



Complete Summary

GUIDELINE TITLE

Practice management guidelines for the optimal timing of long bone fracture stabilization in polytrauma patients.

BIBLIOGRAPHIC SOURCE(S)

EAST Practice Management Guidelines Work Group. Practice management guidelines for the optimal timing of long bone fracture stabilization. Winston-Salem (NC): Eastern Association for the Surgery of Trauma (EAST); 2000. 39 p. [25 references]

COMPLETE SUMMARY CONTENT

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SCOPE

DISEASE/CONDITION(S)

Long bone fractures in polytrauma patients

GUIDELINE CATEGORY

Assessment of Therapeutic Effectiveness
Management

CLINICAL SPECIALTY

Emergency Medicine
Internal Medicine
Neurological Surgery
Neurology
Orthopedic Surgery
Surgery

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

To present recommendations on the optimal timing of long bone fracture stabilization in polytrauma patients

TARGET POPULATION

Polytrauma patients with long bone fractures in need of bone fracture stabilization

INTERVENTIONS AND PRACTICES CONSIDERED

Early and late long-bone fracture stabilization in patients with the following types of injuries:

1. Mixed injuries (divergent non-long-bone injuries)
2. Brain injuries (mild, moderate, and severe traumatic brain injuries)
3. Chest injuries group

MAJOR OUTCOMES CONSIDERED

Morbidity and mortality associated with early versus late timing of long bone fracture stabilization in mixed injury, brain injury, and chest injury groups of patients. Morbidity outcome measures included the following:

- Rate of adult respiratory distress syndrome (ARDS)
- Rate of pulmonary complications
- Number of days on ventilator
- Length of stay in the intensive care unit
- Total length of stay
- Rate of pneumonia
- Rate of systemic infection
- Rate of multiple organ failure
- Hospital costs
- Adverse central nervous system (CNS) events (in brain injured patients only)
- Central nervous system (CNS) outcome (brain injured patients only)

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Identification of References

Literature searches were conducted by committee members using Medline. The subcommittee chair also had the OVID Company perform a literature search using EMBASE. Literature survey parameters included studies written in the English language using human subjects which were published between 1980 and 1998.

The bibliography of the relevant articles obtained from the Medline literature searches was reviewed to find additional potentially appropriate publications.

Inclusion in Evidence Tables

Articles retrieved from the above process were selected for inclusion if they met the following criteria: (a) the blunt trauma mechanism was high-energy, (b) each patient had a long bone injury, (c) each patient had a major non-long bone injury, and (d) there was an early and a late group undergoing fracture stabilization.

NUMBER OF SOURCE DOCUMENTS

Not stated

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, Double-Blinded Study

Class II: Prospective, Randomized, Non-Blinded Trial

Class III: Retrospective Analysis of Patient Series

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not applicable

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

A. Level I Recommendations

There is insufficient evidence to support a standard of care on this topic.

B. Level II Recommendations

1. Polytrauma patients undergoing long bone stabilization within 48 hours of injury have no improvement in survival when compared to those receiving later stabilization; however, there may be some patients who will have fewer complications. There is no evidence that early stabilization has any detrimental effect. It seems preferable to perform early long bone stabilization in polytrauma patients.

2. There is no compelling evidence that early long bone stabilization in mild, moderate, or severe brain injured patients either enhances or worsens outcome. The timing of long bone stabilization should be individualized according to the patient's clinical condition.
3. There is no compelling evidence that early long bone stabilization in patients with chest injury alters outcome. It appears reasonable to individualize the timing of long bone stabilization according to the patient's clinical condition.

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.

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.

Evidence Classification Scheme:

Class I: Randomized clinical trial

Class II: Prospective, noncomparative clinical study or retrospective analysis based on reliable data

Class III: Retrospective case series or database review

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Conclusions were based on evidence obtained from a randomized clinical trial. [There were no Class I articles identified.] (Class I); a prospective, noncomparative clinical study or a retrospective clinical study or a retrospective analysis based on reliable data (Class II); or a retrospective case series or

database review (Class III). The evidentiary tables included no Class I references, twelve Class II references, and twenty-two Class III references.

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

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Reported benefits of early long bone stabilization in polytrauma patients include increased patient mobilization by eliminating the need for traction and decreased pulmonary morbidity (fat emboli syndrome, pneumonia, adult respiratory distress syndrome [ARDS]), late septic sequelae, hospital care costs, mortality, hospital length of stay (LOS), intensive care unit (ICU) length of stay, and ventilator days.

POTENTIAL HARMS

Some authors suggest that early long bone stabilization in polytrauma patients increases blood loss, fluid administration, and surgical stress, fat embolism and pulmonary complication risks, and mortality. However, others intimate that the pulmonary shunt is similar in those undergoing early or late stabilization, i.e., no worse, no better. There have been additional concerns regarding the timing of long bone stabilization in patients with brain or chest injury. Problems with early fixation of long bones in patients with brain injury include secondary brain injury as a result of hypoxemia, hypotension, and/or complexity of controlling intracranial hypertension, increased mortality, and increased fluid administration which might exacerbate cerebral edema. Early long bone stabilization in patients with pulmonary contusion, multiple rib fractures, or hemothorax is also not advised since there are increased pulmonary complications (adult respiratory distress syndrome, fat embolism syndrome), especially when intramedullary nailing and reaming are used. However, others indicate that chest injury patients with early intramedullary nailing have similar outcomes compared to later intramedullary nailing or other stabilization techniques, i.e., no worse, no better; and pulmonary contusion patients have similar partial pressure of arterial oxygen/fraction of inspired oxygen ($\text{PaO}_2/\text{FiO}_2$) and duration of mechanical ventilation; i.e., no worse, no better.

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

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

EAST Practice Management Guidelines Work Group. Practice management guidelines for the optimal timing of long bone fracture stabilization. Winston-Salem (NC): Eastern Association for the Surgery of Trauma (EAST); 2000. 39 p. [25 references]

ADAPTATION

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

DATE RELEASED

2000

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

Eastern Association for the Surgery of Trauma (EAST) Practice Management Guidelines Work Group

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Eastern Association for the Surgery of Trauma (EAST) Practice Management Guidelines Work Group: C. Michael Dunham, MD; Michael J. Bosse, MD; Thomas V. Clancy, MD; Frederic J. Cole, Jr, MD; Maxime J.M. Coles, MD; Thomas Knuth, MD; Fred A. Luchette, MD; Robert Ostrum, MD; Brian Plaisier, MD; Attila Poka, MD; Ronald J. Simon, 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 PDF format) from the [Eastern Association for the Surgery of Trauma Web site](#)

Print copies: Available from the EAST Guidelines, c/o Fred A. 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:

- Eastern Association for the Surgery of Trauma (EAST) Ad Hoc Committee on Practice Management Guideline Development. Utilizing evidence based outcome measures to develop practice management guidelines: a primer. Allentown (PA): EAST, 2000. 18 p.

Electronic copies are available (in PDF format) from the [EAST Web site](#).

Print copies: Available from the EAST Guidelines, c/o Fred A. 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 September 17, 2001. The information was verified by the guideline developer on September 27, 2001.

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