Hypothesis: The management of geriatric injured patients admitted to a trauma center includes the selective decision to provide comfort care only, including withdrawal of therapy, and a choice to not use full application of standard therapies. The decision makers in this process include multiple individuals in addition to the patient.

Design: Retrospective review of documentation by 2 blinded reviewers of the cohort of patients over a recent 5-year period (1993-1997).

Setting: Trauma service of a level I trauma center.

Patients: A convenience sample of patients aged 65 years and older who died, and whose medical record was available for review.

Main Outcome Measures: Patients were categorized as having withdrawal of therapy, and documentation in the medical record of who made the assessment decisions and recommendations, and to what extent the processes of care were documented.

Results: Among 87 geriatric trauma patients who died, 47 had documentation interpreted as indicating a decision was made to withdraw therapy. In only a few circumstances was the patient capable of actively participating in these decisions. The other individuals involved in recommendations for withdrawal of therapy were, in order of prevalence, the treating trauma surgeon, family members (as proxy reporting the patient’s preferences), or a second physician. Documentation regarding the end-of-life decisions was often fragmentary, and in some cases ambiguous. Copies of legal advance directives were rarely available in the medical record, and ethics committee participation was used only once.

Conclusions: Withdrawal of therapy is a common event in the terminal care of geriatric injured patients. The process for reaching a decision regarding withdrawal of therapy is complex because in most circumstances patients’ injuries preclude their full participation. Standards for documentation of essential information, including patients’ preferences and decision-making ability, should be developed to improve the process and assist with recording these complicated decisions that often occur over several days of discussion.

Arch Surg. 2000;135:34-38

Elderly persons represent worldwide the most rapidly growing sector of the population. As life expectancy has been extended, and travel and recreational activity by individuals older than 65 years has increased, a consequence has been increasing numbers of geriatric patients with serious injury who require hospitalization for treatment. The number of geriatric patients triaged to trauma centers in the United States is projected to increase from 11% to 13% and worldwide from 4% to 7%. Compared with younger trauma patients triaged to trauma centers in the United States is projected to increase from 11% to 13% and worldwide from 4% to 7%. Compared with younger trauma patients, elderly trauma patients are more frequently complicated by multiple preexisting medical problems, infirmity, and impaired capacity to heal their acute injuries. The death rate among hospitalized injured patients, adjusted for severity of injury, is higher for the elderly. Furthermore, elderly trauma patients who are discharged alive have a substantial risk of death in the first 2 months after hospital discharge. Finally, the recovery of elderly patients is more commonly characterized by prolonged impaired function, and inability to return to independent living. Geriatric trauma patients may represent in the next decades the greatest challenge to those committed to optimal care of injured patients.

A paramount issue for many geriatric patients is that they remain in control of their health care, and that they be able to direct health care decisions that pro-
PATIENTS AND METHODS

A retrospective review was conducted of all patients 65 years or older treated on the trauma service at our level I trauma center between January 1993 and December 1997. Patients studied were both direct admissions from the scene of injury and patients transferred from other hospitals. Of 89 patients, 87 charts were available for review by 2 independent reviewers, a surgeon (D.D.T.) and a nurse (B.L.), who recorded their findings on a standardized worksheet. Information abstracted included documentation regarding end-of-life decisions, specifically documentation in the progress notes of patient’s preferences (including whether the patient was unable to express preference), and family availability and participation in decision making. The care the patient was receiving prior to death was categorized as vital and/or curative therapy (Table 1). A specific search of the medical record for an advance directive (living will, power of attorney, or other document) prepared prior to injury was made. Also recorded on the worksheet was medical staff documentation of their assessment regarding prognosis, and discussions and recommendations as to the futility of care. If a second staff surgeon wrote a confirmatory opinion, this was noted. Patients were categorized as either having withdrawal of therapy or no withdrawal of therapy based on what the reviewer found documented in the medical record. Where the 2 independent reviewers disagreed regarding withdrawal of therapy, a third physician reviewer (R.M.C.) examined the documentation in the medical record and the majority determined the categorization. The worksheet asked the reviewer to determine whether the patient was living independently prior to the injury, with assisted care, or dependent care. Also recorded from the medical record was whether the patient had life-threatening or disabling medical conditions prior to injury. The Oregon Health Sciences University trauma registry was used to obtain additional patient demographic data including Abbreviated Injury Score (AIS) by region, Injury Severity Score, whether the patient had multiple injuries (≥2 AIS body regions with an AIS ≥3), Glasgow Coma Scale score, vital signs on admission to the emergency department, sex, mechanism of injury, and length of hospital stay.

