In hospital cognitive rehabilitation was as effective as home rehabilitation in moderate to severe traumatic brain injury

Salazar AM, Warden DL, Schwab K, et al, for the Defense and Veterans Head Injury Program (DVHIP) Study Group. ***Cognitive rehabilitation for traumatic brain injury: a randomized trial.*** *JAMA 2000 Jun 21;**283**:3075–81.*

Sources of funding: Defense and Veterans Head Injury Program and Medical Research Service of the Department of Veterans Affairs.

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QUESTION: In recovering patients with moderate to severe traumatic brain injury, is inpatient cognitive rehabilitation more effective than home rehabilitation?

Design
Randomised (allocation concealed*), unblinded*, controlled trial with 1 year of follow up.

Setting
A military medical referral centre in the US.

Patients
120 active duty military personnel (mean age 25 y, 94% men) admitted to hospital with a moderate to severe closed head injury manifested by a Glasgow Coma Scale score of ⩽13, or post-traumatic amnesia of ⩾24 hours, or focal cerebral contusion or haemorrhage. Other inclusion criteria included head injury within 3 months, Rancho Los Amigos cognitive level of 7 (oriented, appropriate), and no previous severe traumatic brain injury. Patients with mild brain injury were excluded. 89% completed the study.

Intervention
67 patients were allocated to an 8 week, in hospital cognitive rehabilitation programme and 53 to a limited home rehabilitation programme with weekly telephone support from a psychiatric nurse.† In hospital cognitive rehabilitation combined group and individual treatments and was modelled after Prigatano's milieu oriented approach. The programme also integrated work therapy. In the home rehabilitation group patients were given educational materials and strategies for enhancing cognitive and organisational skills.

Main outcome measures
Primary outcome measures were return to gainful employment and fitness for military duty. Secondary outcomes were cognitive, behavioural, and quality of life measures.

Main results
At 1 year, no difference existed between the groups for return to gainful employment or fitness for duty (table). Also, no difference existed between the groups for the cognitive, behavioural, or quality of life measures. However, a subgroup analysis found a benefit of the hospital programme for patients with initial traumatic unconsciousness for >1 hour ($p=0.05$).

Conclusion
In patients with moderate to severe traumatic brain injury, in hospital cognitive rehabilitation was as effective as home rehabilitation.

*See glossary.
†Details of interventions found in Braverman SE, Spector J, Warden DL, *et al. Brain Inj* 1999;**13**:405–15, and Warden DL, Salazar AM, Martin EM, *et al. J Head Trauma Rehabil* 2000;**15**:1092–1102.

Inpatient rehabilitation (IR) v home rehabilitation (HR) in moderate to severe head injury at 1 year‡

Outcomes	IR	HR	RBR (95% CI)	NNT (CI)
Return to work	90%	94%	4% (–7 to 16)	Not significant
	IR	**HR**	**RBI**	**NNT**
Fitness for duty	73%	66%	11% (-44 to 13)	Not significant

‡RBR=relative benefit reduction. Other abbreviations defined in glossary; RBR, RBI, NNT, and CI calculated from data in article.

COMMENTARY

Few studies have rigorously evaluated the efficacy of cognitive rehabilitation.[1] This study by the Defense and Veterans Head Injury Program is an excellent example for others to follow.

The study has sufficient power to rule out a clinically significant benefit of inpatient rehabilitation over home treatment. It is set in a military hospital, however, so the population is rather atypical. The paper implies that the inpatient programme was developed for the purposes of the study, and did not have a track record. Those receiving home treatment had more therapeutic intervention than most who are discharged from hospital after traumatic brain injury, certainly in the UK. It was vulnerable to a ceiling effect; $>90\%$ of patients returned to work, although only 70% achieved fitness for duty.

A subgroup analysis suggested that those who were unconscious for longer than an hour did do better with inpatient rehabilitation; for these patients, 80% of the hospital group were fit for duty at 1 year, compared with 58% of those receiving home treatment ($p=0.05$).

Therefore, if you are unconscious for <1 hour after traumatic injury, you should be discharged from hospital once you are orientated and ambulant, provided there is someone at home to help. Once at home, make sure that the community treatment team sees you promptly and regularly. Watch out for deteriorating symptoms of mood disturbance and irritability.

On the other hand, inpatient cognitive rehabilitation may be effective for those with more severe injuries and less support available at home. It seems likely that the intervention needs to be titrated against the level of disability. For example, Wade *et al* found that early brief interventions after mild head injury are only effective in those who required admission to hospital[2]; those who went straight home from the accident and emergency departments did reasonably well regardless.

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1 Carney N, Chestnut RM, Maynard H, *et al.* Effect of cognitive rehabilitation on outcomes for persons with traumatic brain injury: a systematic review. *J Head Trauma Rehabil* 1999;**14**:277–307.
2 Wade DT, King NS, Wenden FJ, *et al.* Routine follow up after head injury: a second randomised controlled trial. *J Neurol Neurosurgery Psychiatry* 1998;**65**:177–83.