TRAUMA PRACTICE GUIDELINES
Knowing them and using them are two different things

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Injury 2013.




Overview

- Background: definition and development
- Traumatic Brain Injury
- Brain Trauma Foundation Guidelines
- Impact of implementation
- Implementation challenges
- Summary

What is a Clinical Practice Guideline?

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Definition:

- "Systematically developed statement to assist practitioner and patient decisions about appropriate heath care for specific clinical circumstances"

Field & Lohr. In Clinical Practice Guidelines: Directions for a New Program. Washington DC: National Academy Press, 1990.

How are Clinical Practice Guidelines Used?

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- Tools to assist in decision making
- In the improvement of healthcare quality at a clinical level
- In the development of policies regarding allocation of resources for efficient healthcare delivery

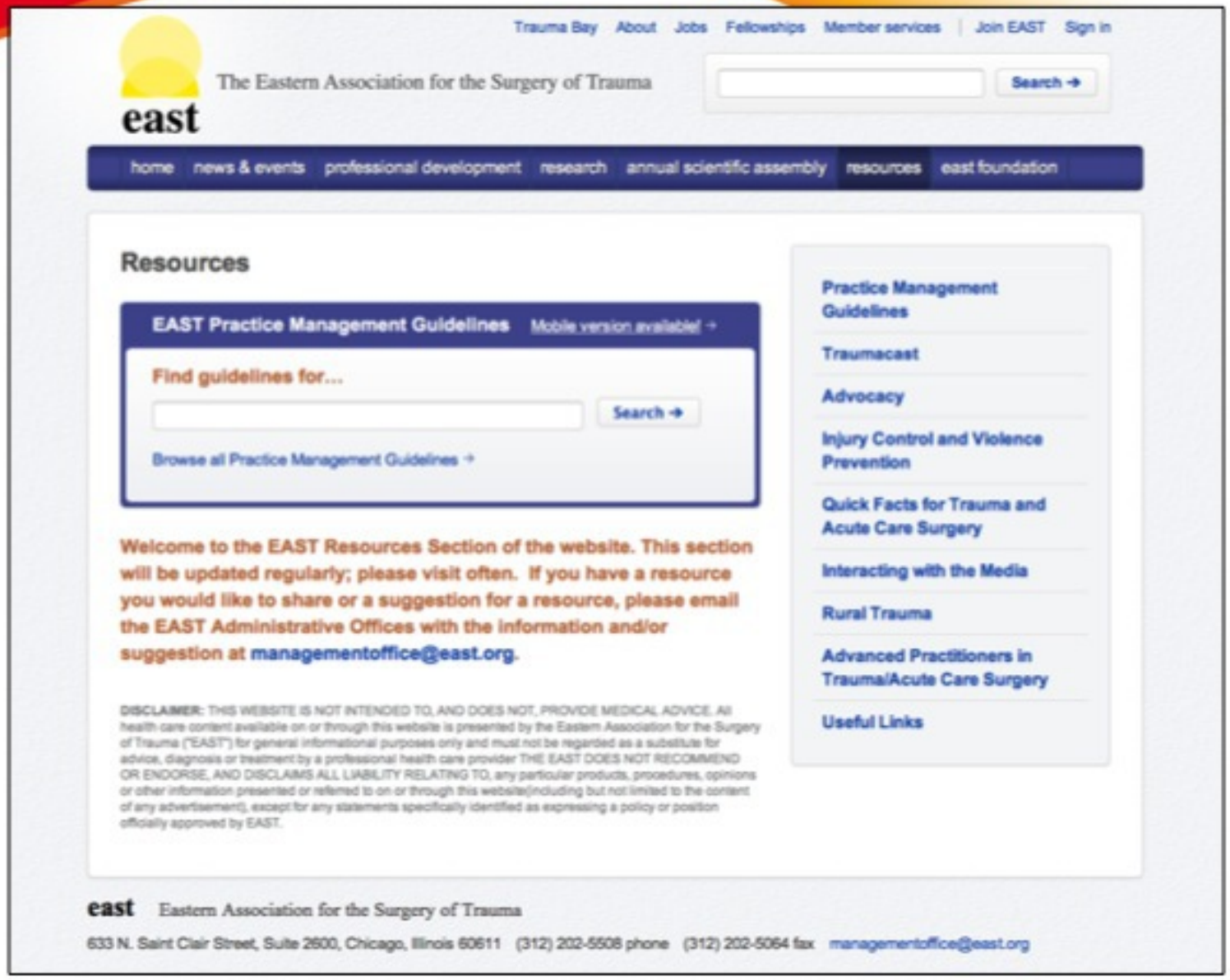
How are Clinical Practice Guidelines Developed?

