



## Complete Summary

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### **GUIDELINE TITLE**

Guidelines for the field management of combat-related head trauma. Triage and transport decisions.

### **BIBLIOGRAPHIC SOURCE(S)**

Knuth T, Letarte PB, Ling G, Moores LE, Rhee P, Tauber D, Trask A. Guidelines for the field management of combat-related head trauma. Triage and transport decisions. New York (NY): Brain Trauma Foundation; 2005. 11 p. [23 references]

### **GUIDELINE STATUS**

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

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## SCOPE

### **DISEASE/CONDITION(S)**

Combat-related traumatic brain injury

### **GUIDELINE CATEGORY**

Evaluation  
Management

### **CLINICAL SPECIALTY**

Emergency Medicine  
Neurological Surgery  
Neurology

## **INTENDED USERS**

Emergency Medical Technicians/Paramedics  
Physicians

## **GUIDELINE OBJECTIVE(S)**

- To provide dispassionate analysis of the known benefits and risks of therapies available to the brain injured patient in the field
- To be a resource and a tool for the combat medic, physician, commanding officer, and logistician who must then make the tough "on the ground" therapeutic, tactical, and logistical decisions that will ultimately result in optimum care for the injured combatant
- To review the bases for triage and transport decisions for combat personnel with traumatic brain injury in the field

## **TARGET POPULATION**

Combat personnel who sustain traumatic brain injury in the field

## **INTERVENTIONS AND PRACTICES CONSIDERED**

The use of Glasgow Coma Score (GCS) and pupillary examination to facilitate decisions regarding triage and transport

## **MAJOR OUTCOMES CONSIDERED**

- Incidence of hypotension, endotracheal intubation, and fluid resuscitation
- Timeliness of in-hospital evaluation
- Duration of hospitalization
- Morbidity and mortality
- Predictive value of Glasgow Coma Score for hospital admission

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

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

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

#### **General Search Strategy**

In order to create an evidence-based document relevant to the field treatment of brain injury, the literature was searched for each topic for publications on brain injury that pertained to the prehospital or austere environment. From the comprehensive literature searches, articles were selected which were relevant to the field management of traumatic brain injury (TBI) and utilized human data.

Articles with outcomes related to morbidity and mortality were preferred. In establishing a literature base for recommendations, the guideline authors generally only include publications that involve human subjects. However, in these Guidelines, they have included some publications that involve training with mannequins given that such training is an accepted practice in assessing competency for emergency medical technician (EMT) certification. Additional studies were, in general, referenced only as a part of background discussion. The prehospital literature was heavily utilized; military literature was used where it was available.

### **Specific Strategy for This Topic**

A MEDLINE search without date limits was performed using combinations of the keywords "combat," "triage," "evacuation," "tactical," "casualty," and "head injury." The 286 articles listed were reviewed in abstract form and 25 were selected for full review. None contained pertinent data specifically related to the evacuation and triage of neurologically injured patients. A MEDLINE search from 1970 to 1999 using the keywords "trauma systems," "trauma centers," "emergency medical services," "prehospital care," and "ambulance transports" identified 147 articles. Careful review and analysis of all 147 articles permitted an assessment of trauma systems and the role of emergency medical service (EMS) in managing patients with severe TBI.

### **NUMBER OF SOURCE DOCUMENTS**

14

### **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**

#### **Classification of Evidence**

**Class I:** Evidence from good quality, randomized, controlled clinical trials (RCT)

**Class II:** Evidence from moderate or poor quality RCT, good quality cohort, or good quality case-control studies

**Class III:** Evidence from moderate or poor quality cohort; moderate or poor quality case control; or case series, databases, or registries

Additional detail on quality criteria for each category is available in the original guideline document.

