The Role of the Internist in the Care of Elderly Patients Undergoing Emergency Surgery

11

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11.1 Introduction

Internists are physicians who specialize in internal medicine. Internists differ from physicians who specialize in family practice because internists only care for adults while family practice physicians may practice pediatrics, obstetrics and gynecology, and surgery. Internists are adept at obtaining medical histories and performing physical exams. Since internists do not specialize in any one disease, they are able to care for patients who present with concerns across the spectrum from wellness and prevention to the most complex medical conditions.

Internists can practice in many different clinical settings. For example, internists can practice in the outpatient setting, hospital, or other institution such as a rehabilitation facility or long-term care facility. Internists who care for patients in offices or clinics outside the hospital are often referred to as primary care physicians. Internists who care for patients who are hospitalized are called "hospitalists." The term "hospitalist" was defined in the landmark article, "The Emerging Role of Hospitalists in the American Health Care System" published in the New England Journal of Medicine in 1996 [1]. The authors defined a hospitalist as "a physician whose primary professional focus is the general medical care of hospitalized patients. Their activities include patient care, teaching, research, and leadership related to Hospital Medicine." Internists, therefore, practice in an outpatient setting as primary care

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physicians, as hospitalists, or a combination of both. Since the 1990s, the number of hospitalists has grown considerably. The American Hospital Association notes that while there were 1000 hospitalists in the USA in 1996, the number grew to 38,000 in 2012 and greater than 44,000 in 2014 [2]. Hospital medicine is considered the fastest growing medical specialty [3]. Hospitalists are often most closely involved both in the training of internal medicine residents and clinical research.

The question often arises as to what happens when a patient cared for by a primary care physician requires urgent surgery? In particular, what happens when an elderly patient requires emergency surgery? This is a very pertinent question as the population ages. Physicians are faced with the question of whether a patient is ever too old or too ill to have surgery, especially emergency surgery. In this chapter, we propose that the elderly patient requiring emergency surgery is the patient that requires all of the expertise of the internist, from the primary care physician to the hospitalist. The internist must have constant and meticulous communication with the surgeon and the surgical team. In caring for the elderly patient contemplating surgery, the wishes of the patient or the health care proxy must be considered and carried out. The internist contributes to all aspects of the care of the patient both before and after surgery. It is often the internist, particularly the primary care physician, who coordinates all of the follow-up care after hospitalization for surgery.

Faced with a medical or surgical emergency, to whom does the patient turn? Often, it is the primary care physician. The internist working in the outpatient setting may have had the opportunity to form a long-term relationship with the patient and the patient's family. The PCP will know the patient's medical and surgical history, the patient's medications and medication allergies or adverse reactions to medications. The physician's knowledge of the patient's social history cannot be underestimated. The primary care physician will know the patient's living situation and his or her network of social support, if there is one. Even when the relationship between the physician and the patient is new or even brand new, the internist is specifically trained to obtain accurate data expeditiously.

The primary care physician is often the first contact between the patient and the medical community. The internist will assess the patient's condition and arrange the appropriate diagnostic testing. If surgery is contemplated or indicated, the PCP will often rely on the close relationship with the patient to make a decision. Particularly in the elderly, a discussion of care in the event of an emergency may have occurred prior to the acute event. Even if this discussion has taken place previously, these issues are discussed again. If the conversation has never occurred, the patient's wishes must be elucidated and understood.

At the time of an emergency, it is often the internist, specifically the primary care physician, who will have an understanding of the patient's wishes. In the best situation, the primary care physician will know the patient, the family member, or other previously appointed health care proxy, and will have had these crucial discussions about end of life care *before* the emergency occurs. When the emergency requires surgical evaluation, the patient may be referred directly to the emergency room or hospital. Internists form communication pathways and referral networks with surgeons who are contacted. Care must be coordinated. It is the internist's responsibility

to convey information accurately and succinctly. In the traditional model, when a patient is admitted to the hospital, the primary care physician continues to care for the patient. It is at this point, however, if the primary care physician admits the patient to a hospital staffed with hospitalists, that care is transferred to the hospitalist. There are pros and cons of this transition. One concern is that once the patient's care is transferred from the primary care physician to the hospitalist, the bond between the patient and the PCP may be broken. The primary care physician may become more peripherally involved at a point in time when the patient is most ill. This transfer may be perceived as a loss of control or "power" by the primary care physician and may make the PCP less satisfied with his or her role [4]. The patient may also be disappointed when his or her long-term physician is less involved.

Once care has been transferred to the hospital, the term "comanagement" has been used to describe the collaboration between hospitalists and surgeons in the care of patients. Comanagement is described as a "negotiated relationship that lets the medical specialist share the responsibility, authority, and accountability for the care of the surgical patient." [5] Later in this chapter, we will discuss the evidence to support whether this collaboration actually improves clinical outcomes.

