

Survey of traumatic brain injury management in European *Brain-IT* centres year 2001

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Summary

Background. The aim of this study was to obtain basic knowledge about the current local conditions and neurointensive care of traumatic brain injury (TBI) in the new multi-centre collaborative *BrainIT* group.

Materials and methods. The survey comprised a background part on local policies (Part A), and a case study section (Part B). The information was gathered by questionnaire followed by telephone interviews. Twenty-three *BrainIT* centres participated in the survey and answers from two respondents were available from 18 of the sites.

Results. The average proportion of agreement between duplicate respondents was 0.778 (range 0.415–1.00). All *BrainIT* centres monitored ICP. The treatment protocols seem to have a pattern concerning escalation of treatment of intracranial hypertension: 1/ evacuation of mass lesions and head elevation; 2/ increased sedation and mannitol; 3/ hyperventilation; 4/ ventricular drainage; 5/ craniectomy and barbituates.

Conclusions. There seemed to be an agreement on neurointensive care policies within the *BrainIT* group. The suggested order of treatment was generally in accordance with published guidelines although the suggested order and combinations of different treatments varied. Variation of treatment within the range of prescribed standards provides optimal conditions for an interesting future analysis of treatment and monitoring data in reality using the *BrainIT* database.

Keywords: Head injury; survey; management.

Introduction

The *BrainIT* (The Brain monitoring with Information Technology) group is an open collaborative or-

ganisation that was created to enable evaluation of neurointensive care. With the advent of powerful computers in most units the group felt that some kind of system should be set up to use this hardware for: testing new monitoring devices, collecting minute-by-minute care data and creating a database where it would be possible to pool this data [1]. The database will contain prospectively collected data from patients in the *BrainIT* centres.

The present study was undertaken as an initial step in analysing treatment of patients with traumatic brain injury (TBI) in *BrainIT* centres. The goal was to see if there was agreement on treatment within centres and if there were great differences between the different *BrainIT* centres.

Materials and methods

The survey was comprised of a background part on local policies and conditions (Table 1, Part A), and a case study section (Table 2, Part B) focused on discerning differences in treatment tradition for specific clinical situations in traumatic brain injury. The information was obtained by written questionnaire followed by telephone interviews a few days later. Twenty-four *BrainIT* centres participated in the survey and answers from two respondents were available from 18 of the sites. The complete questionnaire has been published [2].

Table 1. *Part A local policies and conditions*

Question	Predominating answer	Proportion with this answer
Prehospital care	“Scoop and run policy” i.e. basic life support	60%
Primary admission to NSU	<25% primary admission	55%
Reason for referral to NSU from primary hospital	TBI, unconscious and pathological CT	93%
Acute neurosurgery in primary hospital (without NS)	no neurosurgery in local hospitals	88%
What kind of ICU exist at the center	separate NICU	76%
Where are TBI patients admitted (BrainIT center)	NICU, irrespective of other injuries	44%
Are there written protocols for treatment	local or published guidelines are used	78%

NS Neurosurgery, NSU Neurosurgical Unit, ICU Intensive Care Unit, NICU Neurointensive Care Unit.

Results

The average proportion of agreement between duplicate respondents was 0.778 (range 0.415–1.00). All *Brain IT* centres monitored ICP and other cerebral monitoring techniques were available in most centers.

Part B case study

Questions based on a fictitious case admitted with traumatic brain injury including information on how the radiology, neurology and intracranial pressure developed:

The treatment routines seem to have a pattern concerning escalation of treatment of intracranial hypertension: evacuation of mass lesions and head elevation [1]; increased sedation and mannitol [2]; hyperventilation [3]; ventricular drainage [4]; craniectomy and barbituates [5].

Discussion

This survey of TBI treatment is different than those earlier carried out in the USA; UK and Ireland [3–7]. The earlier surveys have tried to establish what rou-

Table 2. *Part B case study*

Question	Predominating answer	Proportion with this answer
Initial information Glasgow coma sum score 8 (motor score 5), spontaneous breathing and circulatory stable		
ATLS principles applied	yes	95%
Intubate patient for neurological reasons	yes	83%
Neurological indication for intubation	GCSM 5 ≤	51%
Goal for ventilation	maintain ventilation ≥ 4 kPa	75%
New additional information CT scan: Diffuse edema. Small kontusion right temporal lobe. Ventricles and basal cisterns slightly compressed		
Indication for ICP monitoring	yes	90%
Type ICP monitor	intraparenchymal monitors	60%
Neurological indication for ICP monitoring	Glasgow motor score 5 ≤	51%
New additional information Glasgow motor score decreases to 4. New CT scan: Acute subdural hematoma 5 mm thick right side. 7 mm midline shift		
Is GCSM 4, ASDH and 7 mm shift clear indication for surgery	yes	80%
New additional information Glasgow motor score still 4. New CT scan: Acute subdural removed, increase of right temporal contusion. Still 7 mm midline shift		
Is GCSM 4, contusion and 7 mm shift a clear indication for surgery	no	60%
New additional Information After 2 days. ICP increases to 25 mmHg and occasional plateau waves. New CT scan: No mass lesion, no midline shift. Ventricles and basal cisterns slightly compressed		
Mannitol as part of treatment	yes	71%
CSF drainage as part of treatment	yes	56%
General policy questions on treatment of refractory high ICP		
Are barbituates used in centre	yes	86%
Are decompressive craniectomies sometime used	yes	88%
Is active hypothermia used	never	62%

tines were used in TBI care. This survey has been designed to gather basic information on organisation of care in the different BrainIT centres and on what the different centres believe that they are doing with the TBI patients [2].

There were 2 respondent from most centers and their answers concurred to a large extent on treatment strategies. There also seemed to be an agreement on indications for intubation, ventilation levels and ICP monitoring within the BrainIT group. The suggested order of treatment was generally in accordance with published guidelines [8, 9].

All centres in Brain IT are interested in NIC which means that the findings were not representative of all european centres. What is important is that the centres have been characterised as to what they think they are doing with their patients. This is an important basis for future analysis within the BrainIT network of what is actually going on with the patients. The BrainIT network should also give valuable information on the effects of the different treatment traditions that exist between centres.

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