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Determining discharge destination in Geriatric Evaluation and Management units: Is progressive goal attainment a better early indicator of discharge destination than improvement in Functional Independence Measure scores?

Short running title: Determining discharge destination in GEM

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Abstract

Aim: To determine whether progress in goal attainment is a more responsive measure of functional improvement than the Functional Independence Measure (FIM) and whether it is a more accurate predictor of discharge destination in the early phase of a Geriatric Evaluation and Management (GEM) episode.

Method: This project is a prospective audit of goal achievement, functional ability and discharge destination.

Results: Eighty-three patients were included in this study.

Logistic regression was conducted with the outcome variable discharge destination (home versus residential care), and the predictors being goal attainment, age at admission and change in FIM motor from admission to 2 weeks. Of these, goal attainment was the only significant predictor. The overall amount of variability in the discharge destination explained by the predictors was 25% (Nagelkerke Pseudo R-Square)

Conclusion: Progressive goal attainment may be a better predictor of improvement in function and discharge destination than change in FIM.

Keywords: Discharge destination, Geriatric Medicine, Rehabilitation Medicine

Introduction

Geriatric Evaluation and Management (GEM) Units provide rehabilitation and assessment of appropriate discharge destination for older persons, generally following an acute illness. Patients admitted to a GEM ward are characterised by complex medical issues that may include medical instability, physical disability and/or cognitive dysfunction. At admission it is often difficult to predict whether a patient will be able to return to their previous living situation or require high dependency residential care. Factors assessed at admission, such as severity of illness, level of function, social support and age, have been shown to be predictive of discharge destination [1]. In contrast, level of frailty was not predictive of discharge destination from GEM [2]. Where the discharge destination is uncertain, the team may also evaluate early progress in functional abilities before determining the discharge plan. This appraisal of progress can be somewhat subjective and it may be unclear whether the patient is making satisfactory improvement. If progress can be more objectively determined, this may assist the team in making earlier discharge decisions. Objective evaluation of progress in function in the initial stage of the GEM episode can be undertaken in two ways; use of standardised tools such as the Barthel Index or Functional Independence Measure (FIM), and/or a more individualised approach based on short term goal setting.

Currently, functional change during a GEM admission in Victoria, Australia is evaluated using the FIM [3]. This global measure of performance in a variety of activities of daily living, mobility and cognitive functions is scored at admission and discharge. The FIM is well validated in the literature as an outcome measure in rehabilitation [4] and has been utilised in studies investigating rehabilitation for the older person [5-7]. Jackson et al (2013) [8] have demonstrated that self care items (grooming and toileting), a mobility item (chair transfers) and cognitive items (comprehension, expression, problem solving, and memory) of the FIM at admission are predictive of discharge destination from inpatient rehabilitation for older people. However, the utility of this measure in GEM has not yet been established.

Short term goal (STG) setting is an alternative approach to progressive assessment of function. In the GEM unit, short term goals address activities relevant to the inpatient stay in preparation for return to the community. The emphasis is on establishing goals that are objective and measurable, relate to key functional issues for the individual and are meaningful to the individual, within a defined timeframe [9-13]. Goal attainment has been investigated in geriatric medicine wards [14], and post acute geriatric rehabilitation [15]. Rockwood (1993) [14] found goal attainment, measured with goal attainment scaling, to be more efficient and responsive to change than the Barthel Index or the FIM. Kus et al (2011) [15] demonstrated an association between goal attainment and improvement in function during a GEM episode of care.

The primary purpose of this study was to investigate progress in mobility and self care function in the early phase of a GEM episode as a predictor of discharge to high dependency residential care. Two measures of progress were investigated; short term goal achievement in the early phase of a GEM episode and improvement in function as measured by the FIM.

Secondary aims were to evaluate:

- the association between these measures of progress and length of stay (LOS) in GEM
- the association between these measures of progress and improvement in function between admission and discharge.

Materials and Methods

Study Design

This study was a prospective observational cohort study.

Setting

The setting was a 22 bed GEM unit co-located with a large tertiary hospital.

Ethics

This study was approved by the Quality Assurance Sub Committee of the Human Research and Ethics Committee of the hospital. The committee did not require consent of patients as no identifying patient information was required additional to routine clinical practice and confidential patient data was viewed only by staff who normally access the patient record.

Participants

Participants were consecutive patients admitted to the hospital's GEM Unit. Exclusion criteria included: a planned length of stay of less than 2 weeks, previous residence in high dependency residential care; discharge to an acute hospital setting and where no functional goals were determined by the team at admission.

Measures

The FIM was utilised as a standardised tool for measuring function. The FIM has 18 items measuring the level of assistance required to perform a variety of activities of daily living, continence, mobility and cognitive functions (eg. memory, communication). The FIM is the gold standard measure of function in rehabilitation and has well established reliability and validity [16,17]. The domains relating to motor function (FIM motor); self care (eating, bathing, upper and lower body dressing, toileting), continence (bladder and bowel) and mobility (transfers to bed, toilet and bath, locomotion, stairs) were utilised as measures of progress in physical function, the focus of this study. The FIM was rated at the team meeting by the GEM staff caring for the patient over the 24 hour period with scores recorded at the team meeting. The majority of staff attending the team meeting had completed FIM training and credentialing. Assistance was provided by staff with FIM credentials to less experienced team members where necessary to achieve accurate FIM scores. FIM Motor scores were collected at admission, two weeks post the initial team meeting and at discharge.