- Summary of research
- Multidisciplinary team including stakeholders
- Evidence –based recommendations
- Considerations:
  - Validity and reliability of research
  - Clinical applicability

Implementation and Impact

- Most clinicians agree that guidelines are:
  - Helpful sources of advice
  - Good educational tools
  - Are intended to improve quality
- Some concern however that:
  - Guidelines are intended to cut costs primarily
  - Guidelines are too rigid or impractical to apply to individual patients
  - Guidelines reduce clinician autonomy

Farquhar, Kofa & Slutsky. MJA. 2002.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Traumatic Brain Injury

Local Experience

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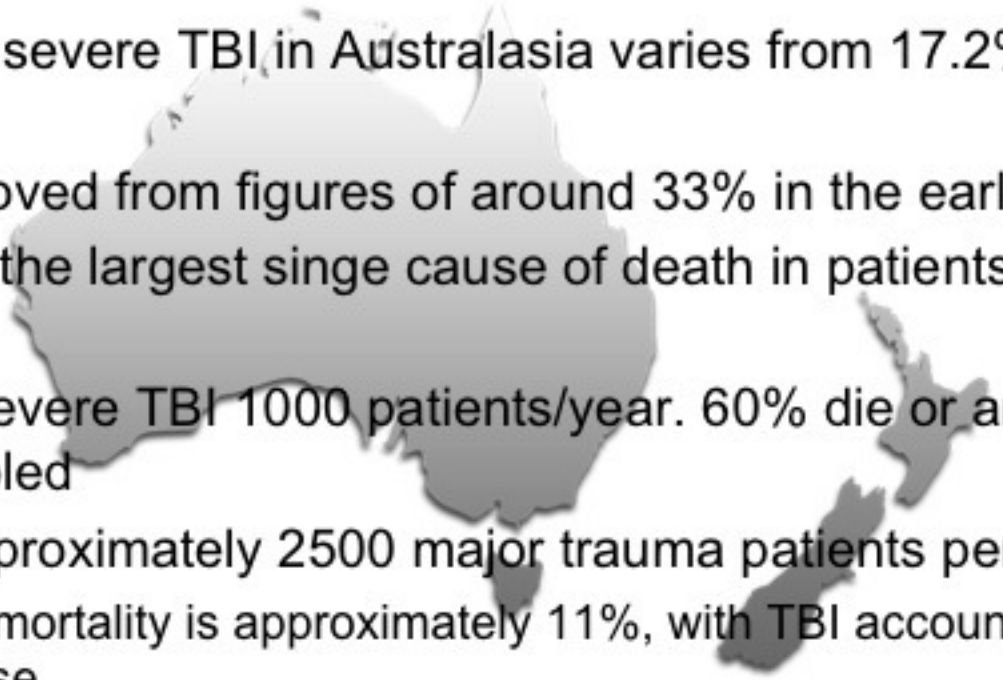

- Mortality from severe TBI in Australasia varies from 17.2% up to 19.6%
- This has improved from figures of around 33% in the early 1990's
- Brain injury is the largest singe cause of death in patients surviving to hospital
- In Australia: severe TBI 1000 patients/year. 60% die or are left severely disabled
- In Victoria, approximately 2500 major trauma patients per year
  - In hospital mortality is approximately 11%, with TBI accounting for 75% of these

Gabbe et al. 2011. www.plosone.org

Gabbe et al. 2011. Ann Surg. (253)138-143.

Hunt et al. 1995. ANZ J Surg. (65)83-86.