Once the primary care physician has evaluated the patient, conducted the appropriate diagnostic evaluation, and recognized the need for emergency surgery, the physician will have a frank discussion with the patient and/or the health care proxy. Advance directives may have already been discussed, but now the attention turns to the surgical procedure. Important questions to consider include the following: What are the patient's intentions or expectations? What is the likelihood that the patient will recover from the surgery and return to baseline status? If the baseline condition is relatively "good" and surgery is expected to return the patient to baseline, the physician, the patient, and the proxy may all consider the option of surgery and the adherent risks to be acceptable. If, however, the baseline condition of the elderly patient is poor, the decision to proceed with surgery must be carefully considered. For example, if the patient has dementia or multiple chronic medical problems, surgery may not even return the patient to the prior poor baseline status and the choice may be not to proceed with surgery. In this context, all parties concerned, the patient, the health care proxy, the primary care physician, the hospitalist, and the surgeon must consider the quality of life versus merely prolonging life. Concepts of "frailty" and "futility" will be discussed as we proceed with this discussion.

11.2 Medical Evaluation of the Elderly Patient Requiring Emergency Surgery

11.2.1 Goals of the Medical Evaluation

The internist is frequently called upon to conduct a medical evaluation for patients planning to undergo surgery, whether in an outpatient or acute care setting. Patients undergo medical evaluation in order to minimize known risks and identify any unknown risks, including underlying comorbidities, that may compromise patient

safety. In the past, the term "medical clearance" has been used to describe this process. However, this term has fallen out of favor among many providers and has been replaced with "medical evaluation," a term thought to be more representative of the provider's role [6]. To some, the term "medical clearance" is a misnomer implying that a patient has been "cleared" of risks that the surgery may present. The patients and their families may mistakenly be led to believe that the surgery is without risk and that safety is essentially guaranteed. Additionally, the term "clearance" undermines the true goal of the assessment and it fails to deliver useful information to the surgeon. Designating a patient as "cleared" for surgery does not give any information about estimating risk or predicting postoperative outcomes. Goals of the medical evaluation include:

- Quantifying the risk involved.
- Identifying additional risk factors that may affect the patient's operative risk.
- Determining what interventions can be taken to mitigate the risk.

A thorough medical evaluation ensures that the surgeon, patient, and patient's family understand the potential risks and likelihood of complications perioperatively or postoperatively. Thorough and effective communication between teams is essential when a patient is being evaluated for surgery. Numerous factors contribute to operative risk in elderly patients, including age, cardiac health, exercise tolerance, obesity, smoking status, comorbidities, and medications. Surgical scoring systems take these factors into consideration to predict the risk to the patient [7].

11.2.2 Surgical Scoring Systems

Numerous risk calculators and scoring systems exist to aid the internist and surgeon in evaluating and classifying the patient's risk. Commonly used tools include: the National Surgical Quality Improvement Program (NSQIP) Myocardial Infarction or Cardiac Arrest (MICA) risk-prediction rule, the NSQIP surgical risk calculator, and the Revised Cardiac Risk Index (RCRI). These scoring systems were developed based on clinical databases.

The RCRI is a multivariable predictive index used to stratify the risk of major perioperative cardiac complications; it is largely included in the American College of Cardiology and American Heart Association guidelines to assess risk based on clinical factors [8]. Published in 1999 and adapted from the original Goldman Cardiac Risk Index, it is simpler and easier to use, gaining widespread use among clinicians conducting medical evaluations. The RCRI is composed of six equally weighted factors (Table 11.1).

Data was based on a single-center prospective cohort of 2893 patients undergoing major elective noncardiac surgery over the age of 50. The patients were then monitored for major cardiac complications including cardiac arrest/ventricular fibrillation, acute myocardial infarction, third-degree heart block, pulmonary edema, and cardiac death [9, 11] (Table 11.2).

Table 11.1 Revised cardiac risk index factor (RCRI) [9]

1. History of coronary artery disease
2. History of congestive heart failure
3. History of cerebrovascular disease (stroke or transient ischemic attack)
4. Diabetes requiring treatment with insulin
5. Chronic kidney disease (creatinine >2 mg/dL)
6. High-risk surgery including suprainguinal vascular, intraperitoneal, intrathoracic

Table 11.2 Risk of complications with associated confidence intervals (CI) [9, 10]

	Risk for cardiac death, nonfatal myocardial infarction, and nonfatal cardiac arrest	Risk for myocardial infarction, pulmonary edema, ventricular fibrillation, primary cardiac arrest, and complete heart block
With no risk factors	0.4% (95% CI: 0.1–0.8)	0.5% (95% CI: 0.2–1.1)
With one risk factor	1.0% (95% CI: 0.5–1.4)	1.3% (95% CI: 0.7–2.1)
With two risk factors	2.4% (95% CI: 1.3–3.5)	3.6% (95% CI: 2.1–5.6)
With three or more risk factors	5.4% (95% CI: 2.8–7.9)	9.1% (95% CI: 5.5–13.8)

The RCRI was evaluated for its ability to predict cardiac complications and mortality in a 2010 systematic review [12]. The review analyzed 24 studies totaling 792,740 patients from 1966 to 2008. The authors concluded that the RCRI stratified low- versus high-risk patients undergoing noncardiac surgery moderately well with the exception of vascular noncardiac surgery. Additionally, it was not an accurate predictor of all-cause mortality, an expected result given that cardiac events only make up a proportion of perioperative and postoperative mortality.