### **METHODS USED TO ANALYZE THE EVIDENCE**

Systematic Review with Evidence Tables

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

The Guidelines follow the recommendations of the Institute of Medicine (IOM) Committee to Advise the Public Health Service on Clinical Practice Guidelines outlined below:

1. There should be a link between the available evidence and the recommendations.
2. Empirical evidence should take precedence over expert judgment in the development of guidelines.
3. The available scientific literature should be searched using appropriate and comprehensive search terminology.
4. A thorough review of the scientific literature should precede guideline development.
5. The evidence should be evaluated and weighted, depending on the scientific validity of the methodology used to generate the evidence.
6. The strength of the evidence should be reflected in the strength of the recommendations, reflecting scientific certainty (or lack thereof).
7. Expert judgment should be used to evaluate the quality of the literature and to formulate guidelines when the evidence is weak or nonexistent.
8. Guideline development should be a multidisciplinary process, involving key groups affected by the recommendations.

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus

### **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

The authors of these guidelines, entitled *Guidelines for the Field Management of Combat-Related Head Trauma*, represented a multidisciplinary group consisting of neurosurgeons, trauma surgeons, neurointensivists, and paramedics from both the civilian and the military sectors. They were selected for their expertise in traumatic brain injury (TBI), combat medicine, or military medical education. All the military authors had recent combat experience. Each author independently conducted a MEDLINE or comparable search, reviewed and evaluated the literature for their assigned topics, then cooperated in formulating the Guidelines during several work sessions aimed at completing understandable and applicable recommendations based on the best evidence available. The template for these Guidelines was the first edition of the *Guidelines for Prehospital Management of Traumatic Brain Injury* developed by Brain Trauma Foundation (BTF) in 1999–2000.

Section I of each chapter in the original guideline document describes the conclusions the authors formulated from the literature. For the chapters on assessment, which included prognosis studies, the authors summarized the evidence rather than made recommendations. Thus, their findings are listed as "Conclusions" for any diagnostic or prognostic assessment and as "Recommendations" where the end result is a specific treatment or set of treatment options. Section VII in each chapter provides a brief analysis of the

literature that supports the conclusions or recommendations, whereas Section VIII references a more extensive list of studies.

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

### **Degrees of Certainty**

**Standards:** Reflect a *high degree of clinical certainty* as indicated by the scientific evidence available (supported by Class I evidence).

**Guidelines:** Reflect a *moderate degree of clinical certainty* as indicated by the scientific evidence available (supported by Class II evidence).

**Options:** Reflect *unclear clinical certainty* as indicated by the scientific evidence available (supported by Class III evidence).

## **COST ANALYSIS**

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

## **METHOD OF GUIDELINE VALIDATION**

External Peer Review  
Internal Peer Review

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

At several points during the development process, a review team comprised of representatives of the armed services medical "school houses," military neurosurgery and trauma surgery, and military medic instruction evaluated the document, and their comments were delivered to the authors. Several draft documents were produced and evaluated before this document was finalized and published. (The names of the reviewers are listed at the front of the original guideline document.)

## **RECOMMENDATIONS**

### **MAJOR RECOMMENDATIONS**

"Degrees of Certainty" (Standards, Guideline, Options) and "Classification of Evidence" (Class I to III) and the correlation between the two are defined at the end of the "Major Recommendations" field.

### **Recommendations**

#### **A. Standards**

Class I data are insufficient to support a treatment standard for this topic.

## **B. Guidelines**

Class II data are insufficient to support a treatment standard for this topic.

## **C. Options**

1. Class III data support the assertion that civilian regions having organized trauma care systems have better outcomes. This, combined with Class III data from military studies, would suggest that continuing to improve on the military's existing organized trauma care system is appropriate.
2. Class III civilian data supports the recommendation that patients with Glasgow Coma Scale (GCS) score 9–13 should be transported to a trauma center for evaluation.
3. Patients with GCS score 14 should not return to duty until disorientation resolves. GCS data obtained in the hyperacute setting, particularly concerning decisions for expectant management, should be used cautiously as it may overestimate the severity of intracranial injury. Pupillary examination may have limited usefulness due to the frequency of blast injury and the potential for traumatic iridoplegia resulting in fixed, dilated pupils which are not indicative of severe brain injury. Both GCS score and pupillary examination should be obtained, documented and repeated throughout the transport as frequently as is practical in order to follow and report the patient's clinical course.

