



Complete Summary

GUIDELINE TITLE

Practice management guidelines for geriatric trauma.

BIBLIOGRAPHIC SOURCE(S)

EAST Practice Management Guidelines Work Group. Practice management guidelines for geriatric trauma. Allentown (PA): Eastern Association for the Surgery of Trauma (EAST); 2001. 55 p. [29 references]

COMPLETE SUMMARY CONTENT

SCOPE
METHODOLOGY - including Rating Scheme and Cost Analysis
RECOMMENDATIONS
EVIDENCE SUPPORTING THE RECOMMENDATIONS
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS
QUALIFYING STATEMENTS
IMPLEMENTATION OF THE GUIDELINE
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT
CATEGORIES
IDENTIFYING INFORMATION AND AVAILABILITY

SCOPE

DISEASE/CONDITION(S)

Geriatric trauma

GUIDELINE CATEGORY

Evaluation
Management
Risk Assessment

CLINICAL SPECIALTY

Emergency Medicine
Geriatrics
Internal Medicine

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel

Nurses
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To provide the trauma practitioner with some evidence-based recommendations that can be used to guide decision-making in the care of the geriatric trauma patient. Specifically, the guideline sought answers for the following set of questions:

- Is age itself a marker of increased morbidity/mortality? If so, what age should be used?
- Is age instead a surrogate for increased pre-existing conditions (PEC's)? If so, which pre-morbid conditions are particularly predictive of poor outcomes?
- Should age itself be a criterion for triage from the field directly to a trauma center, regardless of Glasgow Coma Scale (GCS) score, trauma score (TS), etc.? If so, what age should be used?
- Do trauma centers have better outcomes with geriatric trauma than non-trauma centers?
- Are there specific injuries, scores [Injury Severity Score (ISS), trauma score, Glasgow Coma Score, etc], or pre-existing conditions/age combinations in geriatric trauma patients that are so unlikely to be survivable that a non-aggressive approach from the outset could be justified?
- What resuscitation end-points should be used for the geriatric trauma patient?
- Should all geriatric trauma patients receive invasive hemodynamic monitoring? If so, what specific types of monitoring should be used? If not, which geriatric patients benefit from invasive monitoring?

TARGET POPULATION

Geriatric trauma patients

INTERVENTIONS AND PRACTICES CONSIDERED

Triage Issues in Geriatric Trauma

Criteria used for triage (i.e., determination of intensity of treatment) of geriatric trauma patients:

1. Advanced patient age (not to be used as sole criterion)
2. Presence of pre-existing medical conditions
3. Presence of complications
4. Severity of Injury Scoring
 - a. Glasgow Coma Scale (GCS)
 - b. Trauma Score (TS)
 - c. Revised Trauma Score (RTS)
 - d. Acute Physiology and Chronic Health Evaluation Score (APACHE)
 - e. Acute Physiologic Score (APS)
 - f. Simplified Acute Physiology Score (SAPS)
 - g. Injury Severity Score (ISS)

- h. Maximal Abbreviated Injury Score (MAIS)
 - i. Geriatric Trauma Survival Score (GTSS)
 5. Admission base deficit score
 6. Admission respiratory rate score

Parameters for Resuscitation of the Geriatric Trauma Patient

1. Hemodynamic monitoring using a pulmonary artery catheter
2. Cardiac index
3. Oxygen consumption index
4. Base deficit measurements for determining status of resuscitation and risk of mortality
5. Judicious use of vasoactive drugs

MAJOR OUTCOMES CONSIDERED

- Age-dependent mortality in trauma patients
- Early versus late mortality in elderly trauma patients
- Predictive capacity of pre-existing conditions for adverse outcomes
- Predictive capacity of physiologic and anatomic injury scoring systems for geriatric outcome
- Predictive capacity of complications for overall outcome in geriatric trauma patients
- Mortality in hemodynamically monitored geriatric patients versus unmonitored patients
- Predictive value of transfusion and fluid requirements for mortality in geriatric patients
- Predictive value of base deficit for mortality in geriatric trauma patients

