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## Introduction

Surgical ethics in Western medicine are classically governed by four basic principles: *non-maleficence*, *beneficence*, *autonomy*, and *justice*. As we consider management of the injured geriatric patient, the principle of *double effect* is also of utmost importance. The ethics that underlie contemporary surgical care of the elderly are founded on principles of medicine originating with the Hippocratic Oath. *Beneficence*, *non-maleficence*, and confidentiality, originally described by the earliest records of the oath, continue to be the guiding principles for surgical care into the twenty-first century. These were modified and expanded in 1803 when Thomas Percival created guidelines for physician behavior toward the patient in his treatise, *Medical Ethics; or A Code of Institutes and Precepts Adapted to the Professional Conduct of Physicians and Surgeons* [1]. Later in the nineteenth century, the American Medical Association produced its Code of Medical Ethics as a contract that defined the relationship between the physician, the patient, and the public trust, adding the principle of *justice* to beneficence and maleficence [2]. By the mid-twentieth century, the recognition that unprecedented medical advances and research, while potentially beneficial to humanity in general, was not always to the benefit of the individual patient and could be misused or abused. The concept of informed consent became a widespread expectation with the 1972 Patient's Bill of Rights. This heralded a change in medical ethics, as it evolved away

from paternalism to embrace *autonomy* as the main guiding principle and value, at least in American health care [3]. Now in the new millennium, as more attention is paid to health-care resource allocation, access, and disparity, the ethical principle of *justice*, or equal distribution of care, is becoming increasingly important to surgical practice as we consider the effects of surgical decision making not just on the individual patient but on the health of the population at large. This is particularly relevant for elderly trauma patients and the surgeons who care for them, as we balance multiple and conflicting ethical priorities in the face of advances in surgery that may not translate into better outcomes for this often frail and compromised group of patients. How this affects surgical decision making for the geriatric trauma patient, and the ethical principles that guide it, is the subject of the ensuing chapter.

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## Basic Principles of Medical Ethics

### Non-maleficence

*Primum non nocere; first, do no harm.* This principle heralds with the Hippocratic Oath in which the physician commits to abstain from doing harm. It gives the physician pause to consider that in some situations, an intervention may cause the patient harm without a net benefit. It is thus important to understand the potential risk of harm of any treatment offered to a patient. In considering the geriatric trauma population, overall mortality is 8 % [4]. For each 1-year increase in age beyond 65, the odds of dying after geriatric trauma increase by 7 % per year [4]. Further, the mortality associated with urgent or emergent operative intervention is two to three times greater in those over age 65 compared to younger patients [5]. This is further increased for the frail elderly; with the availability of frailty scoring systems [6], the surgeon can prognosticate with more accuracy the benefit or harm of emergency surgery in the geriatric trauma patient with significant comorbid conditions. There is most certainly

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an age-dependent survival decrement [7], and the patients overall outcome should be considered when seeking invasive interventions.

## Beneficence

The second ethical principle of *beneficence* goes hand in hand with non-maleficence and also is rooted within the Hippocratic Oath. Beneficence requires that the procedure provided is with the intent of doing good for the patient involved and promotes their overall well-being. One could argue that in the setting of traumatic injury, the intent of the team is always focused toward the good of the patient. In practice, virtually all treatments have some risk of harm, and the practitioner must weigh the potential risks against the intended benefit before proceeding. Frequently, there is conflict between beneficence and non-maleficence, with surgical treatment constituting both, in the same patient. Since beneficence must be weighed against non-maleficence, the effects of the two principles together give rise to the concept of “double effect” which is described in detail later.

Beyond the *intent* to help the patient, beneficence further demands that health-care providers develop and maintain skills and knowledge specific to the patient population that they care for such that they may provide the *best possible care*. One is ethically required to continually update training, maintain appropriate knowledge and skill, consider individual circumstances of all patients, evidence based medicine as it applies to the individual patient, and strive for net benefit. Thus, it is important to understand the challenges specific to the care of the geriatric patient that are discussed elsewhere in this text.

## Autonomy

The concept of autonomy is rooted in the right of the individual to make decisions regarding personal matters. It is supported by legal and ethical precedent in the United States, including The Patient’s Bill of Rights (American Hospital Association 1972) [8], and The Patient Self-Determination Act of 1990 [9]. Autonomy requires that the patient have autonomy of thought, intention, and action when making decisions regarding health-care procedures. It also justifies the patient’s right to refuse any treatment and to be informed of the consequences of the treatment. In order for a patient to make a fully informed decision, he must understand all risks and benefits of the procedure and the likelihood of success. This requires that the patient be well informed during the consent process. Patients may choose among treatment options or refuse care, even if the recommended treatment is lifesaving.

