

*Brief Reports***Algorithm for initiation of medication self-management training based on FIM (AIMS-F) in stroke patients**

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ABSTRACT

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Objective: Medication management is an important factor for the prevention of deterioration or recurrence of cerebral infarction. Aiming at early achievement of independence in medication, we developed a new algorithm for initiating medication self-management training based on the Functional Independence Measure (FIM) scale, which we abbreviated as AIMS-F.

Methods: Stroke patients who ultimately achieved independence in medication management were analyzed retrospectively. The patients were divided into two groups: a group that required self-help devices for management and a group that was able to manage with medication bags, at the initiation of training. From the scores of five items in the FIM scale (bladder control, bowel control, grooming, memory, and social interaction), the choice of the optimal initiation method (self-help devices or medication bags) was predicted. Logistic regression analysis was conducted to find the cutoff point at which training can be initiated with medication bags.

Results: The receiver operating characteristic curve (ROC) that fitted the logistic model had an area under the curve (AUC) of 82%. The cutoff point of the total score of five FIM items was 32. At this cutoff, sensitivity was 85% and specificity was 64%.

Conclusion: This study demonstrated the usefulness of AIMS-F to standardize the initiation of medication

self-management training. By introducing the AIMS-F, the timing and the method of initiating medication self-management training are clearly indicated, which may provide a standardized approach that allows early achievement self-management.

Key words: FIM, early self-management of medication, algorithm, medication management method, stroke patient

Introduction

Most of the patients admitted to Kaifukuki rehabilitation wards are stroke patients. In our hospital also, stroke patients constituted 80% of all patients admitted to the kaifukuki rehabilitation ward. A study showed that in Japan, 51% of the patients who had the first stroke recurred within 10 years [1]. For the prevention of disease deterioration or recurrence, medication management is the most important issue. In our hospital, we regard medication management as an important self-care, and have started to promote early medication management since 2007, using a “medication evaluation and planning form” (hereinafter referred to as old evaluation form) [2] based on 5 items (bladder control, bowel control, grooming, memory, and social interaction) extracted from the Functional Independence Measure (FIM) scale that is used to evaluate activities of daily living. In our hospital, we organize monthly conferences, in which patient evaluation is conducted mainly by the staff members in charge of the patients, such as nurses, physiotherapists, occupational therapists, and speech therapists, incorporating information from related health personnel such as care workers, pharmacists, dietitians, and dental hygienists. Therefore, we consider that introduction of an algorithm based on FIM will simplify the process and facilitate standardization of management policies. However, while the old evaluation form determined the timing of the initiation of medication self-management training, the choice of the initial management method [medication bags or self-help devices such as weekly

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Figure 1. Medication management methods used in our hospital.

(a) Medication bags: Medications to be taken in the morning, afternoon and evening are put into separate bags, for managing medications for one week.

(b) Weekly medication calendar: Medications for each day are put in separate pockets of the calendar that is hung on a wall, for managing medications for one week.

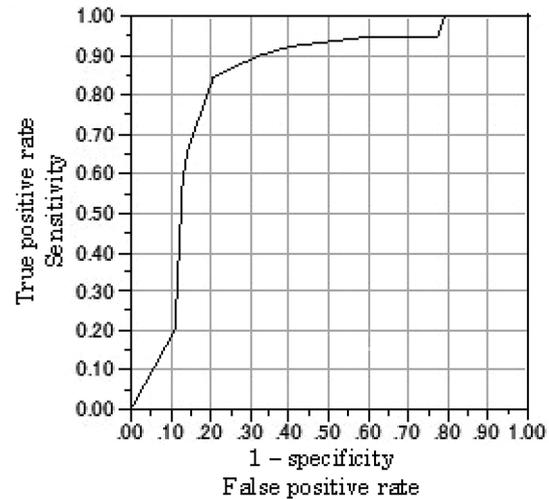
(c) Daily medication box: Daily medications are put into a box with partitions, for managing medications for one day.

medication calendar and daily pill box (Fig. 1)] differed depending on the staff in-charge, and there were no definitive selection criteria. Then, in order to eliminate differences and to use a standardized approach, we examined by statistical method a prediction formula to select the initial method of medication self-management training based on the FIM score at the initiation of training. In this report, we add the results of the present study to those of the 2007 study and report a new algorithm called the “algorithm for the initiation of medication self-management training based on FIM (hereinafter abbreviated as AIMS-F)”.

Methods

A retrospective study was conducted in 81 stroke patients (47 males and 34 females, mean age 67.1 ± 31 years, mean FIM score 94.6 ± 19.4) admitted to the kaifukuki rehabilitation ward of our hospital. Between May and August 2010, these patients started medication self-management training based on the old evaluation form [initiation criterion: total score for five items in the FIM scale (bladder control, bowel control, grooming, memory, and social interaction) was 21 or above] and ultimately achieved independence in medication self-management. The patients were divided into two groups: a group that required self-help devices (weekly medication calendar and daily pill box) for management and a group that were able to manage with the medication bags, at the initiation of training.