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Triage Issues in Geriatric Trauma

An initial computerized search was undertaken using Medline with citations published between the years of 1966 and 1999. Using the search words "geriatric", "trauma", "elderly", and "injury", and by limiting the search to citations dealing with human subjects and published in the English language, well over 2,300 citations were identified. From this number were then excluded letters to the editor, case reports, reviews, and a large number of articles dealing with minor injury mechanisms, particularly hip fractures from slip-and-falls. An additional cause for exclusion of references was publication prior to 1975 as it was felt that the trauma care provided at this time was so different compared to current trauma care that recommendations based upon data from this earlier time period would not be valid. The abstracts of the remaining citations were each reviewed, and those articles that did not address prognostic variables or other

issues pertinent to the triage of the geriatric trauma patient were further excluded. This yielded a total of 32 articles that comprised the initial evidentiary table. The bibliographies of these 32 articles were then further reviewed and additional 13 articles meeting the above-mentioned criteria were added for a total of 45 references within the evidentiary table. Each reference was then reviewed by three trauma surgeons, and consensus reached regarding appropriate classification of each reference according to the Canadian and United States Preventive Task Force.

Parameters for Resuscitation of the Geriatric Trauma Patient

Literature used for these guidelines was obtained via a search of the MEDLINE database from the National Library of Medicine. Citations in the English language during the period of 1966 through 1999 using the words elderly, geriatric, trauma, shock, and resuscitation were identified. Citations concerned primarily with multisystem trauma or single organ injury in a multisystem context were utilized. Additional non-trauma references were used to relate epidemiological or physiologic factors concerning the geriatric patient to the context of potential injury. This search identified 4,783 references. For use in the evidentiary table, these were then sorted in order to identify articles associated with geriatric trauma patients exclusively. The bibliographies of each article were searched for additional references not identified by the original MEDLINE query. Letters to the editor, case reports, review articles, and series examining non-trauma patients were excluded for use in the evidentiary table.

NUMBER OF SOURCE DOCUMENTS

Triage Issues in Geriatric Trauma: 45

Parameters for Resuscitation of the Geriatric Trauma Patient: 9

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Evidence Classification Scheme:

Class I: Prospective randomized controlled trials (PRCTs) - the gold standard of clinical trials. Some may be poorly designed, have inadequate numbers, or suffer from other methodological inadequacies.

Class II: Clinical studies in which the data were collected prospectively, and retrospective analyses which were based on clearly reliable data. These types of studies include observational studies, cohort studies, prevalence studies and case control studies.

Class III: Most studies based on retrospectively collected data. Evidence used in this class includes clinical series, databases or registries, case reviews, case reports, and expert opinion.

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Level I: The recommendation is convincingly justifiable based on the available scientific information alone. This recommendation is usually based on Class I data, however, strong Class II evidence may form the basis for a Level I recommendation, especially if the issue does not lend itself to testing in a randomized format. Conversely, low quality or contradictory Class I data may not be able to support a Level I recommendation.

Level II: The recommendation is reasonably justifiable by available scientific evidence and strongly supported by expert opinion. This recommendation is usually supported by Class II data or a preponderance of Class III evidence.

Level III: The recommendation is supported by available data but adequate scientific evidence is lacking. This recommendation is generally supported by Class III data. This type of recommendation is useful for educational purposes and in guiding future clinical research.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The draft document was submitted to all members of the panel for review and modification. Subsequently the guidelines are forwarded to the chairmen of the Eastern Association of Trauma ad hoc committee for guideline development. Final modifications are made and the document is forwarded back to the individual panel chairpersons.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Level of recommendations (I-III) and the class of data grading (I-III) are defined at the end of the "Major Recommendations" field.