Comparison of categorical variables between patient groups was done using \( \chi^2 \) statistics and continuous variables (presented as mean ± SD) by unpaired t test. Significance was set at \( P < 0.05 \). Single independent variables were used in logistic regression models to determine which were associated with categorizing the patient as having withdrawal of therapy. Data analyses were performed using SPSS for Windows, Version 6.1, software (SPSS Inc, Chicago, Ill).

Table 1. Defining Curative and Vital Therapy

<table>
<thead>
<tr>
<th>Curative therapy</th>
<th>Vital therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics</td>
<td>Ventilator support</td>
</tr>
<tr>
<td>Tube feeding</td>
<td>Inotropic agents</td>
</tr>
<tr>
<td>Wound care</td>
<td>Pressors</td>
</tr>
<tr>
<td>Blood products</td>
<td>Cardiopulmonary resuscitation</td>
</tr>
</tbody>
</table>

The goal of this retrospective study was to evaluate the documentation of decision making in elderly trauma patients who died after they had been admitted to the hospital following injury. In Portland, Ore, patients identified in the field who meet the criteria for trauma system entry must be transported to 1 of 2 level I trauma centers, and in the state trauma system, patients with serious injury in rural trauma centers are expected to be transferred to a higher level trauma center. Thus, these high-risk patients in this study are included in the trauma registry of our level I trauma center. The specific intention of reviewing the medical records of all geriatric injured patients who died was to determine how often there was withdrawal of therapy and who made the decisions to withdraw therapy, and to assess the process of documentation in the chart.
Of 89 patients, aged 65 to 94 years, 87 charts were available for review. Seventeen patients died within minutes of arrival during efforts to evaluate and resuscitate them, and were not included in the statistical analysis. Of the remaining 70 patients, the 2 primary reviewers agreed in 55 cases that documentation was sufficient in the chart to categorize the patient as either having or not having withdrawal of therapy. The remaining 15 patients were evaluated by a third reviewer. By consensus, 47 patients had documented decision to withdraw therapy. Thirty-six patients had termination of vital therapy, 2 patients had termination of curative therapy, and for the remaining 9 patients chart documentation was most consistent with no added therapy for a moribund patient. Included in the group of patients who had withdrawal of therapy were 10 patients transferred from an intensive care unit to the ward for comfort care only, where they died. Trauma was the principal cause of death in 65 of 70 deaths. Preexisting medical conditions (cancer, respiratory failure) accounted for 5 deaths. It is noteworthy that in 10 patients a decision was made early with family concurrence to provide only comfort care. Examples included patients with self-inflicted gunshot wounds to the head or where it was known the patient had metastatic cancer.

Preinjury lifestyle was documented in only 41 patients. Thirty were living independently, 6 were in an assisted-care setting, and 5 were in a dependent-care setting. A total of 80 preexisting diagnoses were present in 49 patients, and most commonly were cardiac disease and hypertension. Ten patients had serious preexisting conditions—6 were considered life threatening; 4 were considered disabling.

There were no major demographic differences between patients in whom therapy was withdrawn and those with no withdrawal of therapy (Table 2). The length of hospital stay for the patients who had withdrawal of therapy was 7 ± 8 days, and the length of stay for no withdrawal of therapy was 5 ± 6 days.

Documentation of end-of-life decision making was often ambiguous for the 47 patients who had withdrawal of therapy. Only 5 patients had advance directive documents (power of attorney, living will, or other document) in the medical record. Ten patients had verbally expressed to their physician their desire to withdraw therapy. For 39 patients the attending surgeon documented futility and recommended withdrawal of therapy. Family members of 44 patients participated in the decision to withdraw therapy. In only 20 instances among

### Table 2. Characteristics of the 70 Decedents

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Withdrawal of Therapy (n = 47)</th>
<th>No Withdrawal of Therapy (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean, y</td>
<td>78</td>
<td>80</td>
</tr>
<tr>
<td>Male, No. (%)</td>
<td>33 (70)</td>
<td>16 (70)</td>
</tr>
<tr>
<td>Injury Severity Score, mean</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>Blunt injury, No. (%)</td>
<td>40 (85)</td>
<td>19 (83)</td>
</tr>
<tr>
<td>Head injury, No. (%)</td>
<td>38 (81)</td>
<td>18 (78)</td>
</tr>
</tbody>
</table>

Documentation was incomplete in the 70 patients who were analyzed in this study as either having withdrawal or no withdrawal of therapy. The attending surgeons’ notes in the medical records documented their judgment regarding futility of care and/or advocating withdrawal of therapy in 54 charts, including 42 of the 47 who had withdrawal of therapy. Documentation of end-of-life discussions with the family was identified in 50 charts, including 44 of 47 who had withdrawal of therapy. Fifty-five patients had do-not-resuscitate orders documented in the medical record. These orders included specific language regarding cardioversion, chest compressions, and intubation as required by our institution’s do-not-resuscitate guidelines. An ethics consult was obtained in 1 patient whose preference for treatment was in marked disagreement with family preferences.

