricting care. In circumstances where providers feel ethically conflicted or that a patient's goals are inconsistent with their personal values, the American Medical Association Code of Ethics states that clinicians are not compelled to perform procedures but should involve a second provider who is willing to comanage the patient by performing the desired procedure [29]. When faced with ethically challenging situations, providers are encouraged to involve the ethics committee of their institution.

Many providers are more comfortable participating in the care of patients with DNR orders who undergo procedures aimed at extending or improving their quality of life [30]. For example, a 90-year-old with a preexisting DNR order who suffers from significant cervical spinal stenosis with neurological sequela impacting functional status might consent to have a high-risk surgery with the hope to regain function of limbs. In this patient, the risk of dying during surgery would be outweighed by the possible benefit of improving function and quality of life. Upon extubation, the patient would like to be do not resuscitate/do not intubate (DNR/DNI). If the surgery was not successful and the patient was to become ventilator dependent, the patient would wish to have comfort-focused care.

In addition to clearly defining a patient's goals of care and ensuring that these are accepted by medical providers, it is helpful to understand the typical outcomes of resuscitative efforts in the elderly. A systematic review found that the overall chance of survival to hospital discharge for in-hospital CPR in adults 70 years and older is low–moderate (11.6–18.7 %), and the percentage of older adults surviving to discharge decreases with advancing age (11.6 % for those age 90 years and older) [31]. A study of noncardiac surgery intraoperative cardiac arrest identified a rate of approximately 7 % per 10,000 noncardiac surgeries with an associated mortality of 44 % within 24 h and 63 % at 30 days [32]. A review of the ACS-NSQIP database of non-trauma patients from 2005–2010 found that, among the more than 1.3 million surgical cases captured in the data set, 6,282 cases of CPR were performed within 30 days of surgery. Of these, 14.1 % occurred intraoperatively and 85.9 % occurred postoperatively. Of the instances of postoperative CPR, 49.8 % occurred within 5 days after surgery. The incidence of CPR varied by specialty with 1:33 for cardiac surgery compared to 1:258 for general surgery [33]. There is limited data regarding functional status in older adults after CPR, although this is often the most important outcome to patients and families. In one study, only 20 % of survivors aged 81 and older who underwent cardiopulmonary resuscitation were capable of independently functioning outside of institutional care [34].

Recommendations

Undesired and unanticipated outcomes can occur during the perioperative period, and advanced directives can provide clarification when navigating decisions regarding treatment. Institutional policies should be implemented in all health-care facilities regarding the need for discussions about advanced directives prior to pursuing any surgical interventions. However, it is often challenging to put theory into clinical practice given the lack of comfort in discussing patient goals and advanced directives, misinformation regarding the utility of advanced directives during the perioperative period, and time constraints. To ease these challenges, these discussions should occur as early as possible in the clinical encounter, ideally when the decision to have surgery or not is still being contemplated. It is best if the discussion is multidisciplinary and includes the patient, family members, anesthesiology, surgery, and the patient's primary care doctor or geriatrician. As part of this discussion, three points should be clarified and clearly documented: (1) existing DNR order that may limit the use of resuscitative procedures and modification of the DNR order if appropriate, (2) exceptions to the DNR order should specific complications occur during the surgery or anesthesia, and (3) explicit plans for reinstating the DNR order, if it has been rescinded for the procedure, when the patient has recovered from the acute effects of anesthesia. In nonelective surgical cases, it would be helpful to have a system that allows for earlier surgeon and anesthesiologist notification of pending cases with existing DNR orders to allow for sufficient time for conversations regarding possible suspension or modifications to the DNR [27].

Public Reporting of 30-Day Mortality

The goal of public reporting regarding health-care outcomes is to provide information regarding quality of care to patients so they can incorporate this into their decision-making process when considering undergoing a particular health-care service. Thirty-day mortality has become an outcome metric commonly used to measure surgical quality. The overall goal is to motivate surgeons and hospitals to improve performance and quality of care as well as allow patients, referring physicians, and health-care purchasers to select higher-quality care.