Short term goals were routinely set in the team meeting for a two week time frame in the domains of health, social, communication and cognition, mobility and activities of daily living. All disciplines in the GEM team contributed to goal setting. This study focused on goals related to the domains of the FIM motor scale. Goals were required to be specific, objective, measureable, meaningful to the individual and time bound.

Examples of goals in the self care domain:

- able to be showered in shower chair
- Independent in teeth cleaning
- Minimum assist dressing upper body
- Able to stand at rail for pants up and down

Examples of goals in the domain of continence:

- Continent of urine most days
- Social continence
- Independent with continence aids
- Continent overnight.

Examples of goals in the mobility domain:

- Supervision for bed to chair transfers
- Assist x 1 to walk to bathroom
- Take 10 steps with frame in physio gym.

A facilitator was present at the meetings to help staff formulate goals to meet these standards. Goal achievement was scored as "achieved", "partially achieved" or "not achieved" at the team meeting one or two weeks later. Goal attainment and FIM motor scores were scored at the same team meeting. Prior to analysis, all goals were reviewed and goals reflecting functional change were identified and categorised for ease of analysis. The domains of the FIM motor were used to categorise the goals. The median goal attainment score was calculated for each individual.

Demographic and medical data including age, gender, living arrangements at admission, and diagnosis were extracted from the medical history. Discharge destination from the GEM unit was dichotomised to discharge to high dependency residential care (nursing home) and discharge home or to semi-independent living.

Data analysis

Logistic regression was used to develop a model for predicting discharge destination as 'home or semi independent living' or 'high dependency residential care', using the variables of goal attainment, admission FIM motor score, change in FIM motor score in the early phase after admission and age. Because of their related nature, the variables of admission FIM motor score and change in FIM motor score were assessed for co-linearity using Pearson's r . From the logistic regression models, odds ratios, 95% confidence intervals (CI) of odd ratios and the p value from Wald's test are reported. Linear regression was used for prediction of LOS and change in FIM motor score from admission to discharge.

Results

One hundred and twenty-seven patients were admitted to the GEM unit in the 6 month time frame. Forty-five patients were excluded from the study for the following reasons: twenty-three patients had a planned length of stay of less than two weeks, twelve were transferred from a different GEM unit, five patients died, three patients were transferred back to the acute units, one patient had no functional goals determined, and one patient was admitted from high level care. Data was then collected from 82 patients. The average age was 82.4 years (SD 7.9) and 41.5% were male. The five most common diagnoses were medical illness ($n=24$), fractures ($n=23$), falls ($n=15$), post surgical ($n=9$) and neurological ($n=8$). The median LOS was 27.0 days (IQR 19.75-44.25). Median (IQR) admission, 2 weeks and discharge FIM motor was 52.5 (32.75-60.25), 65.0 (53.25 - 74.5) and 73 (57.0 - 80.25) respectively.

Of the 72 patients admitted from home, 50 were discharged home, eight to low level care (semi independent living) and 14 to high level care (nursing home). Of the 10 patients

admitted from low level care, seven were discharged back to their former residence and three were admitted to high level care. Short term goals were set for mobility (transfers, walking or stairs) for 77 patients, in the domain of self care for 64 patients and continence for 52 patients.

Figure 1 shows median short term functional goal achievement for patients discharged home and to high dependency residential care. Thirty-one percent of goals reflected FIM motor scoring (eg. minimum assistance with upper body dressing), whereas other goals represented single components of a multi component FIM motor task (47%) or were more specific to the patient's abilities or ward environment (24%). Figure 2 shows change in FIM motor scores between admission and two weeks post admission for patients discharged home and to residential care.

Logistic regression was conducted with the outcome variable discharge destination (home or semi independent living versus high dependency residential care), and the predictors being age at admission, admission FIM motor score, median short term goal attainment, and change in FIM motor the early phase of the admission (Table 1). The variables of admission FIM motor and change in FIM motor in the early phase after admission had low co-linearity with a Pearson's r of $-.27$ ($p = .01$). Of the variables, median goal attainment and FIM motor admission were the only significant predictors in the model. The overall amount of variability explained by the predictors was 42% (Nagelkerke psuedo R^2). Table 2 demonstrates that the model correctly allocated the discharge destination of 87.7% of cases.

Linear regression was conducted for the outcome variables of length of stay and change in FIM motor score from admission to discharge. For length of stay, no variables reached significance, with a trend observed for median goal attainment at $p = .07$ (see Table 3). In contrast, FIM motor change achieved by discharge was predicted by change in FIM motor in the early phase of the admission (Table 3), with 36% of the overall variability explained (adjusted R^2).