Self-determination in the elderly population may be challenging. Often with advanced age, patients may have

diminished decision-making capacity. Patients are however permitted to determine their future health-care decisions by completing a living will or advance directive and identifying a health-care proxy or surrogate. Physicians are legally bound to observe the wishes set forth in a living will in the event that a patient is incapable of making such decisions. Unfortunately, these documents generally do not lay out stipulations for specific clinical scenarios, nor is it easy or straightforward to determine if the actual clinical reality meets the criteria or circumstance intended by the patient in their advance directive. We thus often rely on surrogate decision makers to assist in determining what the wishes of a patient who lacks decision-making capacity might be.

## Justice

The fourth ethical principle, *justice*, concerns the distribution of resources that may be scarce and also seeks to protect vulnerable populations. Elderly patients are most certainly a vulnerable population. By virtue of the pathophysiology of aging, geriatric patients have decreased vision and hearing, decreased muscle mass, and decreased balance and proprioception and often have osteoporosis—all of these contribute to an increased risk of traumatic injury and a potentially increased severity of injury. Preexisting medical conditions may contribute to increased morbidity and mortality. Further, cognitive impairment may make it difficult for elderly patients to voice their interests. The ethical principle of justice would mandate that we protect this population as a vulnerable population.

Justice mandates that the burdens and benefits of treatment, even new or experimental treatments must be distributed equally among all groups in society including the aged. Numerous articles suggest a degree of ageism in the treatment of ischemic heart disease and breast cancer [10–12]. We must be careful that treatment decisions are not made in a discriminatory fashion in elderly trauma patients.

Instead of considering age alone when making treatment decisions, the physician may instead utilize measurements of functional status and/or frailty as objective indices of a patient’s pre-injury quality of life and potential outcome after injury or surgery [6]. The health-care provider must consider four main areas when evaluating justice: fair distribution of scarce resources, competing needs, rights and obligations, and potential conflicts with established legislation.

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## Principle of Double Effect

Each clinical situation requires consideration of all four of the above ethical principles (summarized in Table 37.1). Frequently, fulfillment of one principle conflicts with

**Table 37.1** Basic principles in medical ethics

Principle	Ethical imperative
Autonomy	Respect the capacity of individuals to make their own choices and act accordingly
Beneficence	Relieve pain and suffering; foster the interests and well-being of other persons and society
Non-maleficence	Do no harm; do not inflict pain or suffering
Justice	Act fairly; distribute benefits and harms equitably

Adapted from Beauchamp and Childress [13]

fulfillment of others. For example, a surgeon may perform an orthopedic procedure with the intent to restore a patient to their previous functional status (beneficence), but may cause further disability or even death from complications related to the procedure (maleficence). Withdrawal of life-sustaining treatment, such as a ventilator, is ethically acceptable if the patient's wishes are to be liberated from burdensome medical treatments. Treatment of pain at the end of life may be beneficial, but is thought to hasten death in some situations. If the *intent* of therapy constitutes beneficence, even if it results in harm, it is ethically justified based on double effect. The principle of double effect allows the surgeon to perform surgery and aggressively treat pain and suffering if the intent is to do good with the understanding that the side effect of the treatment may harm the patient.

## Informed Consent

The concept of patient consent for medical procedures evolved over the twentieth century as a reaction to the cruelties committed by Nazi concentration camp "doctors" [14]. Up until the mid-twentieth century, paternalism prevailed, with the physician determining what was best for the patient in most circumstances. The Nuremberg code established the concept of informed consent for research participants to include a requirement that research benefit societal good, patients be informed and volunteer to participate of their own free will without coercion. The consent process as practiced in the developed world is not just a signature on a piece of paper; the process requires a competent doctor, adequate transfer of information, and consent of the patient. In the event that a patient is unable to give consent, a surrogate may consent on the patient's behalf.

The only circumstance under which consent is not required is in the emergent care of a patient who is unable to give consent. While this is perhaps common in the setting of acute traumatic injury, the entitlement to carry out emergency treatment prevails only so long as the treatment is

directed toward a life-threatening condition and the patient is unable to participate meaningfully in decision making about his or her condition. Once the immediate threat is addressed, consent for further intervention should be sought. If an individual does not recover consciousness or is cognitively impaired by injury or illness, then physicians may turn to surrogates as with any other impaired patient.