The two other aforementioned scoring systems were developed from the American College of Surgeons (ACS) NSQIP. The NSQIP is a risk-adjusted database of surgical outcomes. It originated in 1994 among the Veterans Affairs medical centers, in response to high rates of morbidity and mortality [13, 14]. Studies subsequently showed a considerable decrease in surgical morbidity and mortality, leading to the creation of ACS-NSQIP in 2004 [15]. At participating hospitals, an NSQIP-trained Surgical Clinical Reviewer analyzes medical records to collect 135 variables preoperatively and up to 30 days postoperatively. Complications fall into nine main categories:

- Overall mortality
- Overall complications
- Cardiac complications
- Postoperative pneumonia
- Intubations required within 48 h post-surgery
- Unplanned intubations

- Pulmonary embolism and venous thrombosis
- Renal dysfunction
- Surgical-site infections including superficial, fascia, and deep infections

NSQIP data is risk-adjusted and validated using a logistic regression model. As such, even if two participating hospitals are of different sizes and serve different patient populations, their results can be compared. Using data from over 525 participating hospitals and more than one million operations, the ACS created the NSQIP MICA risk-prediction rule and the NSQIP surgical risk calculator.

The NSQIP MICA risk-prediction rule assesses the risk of perioperative myocardial infarction or cardiac arrest (CA). The tool, which was developed in 2011, is based on a single large multicenter study analyzing intraoperative and postoperative MI or CA up to 30 days after surgery. Cardiac arrest was defined as "chaotic cardiac rhythm requiring initiation of basic or advanced life support", while an MI was defined as meeting one or more of the following criteria: "documented electrocardiographic findings of MI, ST elevation of ≥1 mm in >1 contiguous leads, new left bundle-branch block, new Q-wave in ≥2 contiguous leads, or troponin >3 times normal in the setting of suspected ischemia" [8].

Additionally, the study also looked at intraoperative and postoperative MICA among patients undergoing aortic or noncardiac vascular surgery as a secondary endpoint. Overall, the authors concluded that the MICA risk calculator has a high discriminative ability for intraoperative and postoperative MICA that surpasses RCRI. This was especially seen in patients undergoing vascular surgery [16].

The NSQIP Surgical Risk Calculator assesses risk based on the type of surgical procedure being performed. This calculator takes 21 patient-specific factors into account, such as age, sex, BMI, functional status, and whether the case is emergent or non-emergent. Using this tool, clinicians can calculate the estimated percentage risk of a major adverse cardiac event (MACE), death, and eight other outcomes. Because it is based on "procedure targeted" models, the NSQIP surgical risk calculator may be the most accurate in predicting the risk of surgery-specific MACE and mortality.

Each of these three scoring systems has utility in assessing the risk of surgical complications; all three are recommended in the 2014 American College of Cardiology/American Heart Association Perioperative Guidelines [8]. However, limitations exist for each system, as such, it is important to identify the most appropriate score for every individual clinical scenario. As previously stated, the RCRI is not an accurate predictor of all-cause mortality and has a lower discriminative ability compared to NSQIP MICA. The NSQIP surgical risk calculator takes emergent versus non-emergent cases into account, but it is not specifically designed for patients undergoing emergency surgery. According to the ACS-NSQIP, the definition of an emergency is one which "is usually performed within a short interval of time between patient diagnosis or the onset of related preoperative symptomatology". It is implied that the patient's well-being and outcome is potentially threatened by unnecessary delay and the patient's status could deteriorate unpredictably or rapidly. The NSQIP Principal Operative Procedure must be performed during the hospital admission for the diagnosis." [17].

Additionally, the two tools based on NSQIP data have not been validated with a population outside the NSQIP database, limiting the MICA and surgical risk calculator. Furthermore, the NSQIP definition of an MI may underpredict the number of cases, as the criteria do not necessarily include every case of myocardial infarction. Another limitation is that these systems use the American Society of Anesthesiology Physical Status Classification, a risk scoring system with poor inter-rater reliability [18]. Additionally, NSQIP MICA and RCRI mainly look at elective procedures, and may not be as applicable to patients undergoing emergency procedures. Therefore, these scoring systems, while useful in stratifying risk, may underestimate the risk of morbidity and mortality in patients undergoing emergency surgery. Compared to patients undergoing non-emergent surgery, emergency surgery patients have substantially higher rates of major perioperative complications [19].

In fact, a study published in 2019 found that the ACS-NSQIP risk calculator "significantly and consistently underestimated the risk of mortality and morbidity in all nonagenarians (individuals between 90–99 years old) undergoing emergency general surgery (EGS)"; this was especially pronounced in certain populations, particularly those with any combination of weight loss, steroid use, or septic shock [20]. For patients with any two out of these three risk factors, mortality greatly increased.