Discussion

The primary purpose of GEM admissions is to optimise the person's health and functional status to facilitate discharge to their home environment. Patients admitted to GEM in this study were characterised by relatively high levels of functional disability, with most patients requiring assistance for self care and mobility. It is important to identify at an early stage post admission those patients likely to be discharged home. This enables the team to organise home modifications, training of family members and carers and/or post discharge support services that may be required. It is equally important that patients who are likely to require high dependency care are identified, to instigate discussions with the person and their family about their changing care requirements. This also enables targeting of scarce GEM resources to those patients who are most likely to benefit.

In this study, individualised short term goal setting was more indicative of likely discharge destination than change in FIM motor scores in the early phase of the admission. Patients who achieved their initial short term goals were highly likely to be discharged home. This finding is similar to Rockwood et al (1993) [14] who found that goal attainment was more efficient and also demonstrated an increased responsiveness to change than standardised measures. For those who either did not achieve, or only partially achieved their goals, the likelihood of

discharge to high dependency care was higher. It is important to note though that more than half of those who did not achieve their short term goals still achieved discharge home. The results suggest that failure to achieve initial short term goals is a cause for concern and very close attention should be paid to ongoing progress and future planning. The other significant contributor to the model predicting discharge destination was functional level on admission (FIM motor score), similar to the findings of Naughton et al 1999 [1] and Jackson et al (2013) [8].

Change in FIM motor score in the early phase of the admission did not contribute to the model predicting discharge destination. Although the cohort demonstrated improvement, the level of improvement did not have as strong a relationship with discharge destination as short term goal attainment. Individualised goal setting reflects the progress a person needs to achieve to cope in their home setting, inclusive of the level of social support available. Goals set were often sub components of FIM items, for example ability to walk to the bathroom, a shorter distance in our GEM unit (and arguably most homes) than is required to improve in the FIM locomotion scoring.

Change in FIM motor score at the early phase did predict change in FIM motor from admission to discharge, as would be expected. The lack of congruence between this finding and prediction of discharge destination perhaps highlights the nature of GEM based care, where the focus is on enabling the older person to cope in their own environment rather than achieving functional gains of a more general nature. A patient on GEM may spend their whole admission learning a simple task such as negotiating a single step that will allow them to return home but this achievement will not be captured as a change in their FIM motor score.

There are a number of limitations to this study particularly with regard to lack of evaluation of other factors impacting on discharge destination. These factors include cognition, stabilisation of medical symptoms and co-morbidities. Future studies should address this issue both in terms of goal attainment and standardised measures. Goal attainment measures can also be used to gather health based factors such as reduction of pain and stabilisation of medical issues. These are key concerns in GEM care and may contribute to prediction of outcomes. Goals set in this study explored functional concerns beyond those measured by the FIM motor, such as ability to prepare meals and walk safely in outdoor environments. Broadening the aspects of function considered may also enhance our understanding of optimising GEM outcomes.

In conclusion, this study reaffirms the multifactorial nature of GEM care and the importance of individualised goal setting as a key feature of clinical practice.

Disclosure Statement

No potential conflicts of interest were disclosed

Acknowledgements

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Figure Legends

Figure 1: Bar chart of goal attainment score for cases according to discharge destination.

Figure 2. Box plot of change in FIM motor scores according to discharge destination.

Figure 1: Bar chart of goal attainment score for cases according to discharge destination.

(1.0 = median goal score "achieved", 0.5 = median goal score "partially achieved", 0.0 = median goal score "not achieved"; NB where the median score fell between 2 levels, this was rounded down to the level below (5 cases))

Figure 1 revised 300dpi.jpg

Figure 2 300dpi.jpg

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Author Contributions: Indicate authors’ role in study concept and design, acquisition of subjects and/or data, analysis and interpretation of data, and preparation of manuscript.

Study concept and design: SB, CN, KB

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Table 2
Accuracy of allocation of discharge destination

Observed	Predicted		Percentage correct
	Home or semi independent living	High dependency care	
Home or semi independent living	61	3	95.3
High dependency care	7	10	58.8
Overall percentage			87.7

Table 3. Linear regression outcomes.

Variable		B*	B (standardised)	Significance
Length of stay	Constant	83.82		<.01
	Age at admission	-.36	-.15	.16
	FIM motor at admission	-.25	-.22	.10
	Median motor goal score	-10.08	-.24	.07
	Change in FIM motor from admission to 2 weeks	-.20	-.15	.21
Change in FIM motor from Admission to Discharge	Constant	41.20		<.01
	Age at admission	-.30	-.18	.06
	FIM motor at admission	-.10	-.13	.28
	Median motor goal score	2.36	.08	.49
	Change in FIM motor from admission to 2 weeks	.48	.50	<.01

*B, Beta coefficient

Table 1. Logistic regression outcomes for discharge destination

Discharge destination	Variable	B	Odds Ratio	95% CI	Significance*
	Constant	.60			.85
	Age at admission	.02	1.02	.94 – 1.10	.67
	FIM motor at admission	-.05	.95	.91 – 1.00	.04
	Median motor goal score	-2.12	.12	.02 - .66	.01
	Change in FIM motor from admission to 2 weeks	-.03	.97	.93 – 1.01	.17

* Based on Wald

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