Informed consent is a legal term introduced and defined within FDA regulations in the early 1970s and outlined within the National Research Act in 1974. The basic elements of informed consent include preconditions, information, and consent [14]. Preconditions for informed consent include patient competence to make decisions and the patient's willingness to participate in the consent process. Determination of decision-making capacity is discussed in detail in the next section.

Information is the body of facts provided by the physician or health-care provider to the patient such that the patient has sufficient knowledge to make a decision. The physician is obligated to describe not only the intended treatment or procedure and its benefits, but the associated risks must also be described. In addition, available alternatives to the recommended treatment should be offered, and the patient should be counseled as to the likely course if no treatment or procedure is undertaken at all. The information provided must not only be comprehensive, but must be comprehensible—provided in terms that the patient or their surrogate can easily understand.

The final element of informed consent is the "consent" itself. The patient acknowledges that they understand the procedure or treatment offered and authorizes proceeding with the intended treatment. Consent is usually written but may be given verbally with appropriate documentation of the consent process.

## Decision-Making Capacity

A particular challenge with the geriatric population is determining whether the patient has decision-making capacity. While autonomy is valued, and it is certainly preferable to obtain consent from an informed patient directly, the patient must have appropriate insight to make an informed decision. Clinical judgments about decision-making capacity are part of everyday medical practice. A patient who is unconscious is certainly not able to give informed consent, nor is a patient who is delirious or suffers from significant dementia. Other subtle alterations in mental status may lead a clinician to question a patient's decision-making ability. Furthermore, decision-making capacity may fluctuate with a variety of medical conditions or social circumstances.

Formal declarations regarding competence are made by the courts. The following criteria, however, may be useful as

a guide to ascertain whether or not an elderly patient has decision-making capacity [16]:

1. *Acknowledgment of Relevant Information:* The patient should understand their diagnosis and the proposed treatment.
2. *Appreciating One's Circumstances:* Patients must be able to acknowledge what disorder or disease process they have and understand how it will impact their life. The patient should be able to answer questions about their illness, the need for treatment, and what the outcome might be with and without treatment. If the patient does not have such insight, they may not be competent to give consent.
3. *Logical Use of Information:* The patient should be able to give evidence that they have recognizable reasons for their views or conclusions. Some views may be the consequence of delirium, dementia, or other disorder. It is not the specific view or belief that is at issue in this determination but the process by which a person has the belief that is important; if the patient came to a decision that is at odds with a physician's recommendation, this is acceptable if the decision was made in a logical fashion. If the decision is based in delusion, one may be concerned about the patient's decision-making ability.
4. *Communication of Choices:* This is a paramount condition of judging competence. The patient must be able to communicate the preference of one choice over another. A patient who says "yes" to every treatment option offered may not be appropriately integrating the information given. The identification of a choice is strengthened by evidence that the choice remains stable over time. That said, a patient may certainly change their mind but should be able to provide a meaningful reason for change.

If the above criteria are not met or if the patient has already been declared incompetent to make decisions by the courts, a surrogate decision maker should become involved in the consent process.

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## Advance Directives

The Patient Self-Determination Act of 1990 facilitates the right of the patient to make health-care decisions, refuse treatment, and make decisions about their future care by way of an advance directive and/or appointment of a surrogate decision maker. An advance directive is a document, often referred to as a living will, in which a person states his or her wishes regarding medical treatment in the event that they become mentally incompetent or are unable to communicate. Elements of the document frequently include wishes regarding resuscitation, mechanical ventilation, nutrition and hydration assistance, and dialysis and may also include wishes regarding organ or tissue donation. Physicians are

obligated to honor the wishes expressed in these written documents so as to honor the patient's autonomy even in a state of diminished capacity.

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## Surrogate Decision Making

Surgeons are ethically and legally bound to observe the wishes set forth in a living will in the event that a patient becomes incapable of making such decisions. Unfortunately, in practice, specific clinical scenarios are rarely laid out, and paper is a poor substitute for an informed discussion between patient and physician. This has led to a reliance on surrogate decision makers to interpret a patient's living will or advance directive and ensure the patient's wishes are carried out. In the absence of an advance directive, a surrogate may be asked to make a medical decision on behalf of the patient, in consultation with the physician.

