The impact of cognitive impairment on rehabilitation outcomes in elderly patients admitted with a femoral neck fracture: a systematic review

Muir S W, Yohannes A M

CRD summary
Cognitively impaired older adults who received intensive inpatient rehabilitation following hip fracture repair surgery may have gained similar benefits in physical function as cognitively intact patients, but length of hospital stay may be longer. Further research is required. Bearing in mind the authors’ caveats about methodological quality and reliance on one trial, these cautious conclusions are likely to be reliable.

Authors' objectives
To evaluate the impact of inpatient rehabilitation on outcomes in older patients with cognitive impairment following surgical repair of a femoral neck hip fracture.

Searching
The following databases were searched for articles published in English between 1990 and June 2007: MEDLINE, EMBASE, CINAHL, PsycINFO, DARE and the Cochrane Library. In addition the ProQuest Dissertation and Theses Database and listings by the New York Academy of Science were searched. Search terms were reported. References of included articles and relevant reviews were handsearched.

Study selection
Randomised or non-randomised prospective studies of participants aged 60 years or older, assessing outcome in terms of cognition or functional status following inpatient rehabilitation after surgical repair of femoral neck fracture, were eligible. Case studies were excluded.

In the included studies inpatient rehabilitation was performed in a variety of settings: acute post surgical care on a general orthopaedic ward; specialised hip fracture service; rehabilitation hospitals; and specialised geriatric rehabilitation units within a tertiary care hospital. The mean age of the populations was 78 to 84 years; where reported the age range covered 64 years to 99 years. The majority of included patients were female. Reported outcomes included cognitive impairment, functional activity, length of stay, and discharge destination. Cognitive impairment was evaluated by eight different scales; the most common was the Mini-Mental State Examination (MMSE). Functional activity was measured most frequently by the Functional Independence Measure (FIM). Relatively few studies reported any details about the rehabilitation intervention.

Study selection was performed by two independent reviewers. It was not clear how discrepancies were resolved.

Assessment of study quality
Validity assessment was performed by two independent reviewers using a validated scale (Downs and Black) for both RCT and non-RCT studies; any discrepancies were resolved by consensus. The rating scale includes 27 items within five sections: reporting, external validity, internal validity (bias), internal validity (confounding) and power. The maximum possible score was 32, denoting highest quality.

Data extraction
Basic details of each study, characteristics of the intervention and overall outcome were extracted. The authors did not report how many reviewers performed the data extraction.

Methods of synthesis
A narrative synthesis was presented, giving summaries of the included studies in text and tables. Sackett's levels of evidence were used to summarise the overall findings for the functional activity and length of stay outcomes.

Results of the review
A total of 11 studies were included in this review, one RCT (n=243 patients) and 10 non-randomised prospective cohort studies (n=1,186 patients). The quality score for the RCT was 19/32 and the average quality score for the other studies was 14.7 (range 10 to 19); overall quality was described as fair to poor.

**Cognitive impairment:** Although all 11 studies reported cognitive assessment, the differing scales and thresholds made it difficult to summarise these data. Only three studies re-evaluated cognitive status post rehabilitation, but comparative pre- and post-data were not reported.

**Functional activity** (10 studies): Seven studies reported that patients with cognitive impairments were able to make functional gains following inpatient rehabilitation. Where studies reported relative gain, it appeared that patients with cognitive impairments gained less functioning than patients without impairments, but absolute gain was broadly similar between the two groups.

**Length of stay** (four studies): Three studies found no significant differences between impaired and intact groups in acute hospital stay. The average duration of acute hospital stay varied from 6.6 days, 16 days and 84.5 days across each of the studies. The RCT compared intervention and non-intervention groups, finding a statistically significant decrease in length of stay for mild to moderately cognitively impaired patients who received the intervention. Results were conflicting for the two studies which followed a case-series of patients. Discharge criteria were poorly described and not standardised, so results were not directly comparable across all studies.

**Discharge destination:** Place of residence on discharge was reported in three studies, but only one (RCT) also reported residence prior to the fracture occurring. In the RCT, a greater percentage of the cognitively impaired patients receiving the intervention returned to community living (91%) than those not receiving the intervention (63%).

**Authors’ conclusions**
Cognitively impaired older adults who received intensive inpatient rehabilitation following the surgical repair of a hip fracture may have gained similar benefits in physical function as cognitively intact patients, but may have required a longer length of stay. However, these conclusions should be interpreted cautiously given the poor methodological quality of the studies. Further research is required.

**CRD commentary**
This review addressed a clear question with appropriate inclusion criteria. The searches covered the major databases but, by excluding non-English papers and unpublished studies, publication and language biases may have been introduced. Overall the review process was clearly described (apart from data extraction). The use of two independent reviewers for study selection and quality assessment is likely to have minimised the impact of reviewer error or bias. The methodological quality was appropriately assessed using a validated tool and presented, but these could have been further integrated into the results. A narrative synthesis appeared to have been suitable given the clinical heterogeneity within the primary studies and poor methodological quality. The authors drew appropriately cautious conclusions, which are likely to be reliable based on the limited data available.

**Implications of the review for practice and research**
**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated a number of detailed recommendations for research, particularly the need for well-designed, adequately-powered trials that use validated outcome measures to explore which patient groups might benefit most and the specific rehabilitation interventions that are most effective.

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