Univariate logistic regression models evaluated several independent variables associated with the patients’ categorization as having had withdrawal of therapy. The independent variables predictive of withdrawal of therapy were attending physician note supporting withdrawal of therapy and documented discussion of care options with family and/or patient. Variables that did not predict withdrawal of therapy were patient age, sex, highest AIS (head, face, chest, pelvis, abdomen, extremity), multiple injuries, preexisting medical conditions, admission Glasgow Coma Scale score, respiratory rate, and systolic blood pressure.

The Global Burden of Disease Study projects that in 2020 CE, 5 of the 25 leading causes of death will be injuries. Given that the population of elderly persons is expected to substantially expand, combined with the expected rise in injury-related disease, it is critical that health care policy be developed that provides an appropriate and proportional response to the injured elderly. Elderly patients who are hospitalized with injury have a higher risk of death and require greater commitment of resources to achieve patient survival to discharge. Furthermore, many elderly patients hospitalized with single organ system injuries do not achieve a satisfactory recovery. For some elderly injured patients, apprehension regarding long-term disability exceeds the fear of death. The conflicting challenges of avoidance of adverse outcome and utilization of resources were evident to us in a review of our experience at Oregon Health Sciences University Hospital, a regional level I trauma center. Among 2418 patients admitted during a recent 2-year period as major trauma victims, 270 were older than 65 years. The mortality rate of 14% for the elderly population exceeded by 3-fold the mortality rate of younger patients. Comparing the subsets of the most severely injured patients, designated as having an Injury Severity Score greater than 15, the mortality rate of 30% for the elderly substantially exceeds the mortality rate of 13% for the younger-than-65 age group. In addition to an increased mortal-

©2000 American Medical Association. All rights reserved.
ity, there was an increased utilization of resources measured by a longer length of hospital stay, including an average of 4.5 days in the intensive care unit for the younger group and 6.4 days in the older group. Our experience with discharge status for the elderly was a disappointing 25% discharged to home, and only 5% of patients older than 65 years were discharged to rehabilitation facilities. While our troubling experience with rare full recovery of elderly trauma patients was similar to what others have published, we suspected that patient preference was emerging as a critical influence on medical decisions, particularly among some elderly in circumstances where therapy was thought to be futile. The present retrospective study was intended to examine the process, patient characteristics, and documentation of withdrawal of therapy among elderly patients who were treated on the trauma service. We conclude from this review that optimal health care for selected elderly injured patients will be guided by a need to comply with patient preference expressed either directly by the patient or through family members or other proxies.

The major findings of this study in our judgment were that end-of-life decisions in these elderly patients in the majority of circumstances centered around decisions either to not increase what in some circumstances would be considered routine therapy or to terminate extraordinary supportive interventions such as mechanical ventilation. We prefer to designate these decisions as withdrawal of therapy rather than withdrawal of care, because in every circumstance where supportive therapy was abandoned, the priority remained to provide care in the form of comfort, relief of pain, and measures to allay anxiety for these dying patients. Furthermore, we want to emphasize that none of these deaths were a physician-assisted suicide, a legal process in the state of Oregon that occurs through a strict process different from what was done in these patients. In a minority of cases the patients, but in most cases, the trauma surgeon and the next of kin, participated in decisions regarding withdrawal of therapy. An essential role for the trauma surgeons and other physicians was to provide a prediction of the eventual outcome for these seriously injured patients. In this review we observed that in addition to providing a prognosis, physicians often expressed their judgments regarding the quantitative and qualitative futility of the proposed therapies. While it would be ideal to have patient preferences established in legal documents before injury, this review indicated that such documentation was rarely produced even by individuals who were reported to have such a document. It is clear that end-of-life decisions in the elderly trauma patients were often based on developing a consensus among several individuals.

This review did corroborate several components of our process of withdrawal of therapy. The trauma surgeon frequently initiated the discussion of withdrawal of therapy, often to the relief of the patient or the family who were reluctant to discuss it. In a few instances it was fairly easy to determine what the family wanted. It was our impression in some instances that they were reluctant to make a decision for withdrawal of therapy because of guilt in making this life-or-death decision for a loved one. When the decision was recommended by the surgeon, there was a sense of relief and acceptance by the family. In other instances the decision for the patient was made by proxy based on family members’ understanding of the patient’s wishes expressed prior to the injury. We have found it is important and necessary to provide time for the next of kin to reach consensus. It is worth pointing out that the prolonged length of stay in patients who had withdrawal of therapy was consistent with decisions often being reached after days of deliberation and observation of no clinical recovery. During this time of deliberation, the treating physician should add to the medical record documentation of what therapy is provided, as well as the nature of the patient’s injuries supporting the poor prognosis or inability to achieve an acceptable quality of life. It is this documentation over several days that lends credibility and rationale to the final decision to withdraw therapy. One component of the decision making in these patients that did emerge was a dominant influence of the opinion of the principal health care providers regarding futility of care. Agreement regarding withdrawal of therapy was achieved in the majority of these patients, although in a minority of circumstances there was irreconcilable disagreement among the physicians and other decision makers. Resolution in cases of disagreement was achieved by soliciting independent reviewers, specifically patient advocates or an ethics committee, to assist at forming consensus in a minority of circumstances. We conclude that the recommendation for a process for evaluation of futility made by the Council on Ethical and Judicial Affairs, American Medical Association, is a useful approach for patients with complex problems.