## **Summary**

The combat management of the acutely head injured patient is complicated by tactical, logistical, and medical considerations. Ideally, this "fog of war" would clear, allowing the combat medic the luxury of being able to provide the best available care based on civilian standards practiced in the U.S. on a sunny day with no distractors. Unfortunately, this is likely to be the exception in combat, and the medics must be given the tools, training, and confidence to be able to provide optimal care under these most demanding of circumstances to the most deserving patients in the world.

## **Definitions:**

### **Classes of Evidence**

**Class I:** Evidence from good quality randomized controlled trials (RCT)

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### **Degrees of Certainty**

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## CLINICAL ALGORITHM(S)

A clinical algorithm for "Field Management of Combat-Related Head Trauma" is provided in the original guideline document.

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

An evidentiary table appears at the end of each major section of the guideline document, which classifies each citation based on the quality of the evidence (Class I-III; see "Major Recommendations" for definitions). The recommendations in this summary are supported by 14 Class III studies.

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

Appropriate triage and transport decisions in combat-related head injuries

### POTENTIAL HARMS

Not stated

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

- The information contained in the *Guidelines for the Field Management of Combat-Related Head Trauma*, which reflects the current state of knowledge at the time of completion (November 2005), is intended to provide accurate and authoritative information about the subject matter covered. Because there will be future developments in scientific information and technology, it is anticipated that there will be periodic review and updating of these Guidelines. These Guidelines are distributed with the understanding that the Brain Trauma Foundation is not engaged in rendering professional medical services. If medical advice or assistance is required, the services of a competent physician should be sought. The recommendations contained in these Guidelines may not be appropriate for use in all circumstances. The decision to adopt a particular recommendation contained in these Guidelines

must be based on the judgment of medical personnel, who take into consideration the facts and circumstances in each case and on the available resources.

- The majority of available recommendations are extrapolated from civilian data. In some instances, it will be obvious that the best civilian data have direct application to military scenarios. In others, it will be equally obvious that the best available civilian recommendation is impractical at best, and potentially threatening to life or mission accomplishment at worst. The guideline authors have attempted to discriminate between the two as often as possible, based on the available military-specific literature and personal experience. Ultimately, it will be the decision of the individual medic and/or the unit chain of command as to whether a particular diagnostic or therapeutic maneuver can be implemented. The general direction the authors have taken with their recommendations is that the best-known community standard should be implemented whenever possible.
- The recommendations in these guidelines are based on the best available data, and the authors maintained a patient-driven focus during development. In other words, each recommendation was created based upon the best care possible for the patient, in spite of the fact that tactical limitations may prevent this level of care from actually being available to all patients at all times. It should also be noted that guidelines such as these are quite different than protocols developed by medical facilities or military units. Protocols should be generated locally to give very specific directions as to how individual providers are to act in a variety of situations. Guidelines such as these are intended to serve as a starting point for the development of facility-specific protocols.
- Factors that create limitations in the level of medical care available in the combat environment include the overall tactical scenario, physiologic parameters associated with combat, and logistics. The guideline authors' ability to develop standards for optimal management is limited by a lack of scientific data. The majority of the recommendations provided are extrapolated from civilian data. While many of these recommendations will be both practical and applicable, the ability of the individual medic to provide this care may be limited.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

### IMPLEMENTATION TOOLS

Clinical Algorithm

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.



## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better

### IOM DOMAIN

Effectiveness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

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### ADAPTATION

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

### DATE RELEASED

2005

### GUIDELINE DEVELOPER(S)

Brain Trauma Foundation - Disease Specific Society

### SOURCE(S) OF FUNDING

Brain Trauma Foundation

Uniformed Services University of the Health Sciences

### GUIDELINE COMMITTEE

Not stated

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## **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Not stated

## **GUIDELINE STATUS**

This is the current release of the guideline.

## **GUIDELINE AVAILABILITY**

Electronic copies: Available in Portable Document Format (PDF) from the [Brain Trauma Foundation Web site](#).

Print copies: Available from the Brain Trauma Foundation, 708 Third Avenue, New York, NY 10017

## **AVAILABILITY OF COMPANION DOCUMENTS**

None available

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

This NGC summary was completed by ECRI Institute on August 24, 2007. The information was verified by the guideline developer on January 28, 2008.

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