The study population consisted of 4724 nonagenarians undergoing EGS, identified from 2007 to 2015 in the NSQIP database. For patients who experienced concomitant weight loss and had been prescribed steroids, the study reported a mortality rate of 100%; the rate predicted by the ACS-NSQIP risk calculator, however, was approximately 50%. Similarly, there was a mortality rate of 93% among nonagenarians undergoing EGS who presented with weight loss and septic shock, compared to approximately 70% predicted by the ACS-NSQIP risk calculator. For patients with septic shock and steroid use, the ACS-NSQIP risk calculator predicted a mortality rate of roughly 65% compared to the 80% reported in the study population. In light of these findings, the authors recommended that the ACS-NSQIP risk calculator be used with caution in nonagenarians undergoing EGS, as morbidity and mortality may be significantly underpredicted.

The Emergency Scoring System (ESS) is a recently developed risk stratification tool specifically designed for patients undergoing emergency surgery; it is validated to predict mortality in emergency surgery patients. Additionally, a follow-up study showed that it reliably predicts the rate of 30-day postoperative complications in emergency surgery patients [21]. The ESS was developed using ACS-NSQIP data, identifying 22 variables that impact mortality to assess risk. Compared to other risk stratification calculators, ESS is unique in that it was developed using data from emergency surgeries and intended for patients undergoing emergency surgery. Additionally, the variables in the ESS calculators are objective and clearly defined.

11.2.3 Frailty as a Predictor of Postoperative Outcomes

The risk assessment calculators are convenient tools to help determine the risk of perioperative and postoperative complications. These scoring systems, however, do

not provide meaningful information on the patient's quality of life postoperatively. Elderly patients undergoing emergency surgery may survive the initial treatment, but then suffer significant physical and mental disability secondary to comorbidities and underlying health [22].

Age alone is not a valid predictor of postoperative morbidity, as patients of the same age may vary widely in their exercise tolerance, ability to live independently, and ability to tolerate medical procedures. Even when taking into consideration the patient's comorbidities, the ability to predict long-term postoperative outcomes remains a challenge. Picture two patients: the first, a 76-year old with coronary artery disease and a history of a prior myocardial infarction; the second, a 90-year old with the same medical history. At first glance, the 76-year-old patient might seem like a better surgical candidate. If, however, we knew that the 76-year old was wheelchair-bound, while the 90-year old regularly participated in half marathons, the older patient may then be viewed as a better surgical candidate.

This missing information is best quantified as a patient's frailty. Frailty is a syndrome that is characterized as the physiologic decline in many systems associated with older age. This decline depletes the body's ability to return to homeostasis after stressors, increasing vulnerability to illness and surgery [23, 24]. Simply put, the frail adult is unable to recover as easily as the non-frail adult and will experience a decline in health disproportionate to the degree of the stressful event. These patients are at an increased risk of postoperative morbidity, and thus may have better long-term outcomes with less aggressive measures. It is, therefore, imperative for the internist to identify these adults to help guide the surgeon and family in decision-making. Ideally, this can be done during the patient's visits to their primary care physician, but may also be completed by the hospitalist or surgeon at the onset of an acute event. While some patients may be readily identified as frail, the term is imprecise and can be difficult to objectively delineate.

Many different scoring systems have been developed to identify the frail individual. Some are more comprehensive, such as the Canadian Study of Health and Aging Frailty Index, which has 70 items and would be unlikely to be used in the emergency setting. A 2016 comprehensive review found 67 different frailty assessment tools capturing different aspects of the syndrome [25]. The study identified the Physical Frailty Phenotype as the most commonly used, followed by the Deficit Accumulation Index and the Vulnerable Elders Survey. The Physical Frailty Phenotype (PFP), also known as the Fried or Hopkins Frailty Phenotype, consists of five criteria:

- Low physical activity (Kcals/week)
- Unintentional weight loss (greater than 5% of body weight in the last year)
- Weakness (grip strength)
- Slow walking speed (greater than 6 s to walk 15 feet)
- Exhaustion (self-reported)

Each of the criteria has 1 point value: 0 indicating "not frail", 1–2 indicating "intermediate-risk" of frailty, and 3+ indicating the "frail" phenotype [26].

Table 11.3 FRAIL Scale [27]

Each letter is valued at 1 point for a positive response
Fatigue ("Have you felt fatigued? Most or all of the time over the past month?")
Resistance ("Do you have difficulty climbing a flight of stairs?")
Ambulation ("Do you have difficulty walking one block?")
Illnesses ("Do you have any of the following illnesses: hypertension, diabetes, cancer (excluding minor skin cancer), chronic lung disease, heart attack, congestive heart failure, angina, asthma, arthritis, stroke, and kidney disease?") Five (or greater) = 1, fewer than 5 = 0
Loss of weight ("Have you lost more than 5% of your weight in the past year?")
Scores range from 0 to 5. 0 = non-frail, 1–2 = prefrail status, 3–5 = frail status

While convenient in the outpatient setting, this frailty assessment tool requires patient participation and would not be suitable for evaluation in the emergency setting. A quicker frailty screening assessment tool that has been developed is the FRAIL scale (Table 11.3), which uses the mnemonic FRAIL to help clinicians remember the five items of the questionnaire [27].

