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Sequelae of traumatic brain injury

The consequences of traumatic brain injury can be debilitating and lifelong, writes *Dr Simon Fleminger*

Approximately 200 per 100,000 population per year suffer a traumatic brain injury (TBI) and of these about 80 per cent are mild.

The long-term neuropsychiatric sequelae of TBI, comprising cognitive impairment, personality/behavioural change and psychiatric disorder, are more important than the neurophysical sequelae (such as ataxia, hemiplegia or dysphasia) as causes of disability.

Assessment

The starting point for the assessment of the neuropsychiatric sequelae is to determine the likely degree of brain injury/damage.

Although the Glasgow Coma Scale (GCS) is used to classify injury severity shortly after injury, it is the duration of loss of consciousness (LoC), and the duration of post-traumatic amnesia (PTA) that are the best predictors of the degree of brain damage and consequent outcome.

PTA is defined as the duration of loss of memory from the time of injury until continuous day-to-day memories are restored.

Outcome after TBI is very difficult to predict; in general younger adults do better. On average, those with PTA of less than one week are likely to return to work in due course. But most patients with a PTA of more than two months will be left with significant disability.

Neuroimaging may be helpful. Contusions are particularly likely to occur in frontal and temporal regions, which are both areas involved in social function. Diffuse axonal injury involves white matter tracts throughout the brain.



Common personality problems include apathy, lack of emotional warmth, irritability and ready fatigue

Severe TBI

In those with severe injury, for example with LoC of hours or days and PTA of days or weeks, after recovery of consciousness there is a period of confusion: a post-traumatic delirium.

Troublesome problems during this period, including wandering, agitation and sexually disinhibited behaviour, usually resolve by the time the patient leaves hospital but in a small proportion they persist.

Most of the recovery takes place over the first few weeks and months, so that by one or two years after injury the patient has reached a plateau of recovery and any deficits are likely to be permanent, although longer-term improvements over the first five to 10 years may be seen.

Slowing of speed of information processing and impairment of attention, concentration and memory are the most common cognitive impairments.

Executive function is commonly affected, causing difficulties planning, organising, prioritising and monitoring actions. This dysexecutive syndrome overlaps with changes in personality and behaviour so, for example, the patient is described as chaotic and poorly organised,

or impulsive and showing bad judgement. Lack of insight is frequently present.

Other common personality/behavioural problems include apathy, self-centredness, lack of emotional warmth, childishness, disinhibited behaviour, moodiness, irritability and fatigue.

As a result, the patient with TBI is often very difficult to live with or employ. Family burden is a major problem after TBI.

In the patient with severe TBI these problems are likely to be complicated by disability from neurological sequelae, for example slurred speech and ataxia, and musculoskeletal injuries.

Anxiety and depression are the most common psychiatric sequelae, depending on the circumstances.

Depression may only first become evident months or years after injury. Alcohol and substance misuse are common, although the majority who have these problems post injury will have had problems before.

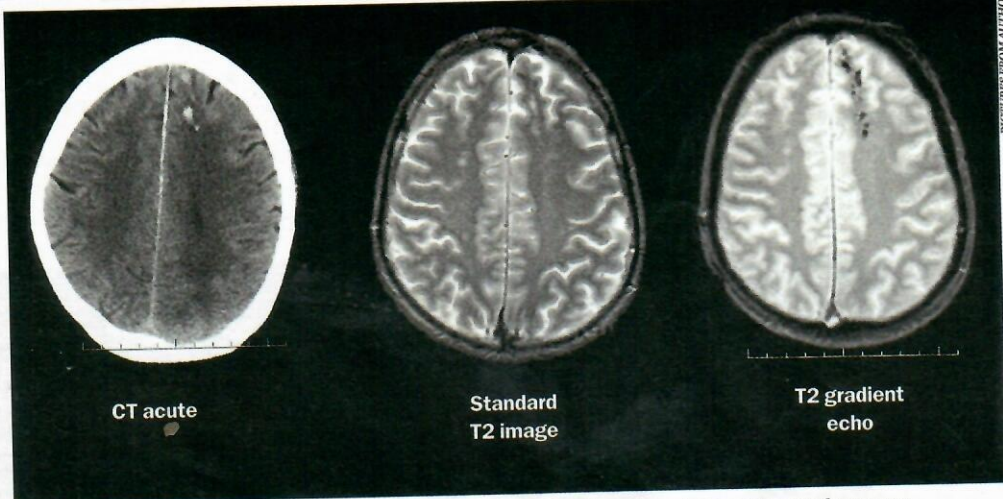
There is probably an elevated risk of psychosis post injury, and a two- to three-fold increased risk of suicide.

Mild TBI

Mild TBI (mTBI) is defined as a GCS of 13, 14 or 15, LoC of less than 30 minutes, and PTA of less than 24 hours. Most will have a normal MRI, which does not rule out the possibility that there has been some brain injury, but suggests that it is at most minor.

Of those with mTBI, about half still have significant symptoms at three months, a quarter at six months and about one eighth at one year.

Around 10–20 per cent of patients after an mTBI do unex-



Neuroimaging of a patient suffering TBI from a fall with about one hour's loss of consciousness

PICTURES FROM AUTHOR

pectedly poorly and develop a post-concussion syndrome. Typical symptoms include headaches, tinnitus, sensitivity to noise or light, dizziness, fatigue, poor concentration and memory, mood lability and irritability, and anxiety and depression.

The role of brain injury in these patients is uncertain. Particularly in those with long per-

sistent symptoms after a very mild injury, psychological factors are probably primary; the problem is akin to a somatisation disorder.

Management

Secondary complications may need to be considered; in particular subdural haematoma, hydrocephalus and post-traumatic epilepsy. Some patients



Diffuse axonal injury on MRI scan several months after the event

suffer hypothalamic or pituitary damage and the consequent neuroendocrine problems may easily be missed.

In the early stages, good information about the consequences of TBI and access to appropriate rehabilitation services are important.

Patients should be warned of the dangers of returning to work too quickly; problems often only emerge as the cognitive demands of work expose impairments, or the stress of work aggravates symptoms that were previously improving.

In terms of drug treatment, the principles of treatment are the same as those for psychiatric problems in the absence of brain

injury, taking account of the brain injured person's vulnerability to side-effects.

Cognitive behavioural therapy is often required alongside rehabilitation for cognitive impairments. Work with family and carers is frequently required.

● *Dr Fleminger is consultant neuropsychiatrist at the Maudsley Hospital, London*

● *11–17 May is Action for Brain Injury week. For more information visit www.headway.org.uk*

● *Practise exam questions on neurology, Education page 43*

FURTHER READING

- Fleminger S. The neuropsychiatry of head injury. In: Gelder M, Andreasen N C, Lopez-Ibor J J, Geddes J (eds). *The New Oxford Textbook of Psychiatry 2nd edition*. Oxford: Oxford University Press, May 2009.
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