We conclude from this review that a useful area for further research work is identifying ways to resolve disagreements regarding futility and withdrawal of therapy. In these complex problems, reaching consensus is often related to determining who has the authority. Currently, our trauma center does not have standardized and explicit practice guidelines for withdrawal of therapy in elderly injured patients; however, there are published guidelines regarding no cardiopulmonary resuscitation orders, and these have provided partial guidance on the decision making regarding the gravely ill trauma patient. One component of the guidelines should be optimal documentation of decision making regarding withdrawal of therapy, including who are the decision makers; what are the projected outcomes; and what evidence, including severity of injuries and preexisting medical condition, is available to support the decisions. Finally, these guidelines must incorporate the reality of an urgent need to make decisions in what can be an ambiguous situation.

A disappointing finding in our study was suboptimal documentation of the process used to accomplish withdrawal of therapy. Medical records were in some cases ambiguous, incomplete, or even inconsistent. For example, it was suspected the medical record did not identify all providers who participated in the decisions. De-
tials regarding the processes involved in withdrawal of therapy were sometimes incomplete. The medical record did not consistently document whether alternative therapies were considered. For example, in a few cases, withdrawal of therapy was discontinuation of mechanical ventilation, and the only information available for inspection on retrospective review was a physician order without a progress note. Evidence of the ambiguity of the notes in the medical record is confirmed by the frequency of alternative interpretation by the 2 independent reviewers of what was actually documented. Disagreements between the independent reviewers of the medical records related most often to alternative interpretation of statements in the chart. Furthermore, the scope of information selected for interpretation varied, with one reviewer, for instance, giving greater credence to nursing documentation than another. Our review showed that there were 2 factors in the withdrawal of therapy that were independently influential: the attending surgeon's documentation that further therapy would be futile and family participation in the decision to withdraw therapy. In addition, we identified 2 principal components to the care provided to the gravely injured elderly trauma patient. First is the decision to withdraw therapy and second is the process by which therapy was withdrawn. Clearly there was considerable variability as these 2 components were worked out for individual patients.

The final issue is, who determines futility? Futility is a central concept in the decision to withdraw therapy, but the definition of futility has been debated in the medical literature. Schneiderman and colleagues have divided futility into quantitative and qualitative futility. Examples of quantitatively futile care would include full ventilatory support of a patient with documented brain death or where there is no precedent for survival. Qualitative futility describes the nature of function following survival of a devastating insult, and the descriptors qualitative futility are dependent on personal preferences and are value laden. For selected geriatric trauma patients, substantial erosion in the capability for independent living defines qualitative futility, with the range of individual preferences defining the specifics of the loss of function. For some individuals, becoming permanently dependent on the assistance of others for management of bodily functions constitutes a qualitative futile outcome, while for others coma and a requirement for mechanical ventilation would be the threshold for qualitative futility. Adding to the complexity of defining futility for an individual patient is the risk that the health care provider projects his or her own values onto the patient, or makes projections regarding patient outcome that are wrong or communicated to the patient in a manner that is confusing or in error. Futility in the past has been in large part determined by the criteria of failure to achieve hospital survival. The substantial occurrence of death in the first 30 days after discharge would indicate that alternative criteria may be needed. In conclusion, this review indicates that decision regarding withdrawal of therapy is commonly encountered when treating seriously injured elderly trauma patients. Decisions are often made by consensus among several individuals, and by proxy when a patient's capacity to participate has been compromised or degraded by injury. A decision is often reached after several days, and is strongly influenced by the opinion of the trauma surgeon regarding likelihood of patient survival and prognosis for extent of recovery. Improved documentation of the specific issues related to decisions regarding withdrawal of therapy is necessary with the intention of assuring all pertinent information is recorded on the medical record by appropriate individuals.

Corresponding author: Donald D. Trunkey, MD, Department of Surgery, L223, Oregon Health Sciences University, 3181 SW Sam Jackson Park Rd, Portland, OR 97201-3098.

REFERENCES