Myburgh et al. 2008. J Trauma. (64)854-862

Treatment Guidelines

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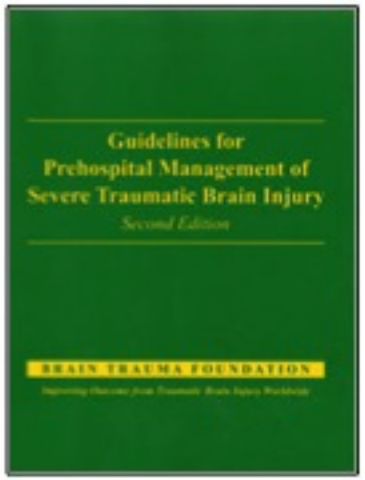
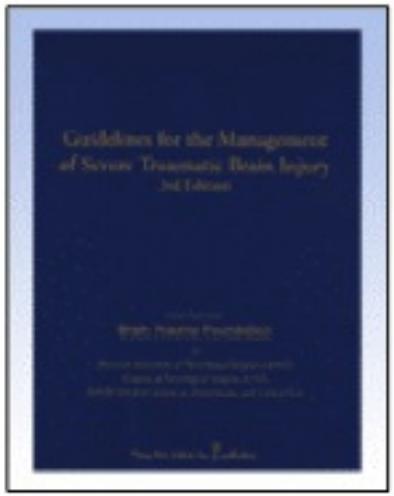


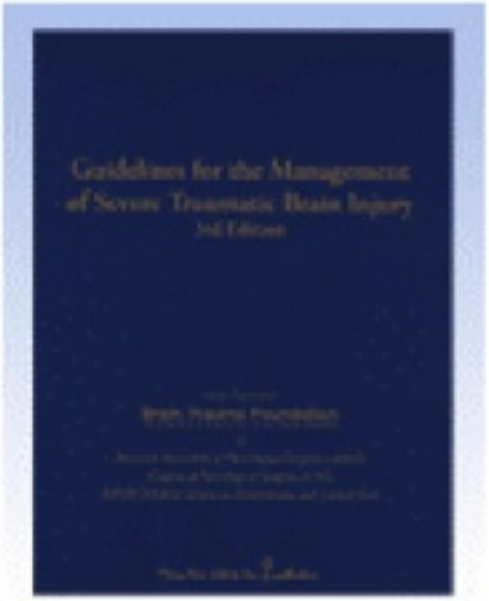


EBIC.nl
European Brain Injury Consortium

Brain Trauma Foundation

Guidelines for the Management of Severe Traumatic Brain Injury

- 1995 1st Edition
- 2000 2nd Edition
- 2007 3rd Edition
  - Published in Journal of Neurotrauma (24) Supp1 2007.



Guideline Summary

- Guidelines regarding the following aspects of care of patients with TBI:
  - Blood pressure and oxygenation
  - Hyperosmolar therapy
  - Prophylactic hypothermia
  - Infection prophylaxis
  - DVT prophylaxis
  - Indications for ICP monitoring
  - ICP Monitoring technology

Guideline Summary

- Guidelines regarding the following aspects of care of patients with TBI: *(cont)*
  - ICP thresholds
  - CPP thresholds
  - Brain oxygen monitoring and thresholds
  - Anesthetics, analgesics and sedatives
  - Nutrition
  - Anti-seizure prophylaxis
  - Hyperventilation
  - Steroids

Management of Intracranial Hypertension

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First tire management of intracranial hypertension is medical therapy:

Intubation and ventilation: RSI

- PCO_2: aim: 35-40mmHg.
- PO_2 aim: >94%
- Avoidance of high inspiratory pressures- low PEEP (5cmH_2O, tidal vol <8ml/kg)

Blood pressure:

- Aim for CPP of >60mmHg
- MAP>80mmHg (assuming ICP 20mmHg when not measured)
- Avoid hypovolemia
- NSaline, Blood and FFP

Sedation:

- Deep sedation for ICP control
- Fentanyl and Midazolam
- Propofol if required (limited to 200mg/hr or more*

Monitoring:

- Arterial line
- Central line
- ICP monitor

Management of Intracranial Hypertension

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First tire management of intracranial hypertension is medical therapy:

Monitoring:

- Arterial line
- Central line
- ICP monitor

Target: <20mmHg

GCS <9 and abnormal CT

GCS <9 and normal CT with

- Age >40yrs
- Motor score <6*
- SBP<90mmHg

Patient requires intubation and deep sedation for extra-cranial trauma

Impact of Implementation

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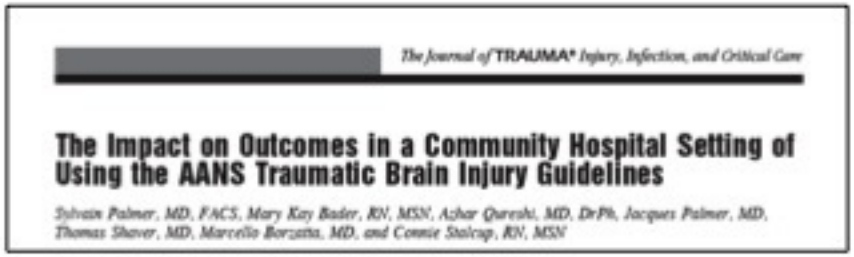
- A number of studies have shown that the management of TBI in accordance with the TBI Guidelines results in improved outcomes:
  - Mortality
  - Functional Outcome Scores
  - Length of Hospital Stay
  - Costs

2004



2001

Fakhry et al J Trauma 2004

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Table 1 Comparison of Groups by Year for TBI Patients

	1991–94 (n = 219)	1995–96 (n = 186)	1997–2000 (n = 423)	*p* Value
Demographics				
Age (mean)	33.8	33.9	35.6	NS
Alcohol level (mean)	119	176	77	<0.001
Gender (% male)	73.5	70.7	77.3	NS
Injury severity				
Initial GCS score (mean)	4.0	3.5	3.5	<0.001
Injury Severity Score (mean)	25.2	24.3	24.0	NS
Maximum head AIS score (mean)	4.0	3.9	3.8	NS
Mortality (% who died)	17.8	18.6*	13.8†	0.047
Length of stay and charges				
ICU days (mean)	9.7	8.4*	7.9	0.021
Hospital days (mean)	21.2	16.7	15.8	0.001
Total charges (mean per patient)	$36,6944	$30,244	$28,429	0.002
Disability scores				
Glasgow Outcome Scale (% w/good recovery or moderate disability)	43.3	50.3*	61.5	<0.001
Rancho Los Amigos score (% appropriate at discharge)	43.9	44.0	56.6	0.004

All significant comparisons are for 1997–2000 and 1995–96 as compared to 1991–94.
* Individual group did not differ significantly from 1991–94.
† 1997–2000 differs from 1991–94 and 1995–96.

Cost Savings

The Journal of TRAUMA® Injury, Infection, and Critical Care

Using a Cost-Benefit Analysis to Estimate Outcomes of a Clinical Treatment Guideline: Testing the Brain Trauma Foundation Guidelines for the Treatment of Severe Traumatic Brain Injury

Mark Faul, PhD, Marlena M. Wald, MLS, MPH, Wesley Rutland-Brown, MPH, Ernest E. Sullivent, MD, and Richard W. Sattin, MD

2007

- Publications: 1995-2006
- Pre-implementation v's post-implementation of TBI Guidelines

Cost Savings

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Table 3 Overall Cost Savings and Lives Saved Resulting From Adoption of BTF Guidelines—Costs per Person

	Deaths	Direct Medical Costs	Rehabilitation Costs	Societal Costs	Implementation Costs	Total Costs
BTF adoption	3,466	$ 49,607	$ 2,751	$ 165,876	$ 2,618	$ 220,853
Current state	7,073	$ 60,887	$ 4,618	$ 330,827	$ 0	$ 396,331
Difference	3,606	$ 11,280	$ 1,866	$ 164,951	($ 2,618)	$ 175,479