Clinically oriented outcomes, including postprocedure cognitive and functional status among elderly patients, are vital for assessing the effectiveness of a surgical program. Unfortunately, these measures are not captured if the 30-day mortality statistics are the only data used to assess surgical quality. In addition, reporting and rewarding low 30-day surgical mortality statistics may create a conflict of interest for providers including (1) encouraging providers to preferentially select healthier patients instead of providing care for medically complex older adults, (2) shifting physician focus toward the quality statistics being measured as opposed to what is important to the patient, and (3) supporting life-prolonging measures during the postoperative period which may not be in the best interests of the patient and may result in a prolongation of suffering [35]. In addition, measuring quality of care based on 30-day mortality often fails to account for patient preference and autonomy. Based on these nuances and complexities of the 30-day mortality metric, it is challenging for the public to clearly interpret this data, and information regarding postoperative functional outcomes, length of hospitalization, need for institutionalization, etc. should be considered as surgical outcome measures.

For patients who have operations with palliative intent, the quality should not be judged by mortality but rather by the robustness of the outcomes that reflect high-quality palliative care including symptom management resulting from the procedure. Other metrics of high-quality palliative care include documentation of a preoperative goals-of-care conversation, pain scores, family meetings, and time between a DNR order and death. Although collection of survival rates following palliative operations might help inform future patients about the value of an operation, 30-day mortality rates for these operations should not be interpreted or publicly reported as a quality metric as they can be significantly misleading.

Impact of Mortality Reporting

Several studies have evaluated the practical effects of 30-day mortality reporting which support the ethical concerns raised by this measure. In New York State, thirty-day mortality reporting following coronary artery bypass graft (CABG) surgery in 1989 was initially correlated with a larger decline in mortality rates compared to other states during that same time period [36, 37]. However, studies have determined that the decrease in mortality was correlated with the referral of high-risk patients from New York to out-of-state regional medical centers [38].

When surveyed, 62 % of surgeons in New York State admitted to refusing to operate on at least one high-risk CABG patient over the prior year due to public reporting [39]. Pennsylvania also observed similar changes following the introduction of report cards for CABG surgery. Sixty-four percent of cardiac surgeons admitted to being reluctant to operate on high-risk patients, and more than half of cardiologists reported having increased difficulty finding a surgeon for high-risk patients with coronary artery disease [40]. Analysis of data from fee-for-service Medicare patients from three reporting states (New York, Massachusetts, and Pennsylvania) compared to regional non-reporting states (Maine, Vermont, New Hampshire, Connecticut, Rhode Island, Maryland, and Delaware) indicated that that Medicare beneficiaries with an acute myocardial infarction (MI) were less likely to receive percutaneous coronary intervention in the three states with mortality reporting compared to the seven regional control states (OR 0.82 [95 % CI, 0.71–0.93]) [41].

In addition to resulting in the selection of lower-risk patients for surgical procedures, reporting systems on 30-day surgical mortality can discourage and delay conversations regarding goals of care following surgery. Concerns about adversely impacting the outcome metric may discourage providers from offering palliative care and/or hospice when a procedure has unintended consequences and, in the most extreme cases, may override a patient's previously noted advance directives. This concern was described in a case report where surgeons deferred conversations regarding palliative care options in a 94-year-old woman who sustained cardiopulmonary arrest during a procedure followed by multiple postoperative complications until postoperative day 31 [42]. To meet ethical standards of care, surgeons should offer informed, high-risk patients surgery that is potentially beneficial with the option to refuse aggressive treatments subsequently if they become overly burdensome or when the goals of the surgery are no longer possible [43].

Educational Pearls

1. When considering if a particular surgical procedure is appropriate for an elder, the unique physical, cognitive, and social circumstances and well as the individual goals and expectations of the patient should be considered.
2. The process of ensuring informed consent includes establishing if an elder possesses decision-making capacity. It should start as early as possible in the pre-operative period, ideally when the decision to pursue operative intervention or not is still being considered.
3. The patient's goals of medical care, including the impact of surgical intervention on any existing DNR orders, should be addressed prior to any surgical procedure.
4. While thirty-day mortality has become an outcome metric commonly used to measure for surgical quality, it does not address many of the outcomes which matter most to elders and their families including post procedure cognitive and functional status.

Conclusions

It is important for providers to be aware of the ethical issues commonly encountered during the surgical care of elders. Ensuring that the decision to pursue surgery is in keeping with the patient's overall health goals, that a clear process of informed consent has occurred, and that advanced directives are respected to allow for self-determination and autonomy are critical to providing ethical surgical care in the geriatric population. Throughout the perioperative period, the patient should remain the center of the process, and outside factors, such as 30-day mortality metrics, should not be allowed to adversely influence care decisions. Understanding these complexities of surgical care in the geriatric population can help ensure care that is patient focused with the goal of improving the lives of older adults.

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