Triage Issues in Geriatric Trauma

While multiple clinical and demographic factors have demonstrated an association with outcome following trauma in geriatric patients, the ability of any specific factor alone, or in combination with other factors, to predict an unacceptable outcome for any individual geriatric trauma patient is quite limited. An initial course of aggressive therapy seems warranted in all geriatric trauma patients, regardless of age or injury severity, with the possible exception of those patients who arrive in a moribund condition. Geriatric trauma patients who do not respond to aggressive resuscitative efforts within a timely fashion are likely to have poor outcomes even with continued aggressive treatment. Modification of the intensity of treatment provided to these "non-responders" should be considered. For those geriatric trauma patients who do respond favorably to aggressive resuscitative efforts, the prognosis, not only for survival but also for return to their pre-injury level of function, is quite good, and certainly justifies the effort.

A. Level I Recommendations

There is insufficient Class I and Class II data to support any standards regarding triage of geriatric trauma patients.

B. Level II Recommendations

Advanced patient age should lower the threshold for field triage directly to a trauma center.

C. Level III Recommendations

1. All other factors being equal, advanced patient age, in and of itself, is not predictive of poor outcomes following trauma, and therefore should NOT be used as the sole criterion for denying or limiting care in this patient population.
2. The presence of pre-existing medical conditions (PEC's) in elderly trauma patients adversely affects outcome. However this effect becomes progressively less pronounced with advancing age.
3. In patients 65 years of age and older, a Glasgow Coma Score (GCS) ≤ 8 is associated with a dismal prognosis. If substantial improvement in Glasgow Coma Score is not realized within 72 hours of injury, consideration should be given to limiting further aggressive therapeutic interventions. Because this recommendation is based upon Class II data, it should be applied cautiously in individual patients.
4. Post-injury complications in the elderly trauma patient negatively impact survival and contribute to longer lengths of stay in survivors and non-survivors compared to younger trauma patients. Specific therapies designed to prevent and/or reduce the occurrence of

complications (particularly iatrogenic complications) should lead to optimal outcomes in this patient population.

5. With the exception of patients who are moribund on arrival, an initial aggressive approach should be pursued with the elderly trauma patient, as the majority will return home, and up to 85% will return to independent function.
6. In patients 55 years of age and older, an admission base deficit ≤ 6 is associated with a 66% mortality. Patients in this category may benefit from in-patient triage to a high-acuity nursing unit.
7. In patients 65 years of age and older, a Trauma Score < 7 is associated with a 100% mortality. Consideration should be given to limiting aggressive therapeutic interventions. Because this recommendation is based upon Class III data, it should be applied cautiously in individual patients.
8. In patients 65 years of age and older, an admission respiratory rate < 10 is associated with a 100% mortality. Consideration should be given to limiting aggressive therapeutic interventions. Because this recommendation is based upon Class III data, it should be applied cautiously in individual patients.
9. Compared to younger trauma patients, patients 55 years of age and older are at considerably increased risk for under triage to trauma centers even when these older patients satisfy appropriate triage criteria. The factors responsible for this phenomenon must be identified and strategies developed to counteract it.

Parameters for Resuscitation of the Geriatric Trauma Patient

The elderly (65 years and older) are the fastest growing segment of the United States population. While trauma is only the seventh leading cause of death in the elderly, the death rate (per 100,000) is significantly higher when compared to a younger cohort. United States Bureau of Census data indicate that in the future there will be an unprecedented number of elderly persons at risk for injury.

It is widely known that the elderly display a high incidence of premorbid conditions. However, the question of whether or not preexisting disease contributes to poor outcome after injury has yet to be conclusively answered. Several studies have indicated that shock, respiratory failure, decreasing trauma score, increasing injury severity score, increasing base deficit, and infectious complications portend a poor outcome in the elderly.

Data indicate that the multiply injured geriatric patient may appear "stable" yet have a profound perfusion deficit secondary to low cardiac output. The early use of invasive hemodynamic monitoring may afford the opportunity to help improve survival.