Supreme Court decisions in the Karen Anne Quinlan and Nancy Cruzan cases have established that it is consistent with autonomy, beneficence, non-maleficence, and justice if a surrogate decision maker acts based on the patient's best interest or in accordance with the patient's previously expressed wishes [17, 18]. This provides the legal basis not only for treatment decisions, but for decisions to withhold or withdraw life support in patients who are incapacitated.

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## Do Not Resuscitate

Patients or surrogate decision makers have the right to refuse life-sustaining therapies based on the principle of autonomy. This can include cardiopulmonary resuscitation (CPR). A "DNR" order, or do not resuscitate, is withholding of CPR—this includes management of airway, intubation, and pharmacologic interventions to stimulate the heart, chest compressions, and defibrillation. Based on televised depictions of CPR, the general public, including the elderly, believe that three-quarters of patients survive CPR [19]. The unfortunate reality is that less than 20 % of patients survive CPR and that 10–44 % of those patients that do survive have permanent neurologic impairment.

The Patient Self-Determination Act of 1990 allows patients to refuse medical treatment even if it results in death, and "DNR" may be part of their advance directive. If a patient is unable to direct their own health care, a surrogate may enact a DNR order based on a patient's previously stated wishes. Alternatively, a physician may recommend DNR. The procedure of CPR was never intended for use in patients dying an expected death from a chronic, fatal, medical illness. Physicians are under no obligation to perform the medical procedure of CPR when the procedure is contraindicated.

## Futility

Much like the concepts of beneficence and non-maleficence, the concept of futility in medicine also dates back to the time of Hippocrates whereby physicians were advised to “refuse to treat those who are overmastered by their disease, realizing that in such cases medicine is powerless.” *Medical futility* has been defined as “a clinical action serving no useful purpose in attaining a specified goal for a given patient” [20]. We can further clarify that medical futility occurs when (1) there is a defined goal, (2) an action is directed at achieving this goal, and (3) there is virtual certainty that the action will fail in achieving this goal [21]. Unfortunately, with modern medical advances physicians in the twenty-first century may be reluctant to claim “certainty” that an action will fail in achieving its goal.

While unlikely, a 70-year-old with a severe traumatic brain injury who underwent craniotomy *might* be restored to an acceptable functional status and an 88-year-old *might* survive postoperative septicemia with multiorgan failure. Modern technologies and advances in medical knowledge have altered our abilities to sustain life. The counter-side is that we also have the ability to prolong death. Thus, in our endeavors where the goals of advanced life support are to prevent premature death by treating reversible illnesses, physicians and families are sometimes caught in a position where the dying process of a patient or loved one is extended and suffering is prolonged.

The American Medical Association states that physicians are not ethically obligated to deliver care that, in their best professional judgment, will not have a reasonable chance of benefiting their patients. These treatments, however, should be discussed with the patient or their surrogate decision maker along with a frank explanation of why the specific treatment is not beneficial. These discussions help to clarify goals of treatment and goals of care. Also, physicians should convey that medical care is NEVER futile, but rather specific therapies may be futile, in that they may not advance the goal or goals of care. In communicating with families, physicians must distinguish between aggressive treatments that may be futile to prolong life and those which are beneficial as they provide comfort. Pain control, respect for patient dignity, and reassurance of the patient and/or surrogate that the medical team will not abandon care even when specific treatments are deemed futile are of utmost importance.

## Conclusion

Caring for the geriatric trauma patient is challenging. The elderly are a vulnerable and sometimes frail patient population. While considering treatment plans and seeking procedural consents for these patients, one must adhere to the basic ethical principles of non-maleficence, beneficence, autonomy, and justice. Further, the principle of

double effect dictates that if the intent of a planned treatment or procedure is in alignment with basic ethical principles, it may be appropriate to accept that there may be associated secondary effects that are undesirable.

While honoring patient autonomy in the face of severe injury, we must recognize when a geriatric patient is unable to speak for him or herself. The trauma surgeon can navigate difficult medical decisions through shared decision making. This can be accomplished by understanding the patient’s wishes via an advance directive or consultation with a surrogate decision maker. While American health care has embraced autonomy, it is incumbent upon health-care practitioners not only to discuss the risks and benefits of specific treatment and procedures with patients and their families but to share with them likely outcomes of disease processes in the injured patient. This may include communication regarding cardiopulmonary resuscitation, DNR orders, or treatments considered futile. As practitioners, we must understand that while a particular procedure might be futile, care of the patient, symptom management, and compassionate communication with surrogate decision makers are never futile.

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