Other frailty indexes have been specifically developed for the emergency setting. One such tool is the Emergency General Surgery Specific Frailty Index (EGSFI), which is a 15-variable measurement tool that includes comorbidities, daily activities, health attitude, and nutrition [28]. This assessment tool was validated as a reliable predictor of postoperative complications and mortality in geriatric emergency general surgery patients.

It is worth noting that many of the frailty assessment tools focus on physical ability and health without taking into account a cognitive assessment of the patient [29]. Frailty has been shown to be associated with an increased rate of cognitive decline and an increased risk of cognitive impairment [30, 31]. Additionally, patients with cognitive impairment have an increased risk of adverse outcomes following physical insult. Therefore, the effects may be compounded in the cognitively impaired frail patient.

Regardless of the frailty assessment tool used, identifying the frail patient is an important part of the medical evaluation by the internist. The presence of the frailty syndrome can significantly impact postoperative outcomes of the geriatric patient undergoing emergency surgery and may heavily influence the type of treatment deemed appropriate in the clinical situation.

11.2.4 Final Decision-Making Considerations

Once a medical evaluation has been performed, the decision to treat surgically versus non-surgically can be fully undertaken. It is worthwhile to note that semantics are very important when discussing with the patient and their family whether or not to proceed with surgery. The decision to perform surgery should not be referred to as whether to "treat or not." This can convey a sense of abandonment in situations when the patient might not be an ideal surgical candidate thus leading the family to opt for more aggressive measures. Instead, the language should focus on whether to treat *surgically* or *medically*, thereby conveying proper treatment of the patient with either choice.

The final decision will consider the surgical risk calculation for the operation along with the patient's frailty index. These calculations can give useful information about the risk of complications and the likelihood the patient will make a meaningful recovery. This information has its limitations and cannot be used as a sole deciding factor, rather it should be used as a guide for the patient, the patient's family, and physicians to make a decision on the most appropriate course of action. Even with the risk assessment and frailty index tools, it is often difficult in emergency situations for a surgeon to make an informed decision without knowledge of a patient's baseline level of function and medical history as age alone has not been proven to be a good indicator. For this reason, obtaining input from the primary care physician, the medical record as well as any advance directives is imperative to making a final decision [32].

It is worth noting that there should be a balance between time spent obtaining these records and expediency of treatment. In the event that immediate surgery may provide life-saving treatment, it is important not to delay surgery, which may be associated with reduced overall outcome. In the case of elderly patients severely injured by trauma, it is recommended that aggressive measures be taken initially as outcomes have been found to be the most favorable with this approach [33]. Overall, the decision to proceed with surgery or not will largely be dictated by the individual clinical picture, the expectations and wishes of the patient, his or her health care proxy, availability of alternate treatments, and the risks of not performing the surgery.

11.3 Decision: Surgery

In the following section, we will discuss the role of internists in the care of elderly patients who are deemed to be appropriate surgical candidates.

11.3.1 Postoperative Management of Surgical Patients

The burden of emergency surgery on the elderly patient is immense, as postoperative mortality rates steadily increase with age with a notable jump after age 75 [34]. The mortality rate after an appendectomy, for example, is 6–7 times higher in those over 70 compared to those 20–49 years old [35]. Given the elevated risks of surgery in this population, proper management during the postoperative period is crucial. Many complicating factors contribute to this elevated mortality including the presence of comorbid conditions as well as altered physical and mental status masking clinical improvement or decline. Postoperative delirium is another important consideration as up to 18% of these cases are complicated by delirium [36].

The American Geriatrics Society's Geriatrics for Specialists Initiative has released guidelines for the optimal care of geriatric patients in the postoperative period [37]. They recommend the use of interdisciplinary teams, early mobility and walking, avoiding restraints, sleep hygiene, adequate nutrition, fluids and oxygen, and appropriate pain control. Postoperative management of elderly patients also

necessitates the assessment of goals of care with patients and their families as well as rehabilitation to work towards a satisfactory discharge status [36]. The complicated nature of caring for the geriatric patient in the postoperative period warrants tailored care by a multidisciplinary team to ensure optimal outcomes.

11.3.2 Comanagement between Internists and Surgeons

A care model that has been gaining traction is comanagement between the primary surgical and hospitalist teams. In this care model, the internist performs daily rounds on comanaged patients, orders diagnostic and therapeutic interventions as well as consults as needed, manages all chronic medical comorbidities, and responds to nurse and nurse practitioner questions [38–40]. These care models have traditionally been implemented for patients with elevated risk for perioperative complications determined by advanced age and presence of comorbid conditions [38].