Although the injured elder is more likely to die than the younger patient, an aggressive treatment program will allow many geriatric patients to regain their preinjury independence. Attention to detail, while important for all trauma patients, must be heightened in the injured elder as the opportunity for good outcomes may be fleeting.

A. Level I Recommendations

There are insufficient data to support a level I recommendation for the method and end-points of resuscitation in the elderly patient as a standard of care.

B. Level II Recommendations

1. Any geriatric patient with physiologic compromise, significant injury (abbreviated injury scale [AIS] >3), high risk mechanism of injury, uncertain cardiovascular status, or chronic cardiovascular or renal disease should undergo invasive hemodynamic monitoring using a pulmonary artery catheter.
2. There are insufficient data to support a level II recommendation for the method and end-points of resuscitation in the elderly patient as a standard of care.

C. Level III Recommendations

1. Attempts should be made to optimize to a cardiac index ≥ 4 L/min/M² and/or an oxygen consumption index of 170 cc/min/M².
2. Base deficit measurements may provide useful information in determining status of resuscitation and risk of mortality.

Definitions:

Recommendation Scheme

Level I: The recommendation is convincingly justifiable based on the available scientific information alone. This recommendation is usually based on Class I data, however, strong Class II evidence may form the basis for a Level I recommendation, especially if the issue does not lend itself to testing in a randomized format. Conversely, low quality or contradictory Class I data may not be able to support a Level I recommendation.

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Level III: The recommendation is supported by available data but adequate scientific evidence is lacking. This recommendation is generally supported by Class III data. This type of recommendation is useful for educational purposes and in guiding future clinical research.

Classification Scheme:

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CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Conclusions were based on evidence obtained from prospective randomized studies (Class I); prospective, non-comparative studies and retrospective series with controls (Class II); or retrospective analyses (case series, databases or registries, case reviews) (Class III).

Triage Issues in Geriatric Trauma

The evidentiary tables included forty-five references, none were rated Class I, one was rated part Class II, part Class III, and forty-four were rated Class III.

Parameters for Resuscitation of the Geriatric Trauma Patient

The evidentiary tables included one Class I reference, one Class II reference, and seven Class III references.

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Improved identification of geriatric trauma patients who will benefit from aggressive resuscitation, timely injury management, and post-trauma rehabilitation
- Decreased morbidity and mortality due to geriatric trauma

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

Unfortunately, after examining the available literature, it is clear that evidence-based responses to all of the questions raised in the guideline are not possible. As

the evidentiary tables (see original guideline document) demonstrate, there are a few, if any, prospective, randomized, controlled trials, which definitively address any of the issues. Secondly, there is a lack of uniformity as to a specific age criterion for geriatric trauma. As shown in the evidentiary tables, geriatric trauma is variously defined in the literature as age greater than or equal to 55, 60, 65, 70, 75, and even 80 years of age. There is even literature support for increased mortality from trauma beginning at age 45! Furthermore, since age is a continuous variable, and not a dichotomous one, adverse outcomes associated with geriatric trauma are likely to increase in a continuous fashion with age as opposed to a stepwise leap as a given patient reaches a specific age. Third, there is no concise definition of a geriatric trauma patient. In some studies, all patients over a given age are included, whereas in others, patients with penetrating injuries, burns, and those with minor injuries, such as slip-and-falls, are excluded. Some studies include all patients regardless of hemodynamic instability or injury severity, while others impose strict entrance criteria or exclude patients who do not survive for a predetermined period of time following admission. Such lack of uniformity with regards to inclusion criteria makes it difficult to compare outcomes across different patient populations. Finally, much of the literature concerning geriatric trauma is relatively "old", that is, published more than 10 years ago. Given the significant improvements in patient care, which have occurred over the past 10 to 20 years, recommendations based upon outcomes achieved more than 10 years ago may not be applicable to today's geriatric trauma.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

The guideline developers make the following recommendations regarding implementation:

Implementation involves extensive education and inservicing of nursing, resident, and attending staff members and has one important guiding principle: the guidelines must be available to the clinicians in real time while they are actually seeing the patient. The two most common ways to apply these are by using either a critical pathway or a clinical management protocol. A critical pathway is a calendar of expected events that has been found to be very useful within designated diagnosis-related groups. In trauma, where there are multiple diagnosis-related groups used for one patient, pathways have not been found to be easily applied with the exception of isolated injuries. Clinical management protocols, on the other hand, are annotated algorithms that answer the "if, then" decision making problems and have been found to be easily applied to problem-, process-, or disease-related topics. The clinical management protocol consists of an introduction, an annotated algorithm and a reference page. The algorithm is a series of "if, then" decision making processes. There is a defined entry point followed by a clinical judgment and/or assessment, followed by actions, which are then followed by outcomes and/or endpoints. The advantages of algorithms are that they convey the scope of the guideline, while at the same time organize the decision making process in a user-friendly fashion. The algorithms themselves are systems of classification and identification that should summarize the recommendations contained within a guideline. It is felt that in the trauma and critical care setting, clinical management protocols may be more easily applied than critical pathways, however, either is acceptable provided that the formulated

guidelines are followed. After appropriate inservicing, a pretest of the planned guideline should be performed on a limited patient population in the clinical setting. This will serve to identify potential pitfalls. The pretest should include written documentation of experiences with the protocol, observation, and suggestions. Additionally, the guidelines will be forwarded to the chairpersons of the multi-institutional trials committees of the Eastern Association for the Surgery of Trauma, the Western Association for the Surgery of Trauma, and the American Association for the Surgery of Trauma. Appropriate guidelines can then be potentially selected for multi-institutional study. This process will facilitate the development of user friendly pathways or protocols as well as evaluation of the particular guidelines in an outcome based fashion.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Timeliness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

EAST Practice Management Guidelines Work Group. Practice management guidelines for geriatric trauma. Allentown (PA): Eastern Association for the Surgery of Trauma (EAST); 2001. 55 p. [29 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2001

GUIDELINE DEVELOPER(S)

Eastern Association for the Surgery of Trauma - Professional Association

SOURCE(S) OF FUNDING

Eastern Association for the Surgery of Trauma (EAST)

GUIDELINE COMMITTEE

EAST Practice Management Guidelines Work Group

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Work Group Members: David G. Jacobs, MD; Brian Ray Plaisier, MD; Philip S. Barie, MD; Jeffrey S. Hammond, MD; Michele R. Holevar, MD; Karlene E. Sinclair, MD; Thomas M. Scalea, MD; Wendy Wahl, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

An update is not in progress at this time.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [Eastern Association for the Surgery of Trauma \(EAST\) Web site](#).

Print copies: Available from the EAST Guidelines, c/o Fred Luchette, MD, Loyola University Medical Center, Department of Surgery Bldg. 110-3276, 2160 S. First Avenue, Maywood, IL 60153; Phone: (708) 327-2680; E-mail: fluchet@lumc.edu.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Practice management guidelines for trauma: East Ad Hoc Committee on Guideline Development (Unabridged: Revised 1998 Mar 20). Available from the [Eastern Association for the Surgery of Trauma \(EAST\) Web site](#).

An excerpt is also available:

- Pasquale M, Fabian TC. Practice management guidelines for trauma from the Eastern Association for the Surgery of Trauma. J Trauma 1998 Jun;44(6):941-56; discussion 956-7.

Also available:

- Utilizing evidence based outcome measures to develop practice management guidelines: a primer. Allentown (PA): Eastern Association for the Surgery of Trauma; 2000. 18 p. Available from the [EAST Web site](#).

Print copies: Available from the EAST Guidelines, c/o Fred Luchette, MD, Loyola University Medical Center, Department of Surgery Bldg. 110-3276, 2160 S. First Avenue, Maywood, IL 60153; Phone: (708) 327-2680; E-mail: fluchet@lumc.edu.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on February 27, 2002. The information was verified by the guideline developer as of March 26, 2002.

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