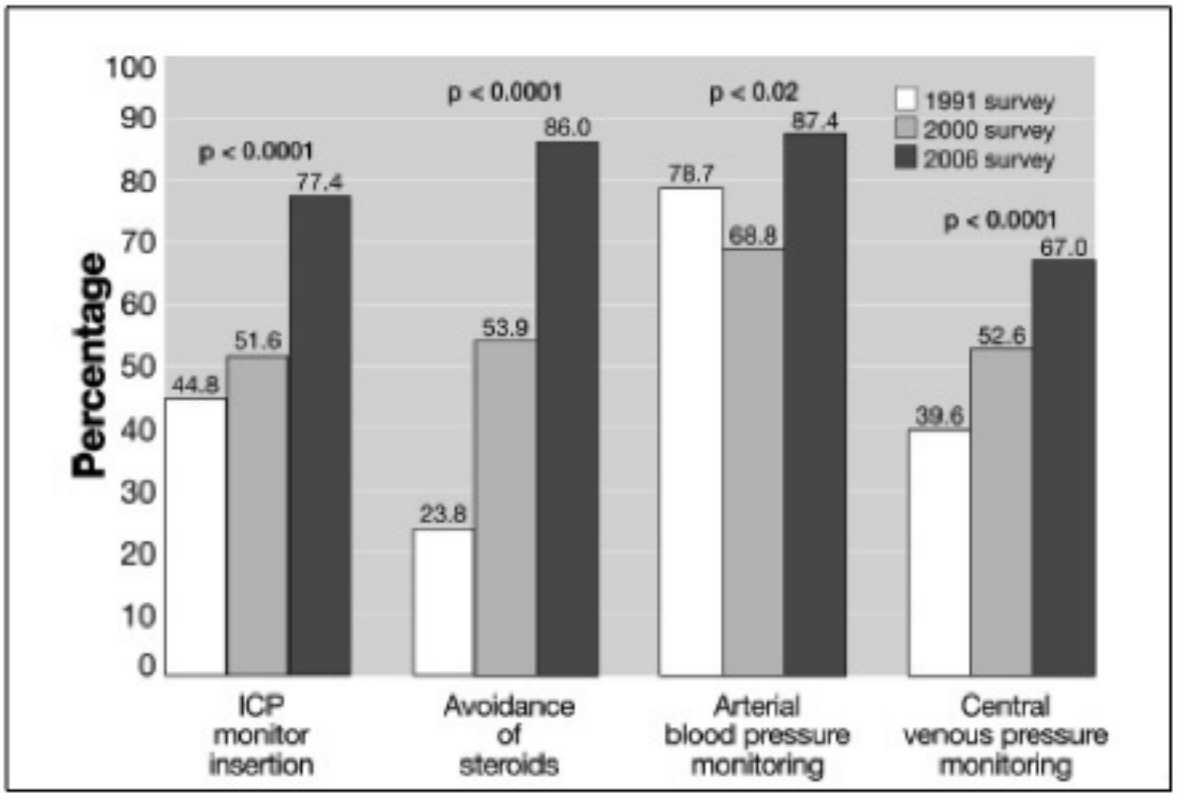
Calculated medical costs probabilities are subject to rounding errors.

- 3,606 deaths saved
- US$175,479.00 per patient

Implementation

- First published 1995
  - Endorsed by American Association of Neurologic Surgeons, WHO Neurotrauma Committee and NY State Department of Health
  - Distributed to all neurosurgeons in the USA
- Surveys of management of patients with severe TBI in
  - 1999-2000 Hesdorffer et al 2002
  - 2000 Valadka et al 2001
  - 2006 Hesdorffer et al 2007

Implementation



Adherence to guidelines: 2000: 33%; 2006: 65%

Hesdorffer & Ghajar J Trauma 2007.

Implementation

- Why did it take 11 years for these improvements to occur?
  - Lack of awareness
  - Lack familiarity
  - Lack of agreement
- What prompted change?
  - Publications showing benefit of implementation of guidelines
    - Saves lives
    - Improves outcomes
    - Reduces costs

Summary

- Clinical Practice guidelines are evidence-based guidelines to improve patient outcomes
- Guidelines for the management of severe traumatic brain injury were first developed and distributed widely throughout the United States in 1995
- Despite the effort of ensuring updated evidence, and proven benefits in mortality, morbidity and costs, implementation took 11 years
- Reasons cited include lack of familiarity and agreement
- Studies showing improved outcomes associated with the adoption of TBI guidelines have probably contributed to their increased implementation

Thank-you! ka.martin@alfred.org.au

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