Due to family situation after returning home, many patients used weekly medication calendar and daily pill box for different purposes. Therefore these two methods are grouped together under self-help device. Medication self-management training was started only after the patient had achieved a score of 21 or above



“medication bag” assigned as positive
0.82361 : Area under the curve = 0.8261

Figure 2. ROC for using medication bags based on the total score for five FIM items (AUC = 82%).

for the five FIM items when evaluated at the monthly conference.

For statistical analysis, logistic regression analysis was conducted for the total score of five FIM items at the initiation of medication self-management training using medication bag and self-help as dependent variables. The receiver operating characteristic (ROC) curve was constructed, and the area under the curve (AUC) was used to calculate sensitivity, specificity and cutoff value.

Results

Logistic regression analysis using the total score of five FIM items as independent variable, and medication bag and self-help device as dependent variables, yielded odds ratio of 1.547 and 95% confidence interval of 1.305–1.902 ($p < 0.0001$). To fit the regression model, the area under the ROC was 82%. The cutoff point for the total score of five FIM items was 32 (Fig. 2). At this cutoff, the sensitivity was 85% and specificity was 64%.

Discussion

Using the old evaluation form, we initiated medication training when the total score for five FIM items was 21 or above. However, since the medication management methods at initiation were decided among the staff members in charge of the patients, there were cases where self-help devices were chosen in spite of high medication management capability, thus delaying the time to independence. For this reason, our study aimed to develop a standardized algorithm (AIMS-F) that is easy to use and not dependent on experience and knowledge.

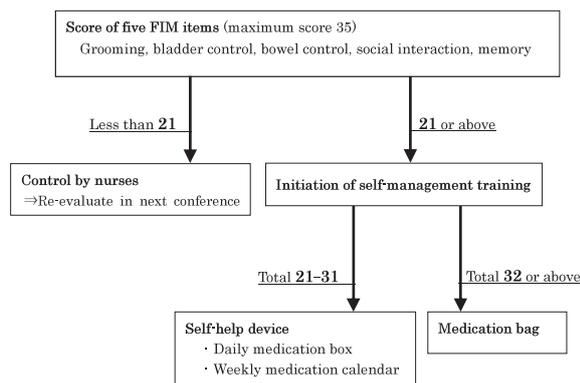


Figure 3. Algorithm for the initiation of medication self-management training based on FIM (AIMS-F).

According to Swet [3], an AUC ranging from 70 to 90% indicates a reasonably useful measure. The AUC of the ROC curve of our method based on the total score of five FIM items was 82%, indicating that this method is useful to classify patients into medication bag and self-help device groups. The cutoff point for the total score of five FIM items was calculated to be 32, yielding sensitivity of 85% and specificity of 64%. These results also show that the calculated criterion is appropriate.

Figure 3 shows the algorithm constructed from the results obtained from the present study in addition to the old evaluation form. This algorithm flows as follows. When the total score of five FIM items (grooming, bladder control, bowel control, social interaction, and memory) is less than 21, medication training is not initiated and the patient will be evaluated again in the next conference. When the total score of five FIM items is 21 or above, medication training is initiated. Using the cutoff point of 32 obtained from the present study, training is initiated using self-help devices (daily medication box and weekly medication calendar) when the score is between 21 and 31, and using medication bags when the score is 32 or above.

With the introduction of AIMS-F, through defining numerical criteria based on FIM scores obtained from multifaceted evaluation by a team, the algorithm clearly indicates whether medication self-management training can be initiated and which method to be chosen for initiation. This method resolves the variability in subjective choice of management methods, which is influenced by the experience and profession of the staff, and also led to standardization

of the explanations to patients and the method of transition to initiate self-management training by nursing management.

Although previous studies also investigated the FIM items associated with self-management of medications, there is no report that clearly indicates the timing of initiation of medication self-management training and the choice of method at initiation. Furthermore, AIMS-F can be used widely in stroke patients admitted to the kaifukuki rehabilitation wards, including those with post-cerebral infarction dementia, higher cortical dysfunction (such as aphasia, inattention, and impaired executive function), and hemiparesis.

While the old evaluation form determined the timing of initiation of medication training, because of the variability in interventional methods, the management method had to be tested by trial and error, which was time consuming. Eventually, there was not sufficient time during the hospitalization period to examine the optimal method carefully. By introducing the AIMS-F, the time to identify the management method is shortened, leaving more time for repeated training with the optimal method and for modification in individual patients. By gaining adequate training time with introducing AIMS-F, it may be possible to achieve independence in self-management of medication at an even earlier stage. Above all, independence in self-managing medications helps patients to regain confidence, which psychologically promotes independence and motivates them toward home rehabilitation. Moreover, conducting medication guidance from when the patients are hospitalized probably increases the awareness of recurrence prevention and ultimately improves QOL.

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