Many studies have investigated the impact of these integrated care teams and have come to conflicting conclusions. Importantly, studies have demonstrated comanagement techniques leading to reduced mortality [40, 41], decreased length of stay (LOS) [41–44], decreased surgical delays [41, 42], decreased complications [38], and improved postoperative functional status [44]. Two studies looked at health care professional and resident perceptions of comanagement and both demonstrated a strongly positive view of the programs [39, 40]. Of note, the study that found the greatest improvement in mortality with comanagement was done in the department of vascular surgery. The authors of this paper posit that the complex nature of their patients and the presence of multiple comorbidities made internist management an invaluable adjunct to patient care [40]. Other studies, however, failed to find a notable impact of comanagement on mortality or complication rates [39, 41–44]. Potential pitfalls of this care model may include the fragmentation of care and disengagement of the surgeon [5]. Table 11.4 shows the outcomes of seven

Table 11.4 The impact of comanagement on patient outcomes

Author	Department	Length of stay (LOS)	Mortality	Surgical delays	Complications	Post-op functional status
Huddleston [38]	Orthopedic surgery	No change	N/A	N/A	Decreased for minor only	N/A
Batsis [45]	Orthopedic surgery	Decreased	No change	Decreased	No change	N/A
Pinzur [43]	Orthopedic surgery	Decreased	No change	N/A	No change	N/A
Auerbach [39]	Neurosurgery	No change	No change	N/A	N/A	N/A
Lizaur-Utrilla [41]	Orthopedic surgery	Decreased	Decreased at 6 and 12 mo	Decreased	No change	No change
Tadros [40]	Vascular Surgery	Increased	Decreased	N/A	N/A	N/A
Adogwa [44]	Neurosurgery	Decreased	N/A	N/A	No change	Improved

recent studies investigating the impact of comanagement. The discrepancies between studies indicate the need for larger future studies with standardized comanagement approaches for a more definitive answer.

11.3.3 Multidisciplinary Geriatric Units

Another more intensive care model for the geriatric population is the multidisciplinary geriatric care unit. This care model has been described as a diagnostic and therapeutic strategy designed for the identification, prioritization, and appropriate management of the complex needs of the postoperative geriatric patient [46]. Riemen et al. proposed the seven key features of a multidisciplinary hip fracture program including orthogeriatric assessment, rapid optimization of fitness for surgery, early identification of individual goals for multidisciplinary rehabilitation, continued, coordinated orthogeriatric and multidisciplinary review, liaison with other services (mental health, falls prevention, bone health, primary care, social services), governance structure for all states, and palliative care [47]. Prestmo et al. outlined their own approach to the "comprehensive geriatric care unit" orchestrated by the Departments of Geriatrics and Internal Medicine [48]. This unit incorporated comprehensive geriatric assessment focusing on somatic health (comorbidity management, review of drug regimens, pain, nutrition, elimination, hydration, osteoporosis, and prevention of falls), mental health, function (mobility and activities of daily life [ADLs]), social situation, early discharge planning and early mobilization, and initiation of rehabilitation [48].

Comprehensive geriatric units show promising outcomes including improved mobility in 4 months [48], increased rate of discharge home [48], decreased length of stay [49], and decreased surgical delay [49]. Table 11.5 demonstrates outcomes from two studies investigating the impact of comprehensive geriatric care units. The role of the primary care physician in this multidisciplinary model is to communicate with the in-hospital team to obtain clear information on the complete evaluation, specialist consults, and management recommendations. Although additional research is required to validate favorable results in the literature, comprehensive geriatric units may, indeed, improve care for the increasing needs of the elderly population.

Table 11.5 The Impact of Comprehensive Geriatric Care Units on Patient Outcomes

Author	Department	Length of stay (LOS)	Mortality	Surgical delays	Complications	Post-op functional status
Biber [49]	Orthopedic Surgery	Decreased	No change	Decreased	No change	N/A
Prestmo [48]	Orthopedic Surgery	Longer	N/A	No change	N/A	Improved

11.3.4 Postoperative Care by the Primary Care Physician

The internist plays a key role in patient management in the postoperative period. In the paper by Brooke et al., the authors described how early follow-up with a primary care physician following thoracic aortic aneurysm repair with postoperative complications was associated with a reduction in readmission rate from 35.0 to 20.4% [50]. The authors hypothesized that these appointments allowed PCPs to identify errors in discharge, recognize postoperative complications, and intervene early [50]. Timely PCP follow-up after hospital admission has repeatedly been associated with superior outcomes and reduced readmission rates [50–53]. Further research is required to delineate specific subpopulations of elderly individuals who would most benefit from early PCP follow-up.

A significant cause of preventable readmissions is poor coordination during transfers of care. During these transitions, the elderly are particularly vulnerable to experiencing poor care quality and care fragmentation. After hospital discharge, elderly patients with continuous complex care needs frequently require ongoing medical care in multiple settings including subacute or long-term rehabilitation facilities. Given that fewer than 50% of patients see their PCPs within 2 weeks of hospital discharge, this lack of provider continuity increases the likelihood of errors and inappropriate care [50]. Primary care physician follow-up after hospital discharge has been highlighted as a key intervention point in medical care to prevent hospital readmissions. Comprehensive programs to enhance care during transitions between settings can reduce not only 30-day hospital readmissions but also readmissions for the entire year after the initial hospitalization [54–56]. Although elderly patients may have a primary care physician, post-hospitalization follow-up is frequently impacted by a variety of factors, including lack of health insurance, copayment requirements, transportation issues, as well as scheduling difficulties.

