

Name of Disorder: Traumatic Brain Injury in Children

Essay Title: Recovery from childhood brain injury

Author: Dr Ali Crichton BA (Hons), DPsych (Clin Neuropsych), MAPS

Institution: Murdoch Children's Research Institute

Date: 27/06/13

Content: 743 words

Traumatic Brain Injury (TBI) refers to a traumatic insult to the brain, capable of producing brain damage and may lead to neurological or neurobehavioural consequences (Begali, 1992). TBI is common and within the inpatient setting accounts for approximately 7.5% of children presenting to all health services in Victoria (Mittra et al., 2007).

TBI in childhood is unique due to the neuroanatomical and developmental context. This means that factors that are less relevant in adult brain injury are more important in childhood, and as a result recovery may be more protracted. The child's brain is still undergoing neuroanatomical maturation and developing functional connections. Children are still acquiring new skills, including cognitive, behavioural and psychosocial skills. Disruption at any of these levels can lead to disruption in the ability of the child to function maximally, and to continue to acquire skills that they previously otherwise would have. Recovery is greatest in children who are older at the time of injury. Also, children's family environments can provide an opportunity to maximise recovery if they are supportive and adaptive.

Prognosis

The impact of paediatric TBI is not static. The needs of a child and their family may vary and change with time since the injury. Recovery is greatest in the initial phase, but recovery can continue well into the child's adolescent years. Initially, physical impairment may be prominent. However, it is the cognitive, behavioural and emotional impairment that have greatest impact on long term outcomes (Taylor, Yeates, Wade, Drotar, Stancin, Minich, 2002; Anderson, Catroppa, Morse, Haritou, Rosenfeld, 2001). Children who are injured early in their life experience an exacerbation or worsening of difficulties in a range of areas (such as academic, social, psychological or behavioural), due to failure to acquire normal developmental skills. At the same time, their peer group will continue to develop and acquire skills. As a result, it can appear that there is a 'widening gap' between the brain injured child and their same aged peers. This may be most noticeable when there is a natural rise in expectations, such as starting high school. At or prior to these time points, families are encouraged to seek support if needed. Also, a child's needs change as the child develops and seeks new experiences within the context of a dynamic family system. The family itself may have ongoing or changing needs that mean they require different levels of support at different time points, and may need to re-engage with services at these critical times.

The neurocognitive consequence of acquired brain injury is well documented in research studies. In summary, children with traumatic brain injuries suffer reduced speed of processing, fine motor problems, poor attention, working memory, long-term memory, subtle language difficulties, executive and organisational difficulties (for a review see Taylor et al 2010). The degree of impairment varies, however, according to the severity of the brain injury, the child's development prior to injury, and the age at which the injury was sustained. Specific changes in the development of the frontal lobes or frontal neural connections can have a particularly devastating effect on resultant cognitive abilities such as planning, problem-solving, self-monitoring, working memory and behavioural and emotional

regulation (Levin et al, 2002; Levin et al, 2004; Roncadin, Guger, Archibald, Barnes & Dennis, 2000; Mandalis et al, 2007; Wade et al, 2002). The impact of these neurocognitive deficits is often observed by families or teachers in the daily lives of children who sustain brain injury, through their associated difficulties in completing activities of daily living and academic difficulties (Yeates, 2000).

Further information and support

For children:

- Information booklet about mild head injury for kids:
<http://www.med.monash.edu.au/psych/research/centres/merrc/download/mhi-childrens-booklet-2004.pdf>
- “A hit on the head and where it led”. Storybook for families and children on acquired brain injury by Jennifer Cooper-Trent, 2004. Downloadable pdf version:
<http://www.maa.nsw.gov.au/default.aspx?MenuID=374>.

For families:

- Westmead Children’s Hospital information booklets written for families. "Step by Step: A guide for families of children and adolescents with a brain injury".
http://www.chw.edu.au/rehab/brain_injury/resources.htm
- Growing up with a brain injury – a guide for parents. Contact Brain Link Victoria (Toll free: 1800 677 579 Telephone: 03 9845 2950/ www.brainlink.org.au)
- Victorian Paediatric Rehabilitation Service information sheets for parents (available http://www.rch.org.au/rehab/abi_resources/).
- Project Learnet - for educators and families working with children with brain injury.
http://www.projectlearnet.org/for_parents.html

Support services

- Victorian Paediatric Rehabilitation Service provides inpatient and outpatient paediatric rehabilitation after traumatic brain injury. Information on referral processes are provided here: <http://www.health.vic.gov.au/vprs/referral.htm>.
- Melbourne CityMission Statewide ABI Paediatric Coordinators assist people working and living with children and young people with Acquired Brain Injury (ABI).
<http://www.melbournecitymission.org.au/What-We-Do/Our-Programs-Services/Disability-Services/Disability-Support-for-Acquired-Brain-Injury-ABI/Statewide-Acquired-Brain-Injury-Paediatric-SAPC-Co-ordinators>

References

- Anderson V, Catroppa C, Morse S, Haritou F, Rosenfeld JV. (2001). Outcome from mild head injury in young children: a prospective study. *J. Clin. Exp. Neuropsychology*; 23: 705–17.
- Begali, V. (1992). *Head Injury In Children and Adolescents* (2nd ed.). Brandon, VT: Clinical Psychology Publishing Company.
- Levin, H. S., Hanten, G., Chang, C., Zhang, L., Schachar, R., Ewing-Cobbs, L., et al. (2002). Working memory after traumatic brain injury in children. *Annals of Neurology*, 52, 82-88.
- Levin H. S., Hanten, G., Zhang, L., Swank, P., Ewing-Cobbs, L., Dennis, M., et al (2004). Changes in working memory after traumatic brain injury in children. *Neuropsychology*, 18, 240-247.

Mitra, B., P. Cameron, P., & Butt, W. (2007). Population-based study of paediatric head injury. *Journal of Paediatric Child Health*. 43(3): p. 154-9.

Mandalis, A., Kinsella, G., Ong, B., Anderson, V., (2007). Working memory and new learning following pediatric traumatic brain injury. *Developmental Neuropsychology*, 32:2, 683-701.

Roncadin C, Guger S, Archibald J, Barnes M, Dennis M. Working memory after mild, moderate, or severe childhood closed head injury. *Developmental Neuropsychology*. 2004;25(1-2):21-36.

Taylor, G.H. (2010). Neurobehavioural outcomes of pediatric traumatic brain injury. In Anderson, V. & Yeates, K.O. (eds.). *Pediatric Traumatic Brain Injury: New Frontiers in Clinical and Translational Research*, pp.145-168. Cambridge: Cambridge University Press.

Taylor HG, Yeates KO, Wade SL, Drotar D, Stancin T, Minich N. (2002) A prospective study of short- and long-term outcomes after traumatic brain injury in children: behaviour and achievement. *Neuropsychology*; 16: 15-27.

Yeates, K. O (2000). Closed-head injury. In K.O.Yeates, M.D. Ris, & H.G. Taylor (Eds.). *Paediatric neuropsychology; Research, theory and practice* (pp.92-116). New York; Guilford.