Effectiveness of Training of ADL and Walking in the Stroke Ward

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Abstract. During living time in the ward, the intensive training was performed on 35 stroke hemiplegic patients who could not accomplish independent ADL even after 6-month or more physical therapy. According to patients' motor development levels, the training was composed of rising from a bed, standing-up, gait with assist and independent gait. The training was mainly conducted by a nurse or physician, and the changes in ADL and gait function were assessed by Barthel Index and the 10 m maximum walking speed, respectively, 7 times in total; before training, twice a week for 12 weeks. ADL and gait function were improved markedly 2 weeks after the initiation of training in the ward. The results indicated that not only the training in the training room but also the intensive training in the ward plays an integral role in functional recovery of stroke hemiplegic patients. ADL correlates with gait function, and improvement in gait function in the ward therefore exerts major effects on improvement in ADL.

Key words: Stroke, Training in the stroke ward, Barthel Index, Gait ability

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INTRODUCTION

With primary purposes of elimination, relief, and prevention of impairment, and functional recovery at the earlier stage, medical rehabilitation is performed on stroke hemiplegic patients more effectively by the team approach of rehabilitation staff including patients and their family members than by the therapeutic approach of individual therapist. The roles of rehabilitation team consist of prevention of disability, recovery and maintenance of physico-emotional function, and improvement of ADL in the rehabilitation unit. The functional outcome in rehabilitation therapy is highly dependent upon as early team approach as possible after onset, not upon specific skills of individual therapists. In Japan, exercises performed

in the training room are often found inapplicable to ADL in the ward. This can be attributed to the lack of effective team approach and of mutual understanding among staffs involved in regard to the assessment of efficacy. Although it is believed in Japan that rehabilitation exercise should be conducted in the training room, an inpatient spends only 0.5% of 24 hours there. With a physician and nurse as leaders, we therefore positively performed training of ADL and walking on hemiplegic patients after stroke during their time at the stroke ward, and examined the changes in ADL and walking function by Barthel Index (BI)¹⁾ and the 10 m maximum walking speed (MWS)²⁾, respectively. We also investigated the correlation between BI and MWS.

METHODS

Subjects

Of stroke hemiplegic patients who admitted to the hospital in order to receive stroke rehabilitation during the period from November, 1994, to April, 1995, 35 patients, who could not accomplish independent standing position and gait 1 month after the initiation of the rehabilitation therapy, served as subjects of the study (Table 1).

Treatment conditions

In addition to rehabilitation therapy in the physical training room, the subjects were instructed to perform exercises of changing positions from supine on bed to sitting and from sitting to standing, from standing to gait with assist, and of independent gait. The exercises were performed bedside or at the ward by the developmental approach by step for 30 min each twice a day. Assistive means such as a bar, cane, prosthesis, etc. were used in case the subjects could conduct the exercises more easily.

Assessment

The BI was used for the evaluation of ADL (score range: 0–100), which included feeding, bathing, personal toilet, dressing, bowel and bladder control, toilet transfer, chair/bed transfer, ambulation and stair climbing. The assessment was made before the training in the ward and every two weeks for 12 weeks.

For the evaluation of walking function, the subjects were requested to walk 10 m-distance in the ward as fast as possible, and the required time to finish the distance and step frequency were measured by a stopwatch. The 10 m maximum walking speed (MWS: m/min) was then obtained,

Table Patient characteristics

Number	35
Age (years)	57.0 (8.5)
Females	18
Males	17
Left/right	20/15
Hemorrhages/infarcts	25/10
Length of stay (months)	2.5 (1.2)
Time since onset (months)	5.5 (1.1)

(): SD

and the maximum distance for 1 min was also calculated. The subjects performed the walking three times at each evaluation, and the fastest MWS was adopted. The subjects who used a cane or prosthesis performed the walking under the condition where they could walk fastest. The evaluation was made 7 times in total before the training and every two weeks for 12 weeks.

RESULTS

Changes in BI and MWS

Figures 1 and 2 shows the mean value of BI and

Fig. 1. The sequential changes of Barthel index scores

Fig. 2. The sequential changes of Maximum Walking Speed

MWS at the initiation of training in the ward, 2, 4, 6, 8, 10, 12 weeks after the initiation of training. Both BI and MWS exhibited a gradual increase in score from 2 weeks to 12 weeks, and the increasing rate was highest at 2 weeks after the initiation of training.

The correlation between BI and MWS at the initiation of training in the ward and 12 weeks after the initiation of training

As depicted in Fig. 3, there was a positive correlation between BI and MWS at the initiation of training (regression formula: $y=1.14x + 47.95$, correlation coefficient: $r=0.739$). The subject who could not walk showed BI less than 75, and those who could walk by using assistive means indicated higher BI.

As shown in Fig. 4, a positive correlation was observed between BI and MWS 12 weeks after the initiation of training ($y=0.15x + 87.52$, $r=0.67$). At

Fig. 3. Correlation of Barthel index and maximum walking speed before the initiation of training in the ward

Fig. 4. Correlation of Barthel index and maximum walking speed after 12 weeks

that time, all the subjects scored BI of 80 or more, and 33 who scored 90 or more could return to their homes with almost complete independence in ADL. All the subjects became independent in walking function, but showed individual differences in walking speed.

DISCUSSION

Importance of the intensive training in the ward for stroke patients

Although the importance and effectiveness of stroke therapeutic exercise in the training room have been well addressed, few data exist on the methods of the training during living time other than training time and its effectiveness evaluated objectively³⁻⁵. It therefore remained unsolved how nurses could participate in the rehabilitation. This study presented objective results that out of stroke patients 6 months after onset who had received therapeutic exercise, those who could stand but walk performed training in the ward, and showed rapid improvement in ADL and walking ability. The results also confirmed that the improvement was maintained for at least further 12 weeks, suggesting that the intensive training in the ward may facilitate ADL and walking ability for 3 months.

A marked improvement in ADL was observed 2 weeks after the initiation of training, which is the efficacy that has appeared as a result of the training in the ward. This change results from the improvement in activities relating to the ability of motion, such as transfer, ambulation, and toilet transfer. The subjects of the present study were not found to acquire practical motions required for daily living in the training room, such as standing, keeping of standing, position, change of posture, walking, etc., and these patients require the training in the ward in which nurses play leading parts.

Relation to ADL and Gait ability

Gait ability can easily be evaluated by the 10 m maximum speed measurement (MSW)². Compared with an increase in BI score due to ADL training, more remarkable improvement in motions was "regaining walking ability". There was a positive correlation between BI and MSW. It is generally accepted that independent gait is regarded as the ability to walk 10 m in 30 sec or less (velocity: 20/min or less). The present results revealed that the improvement in gait function played

useful roles in the improvement of BI score. With a final goal of reaching MSW of 20 m/min (30 sec/10 m or less), gait training in the ward is essential to functional recovery of ADL and walking.

CONCLUSION

- 1) Marked improvements in ADL and walking ability were observed in stroke hemiplegic patients 2 weeks after the initiation of the intensive training in the stroke ward, and the improvements were kept for further 12 weeks.
- 2) Efficacy obtained by training in the ward mainly consisted of improvements in basic motor function such as transfer, ambulation, etc. The intensive training in the ward is therefore important for the patients who did not show enough improvement in ADL or walking ability with the therapeutic exercises in the training room.
- 3) ADL correlates with gait function, and practical

goal of ADL training in the ward is therefore to regain independent walk. Improvement in gait function in the ward exerts major effects on improvement in ADL.

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