11.3.5 Wound Care

Wound care for the postoperative elderly patient in the outpatient setting should be managed with a multidisciplinary perspective. Palliation with symptom control and avoiding infectious complications should be the main goal of care. The physician and nursing staff are critical for dressing changes, choice of dressing, and documenting changes in wound status to the health care team [57]. Rehabilitation specialists such as occupational, physical, and speech therapists assist with maximizing mobility and feeding abilities. The nutritionist can assist with optimal protein and caloric intake to ensure optimal wound healing. Home attendants spend the most time with patients and often are the best resources for information on intake and functional status. The social worker assists in identifying social support systems and ensuring that the patient and/or family and home health aides are able to appropriately care for the wound and bring the patient to all appointments.

11.3.6 Medication Reconciliation

Medication errors harm an estimated 1.5 million people each year in the United States, and the majority of these errors occur during transitions of care [58]. Pharmacists are well-suited to detect these errors and to help patients manage drug-related issues during transitions of care. Studies have demonstrated that accurate medication reconciliation and medication education can decrease readmission rates, which could potentially improve patient outcomes. Reduction in readmission rates can also have significant financial implications to the health system. Studies have demonstrated the feasibility of incorporating pharmacy technicians in the medication reconciliation process. Expanding a pharmacy technician's role to include the initial phase of medication reconciliation can play a vital role.

11.3.7 Depression Screening

Depression in the elderly is common with an estimated prevalence of approximately 12% [59]. Depression is even more common in physically ill elderly patients in general hospitals with estimates of 5–58% and a mean prevalence of 29% [59]. Diagnosis and treatment of depression in hospitalized elderly patients will not only help to alleviate distress but could also help to reduce the risk of suicide. The identification of depression in elderly patients in the perioperative period is of particular importance due to its association with a myriad of complications. Increased rates of postoperative infection, cognitive impairment, and severe acute and chronic pain have all been linked with perioperative depression [59]. Unfortunately, diagnosing depression in perioperative elderly patients can pose particular problems. This is primarily because symptoms of depression, such as loss of appetite, weight loss, decreased energy and fatigue, and disturbed sleep are similar to symptoms of physical illness. This is further complicated by the fact that the elderly frequently deny low mood and physicians in the hospital often feel too busy to take time to inquire about depression. These difficulties highlight the pivotal role primary care physicians must play in postoperative depression screening in the elderly population.

11.3.8 Special Considerations: Pain Management in the Elderly

Pain management is a complex challenge for geriatric patients in the postoperative period. Special considerations in this population include decline in organ function, polypharmacy, change in pharmacokinetics and drug sensitivity, and frailty [60]. Although these factors make elderly individuals more prone to adverse effects of pain medications, rates of uncontrolled pain are consistently higher among older individuals, especially those with cognitive impairment [61, 62]. The mainstay of treatment for severe postoperative pain in the elderly population is opioids. Despite their side effect profile, opioids are safe in the elderly when awareness of patients'

altered sensitivity is recognized [60]. Conservative initial dosing and continuous reassessment of patient response to pain medications are of vital importance [63].

The Beers criteria was developed to identify particularly high-risk pain medications for the geriatric patient. High-risk drugs include meperidine, antihistamines, muscle relaxants, tricyclic antidepressants, and benzodiazepines [64]. Adjunctive treatment with acetaminophen, nonsteroidal anti-inflammatory drugs, or other non-opioid drugs is the best way to reduce opioid consumption and duration of use [65]. Utilization of multimodal pain control remains the best way to manage postoperative pain for geriatric patients who are more sensitive to analgesia, sedation, respiratory depression, cognitive impairment, delirium, and constipation [60].

In conclusion, if a post-discharge follow-up visit is to succeed in reducing the risk of rehospitalization, it will need to include extensive exploration of the patient's changed medical condition, as well as provide education and support. Several guidelines have been produced, including a checklist for physicians by the California Healthcare Foundation [66] and the American Medical Association's there and Home Again Safely publication which details the responsibilities of primary care practices during transitions in care [67]. Recommended responsibilities include coordination with caregivers, case managers, and home health workers, sharing of recommendations and medication instructions with all members of the team, medication reconciliation, involvement of visiting home nurses, wound care, and extensive instruction to patients and caregivers to ensure safe post-hospitalization discharge in the elderly. With the rapid growth in hospitalists and development of the specialty of hospital medicine, it has become increasingly important for hospital-based physicians, surgeons, and primary care physicians to communicate relevant patient information at hospital discharge. Delays and omissions in discharge communications are common and may lower the quality of post-hospitalization care. A number of interventions appear effective in improving the timeliness and quality of discharge [66].

11.4 Decision: Nonsurgical Management

In the following section, we will discuss the care of elderly patients who, for a variety of reasons, are not deemed to be surgical candidates. It is imperative in these situations for the PCP to discuss advance directives with the patient and his or her health care proxy. A Health Care Proxy is a person or persons, either a family member or close friend, appointed by the patient to make health care decisions when the patient is no longer able to do so.

11.4.1 Advance Directives

Advance directives are legal documents that give a patient the opportunity to outline the type of care he or she desires in the event of an emergency or at the end of life. Different approaches have been developed to solve this problem including the

deployment of MOLST forms [68]. MOLST, or Medical Orders for Life-Sustaining Treatment, formerly known as Physician Orders for Life-Sustaining Treatment (POLST), are a portable order set created and signed by the provider and patient to direct care across settings in the last stages of life [69]. The MOLST form is "based on communication between the patient, his or her health care agent or other designated surrogate decision-maker, and health care professionals that ensures shared, informed decision-making" and improved quality of care at the end of life [70]. Primary care physicians are encouraged to have discussions about end of life care with elderly patients so that their wishes will be known should a MOLST or other legal document not be available.

11.4.2 Early Palliative Care

Palliative care focuses on achieving the best possible quality of life for elderly patients and their caregivers, based on patient and family needs and goals independent of prognosis. Interdisciplinary palliative care teams assess and treat symptoms, support decision-making, and help match treatments to informed patient and family goals to ensure a safe and secure living environment.

Palliative care is provided both within and outside hospice programs. Palliative care outside hospice is offered independent of the patient's prognosis and simultaneously with life-prolonging and curative therapies for persons living with serious and life-threatening illnesses. Ideally, palliative care should be initiated concurrently with a diagnosis of a serious illness and at the same time as curative or disease-modifying treatment [71]. Unlike hospice, palliative care may be primary, secondary, or tertiary [70]. Primary palliative care should be part of what all treating primary care physicians provide their patients, such as pain and symptom management, and discussions about advance care planning. Secondary palliative care is offered when the primary care physician refers to palliative care experts for unusually complex or difficult problems. Tertiary palliative care includes research and teaching in addition to palliative care expertise [71].

11.4.3 Hospice

At some point along the palliative care continuum, patients may enter a phase when the transition to hospice care is warranted. While advanced disease states often require intensive and painful interventions, they are not always associated with improved outcomes, nor preferred by patients or their families. Both palliative care and hospice services for elderly patients focus on increasing quality of life and promoting comfort in patients. For elderly patients with multiple chronic conditions, palliative care serves to promote comfort whereas decline in physical or cognitive function during rehabilitation after surgery may warrant a referral for hospice. Early recognition by nurses to integrate palliative care or initiate an evaluation for hospice referral benefits elderly patients by encouraging care that promotes comfort and a

desirable quality of life [72]. Nurses can play a pivotal role in transforming patient care by advocating for palliative approaches [72].

United States hospice services are delivered in a model established by statute in Medicare and followed by most other insurers. The Medicare Hospice Benefit is largely restricted to patients with a prognosis of living for 6 months or less if the disease follows its natural course, who agree to forgo treatment [57]. Hospice is designed to provide comprehensive, interdisciplinary, team-based palliative care, mostly in a place the patient calls home [57]. Hospice care is appropriate when patients and their families decide to forgo curative therapies in order to focus on maximizing comfort and quality of life, when curative treatments are no longer beneficial, when the burdens of these treatments outweigh their benefits, or when patients are entering the last weeks or months of life [57].

In the latter half of the twentieth century, most critically ill elderly patients died in hospitals. A recent study in the New England Journal of Medicine titled "Changes in the Place of Death in the United States" analyzed data from the Centers for Disease Control and Prevention and the National Health Statistics database for patients dying of natural death in the United States from 2003–2017 [73]. For the first time, the most common place of death is at home. The authors note that death at home is preferable for most people, but for many this may not be feasible. However, more information about the patient and family experience of dying at home is needed. Patients' family members can be given significant responsibility and may be unprepared.

There are existing barriers that impede the integration of palliative care services and timely referral for hospice among frail elderly patients. These barriers include lack of knowledge regarding the purpose, benefits and existence of palliative services and hospice care, and the lack of optimal utilization of integrative palliative care and timely hospital referral. MOLST forms are an important step for allowing the elderly near the end of life to translate their wishes into orders and to avoid unwanted resuscitation, artificial ventilation, or hospitalization. Furthermore, understanding and respecting patients' desires for place of death and supporting patients in achieving their wishes should be a priority among the healthcare team.

11.5 Conclusion

The care of the elderly patient undergoing emergency surgery requires a team approach. The internist plays a role in every stage of care. The primary care physician often has established a rapport with the patient prior to the acute event and has an understanding of the patient's underlying medical condition and goals. When a patient is admitted to the hospital, the hospitalist frequently assumes care of the patient and will be called upon to conduct a medical evaluation prior to the decision to pursue a surgical approach. The hospitalist and surgeon can form comanagement teams to improve outcomes. The primary care physician is called upon again to care for the patient after discharge from the hospital. The PCP also plays a role in

establishing early palliative or hospice care, whether in a facility or at home. The contribution of the internist in the management of the elderly patient facing emergency surgery should not be underestimated.

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