INTENSIVE SHORT-TERM REHABILITATION OF GERIATRIC PATIENTS

Initial Results and One-Year Follow up

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ABSTRACT. Thirty-nine chronically ill geriatric patients were subjected to intensive rehabilitation for eight weeks. Seventeen of these patients were compared with matched controls. The results were evaluated with objective tests on ADL functions, mobility and nursing load. A significant improvement was observed in all three parameters in the treatment group as a whole immediately after the treatment period and in the ADL and mobility test at the one year follow-up. The control group showed no significant changes in any of the tests. In comparing the matched pairs a significantly more pronounced improvement was observed in the ADL test immediately after the treatment and at the one year follow-up.

Several reports have previously been published on the effects of active vocational rehabilitation in younger patients with well-defined diseases. A systematic evaluation of intensive medical rehabilitation of geriatric patients has not been performed previously as far as we know. The main aim of geriatric rehabilitation is to get the patient less dependent on social and medical care. These patients often have several diseases and symptoms which necessitate more broad-scale activation. Even though the final aim of rehabilitating the patient to his home may not be achieved to the same extent as with younger patients, an improved function often results in a decreased demand for medical care. Furthermore, inactivity per se predisposes to further medical complications. The present study concerns geriatric patients considered to have chronic conditions and to have passed the acute phase of their disease, during which active rehabilitation usually is concentrated.

Thirty-nine patients were subjected to intensive rehabilitation including occupational therapy and physiotherapy during eight weeks. Seventeen of

the patients were compared with matched controls. The results were reevaluated one year after the end of the treatment period. Three different point-scale-systems were used in order to evaluate changes and to measure different aspects of disability.

MATERIAL

The material comprised 38 patients (19 males and 19 females) 62 to 93 years old and one 49-year-old male patient with hemiparesis after cerebrovascular accident. As earlier mentioned the present study concerned geriatric patients considered to have chronic conditions and to have passed the acute phase of their disease, during which active rehabilitation usually is concentrated. In selecting these patients those who suffered from a severe handicap considered accessible to therapy were chosen although, in some patients it was uncertain whether a short period of treatment would give any results. Patients with intellectual impairment, malignant diseases or severe cardiac decompensation were excluded. In Table I, the main diagnosis of the patients in the treatment group are given. In order to further evaluate the results of rehabilitation, we considered it important to compare the patients subjected to the study with patients getting routine treatment. In chosing these matched controls, the aim was to get a sample of patients similar to the treatment group with respect to sex, age, diagnosis, duration of the disease and with close similarity regarding nursing load, ADL and mobility (see below). It was difficult to find matched controls mostly because these patients often have several diseases. Thus, we found only seventeen controls who agreed satisfactorily with the treated patients. The mean difference in age between the matched pairs was 6.6 ± 4.8 (s.d.) years. The mean age of the treated group was 73 years and that of the control group 74 years, which shows that there was no systematic age difference between the two groups. The differences in disability are shown in Table IV.

At the one year follow up 8 patients in the treatment group had died and it was not possible to get in touch with 3 patients in this group. Thus, 28 patients from the

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Table I. *The main diagnosis of the patients in the treatment group*

	No. of patients	
	Males	Females
Rheumatoid arthritis	0	5
Cerebral vascular disease	10	9
Amputation of lower leg	3	1
Miscellaneous (organic disorders of the nervous system, osteo-arthritis, decrepitude)	7	4

treatment group (15 males and 13 females) were re-examined.

In the control group two patients had died and it was not possible to get in touch with one patient. Thus, 14 patients in this group were available for examination.

Ten matched pairs were left when not reexamined patients from the treatment and control groups were excluded.

METHODS

Methods of examination

To a routine physical examination was added a test of visual acuity, measurement of joint motion and a neurological examination.

ADL-test. A number of functions important for daily living was tested as shown in Table II.

Each separate function was given a numerical value, based on such factors as complexity of function, the value of the task for independence and the mobility needed. Negative points were given for each task a patient could not perform without assistance (use of gadgets was permitted). Zero was given when a task was performed in full independence, without individual adjustments, and when it was completed in full detail. The maximum negative value given was -128.

Mobility test. A scale of numerical values was designed as follows: A patient able to walk more than 10 meters started at zero, a chairbound patient able to walk less

Table II. *Point scale of the functions in the ADL test*

ADL-test	Negative points
Hygiene	
Washing-upper part of body	3
Washing-lower part of body	3
Comb hair	2
Brush teeth (prothesis)	3
Shave	2
Clean, file nails	1
Use handkerchief	2
Use of urinal	3
Transfer to and from toilet	3
Manage toilet-paper, adjust clothing etc.	3

ADL-test	Negative points
Dressing–undressing	
Vest on/off	2
Shirt/blouse on/off	3
Drawers on/off	3
Corset on/off	2
Socks-stockings on/off	3
Use of suspenders	2
Dress-frock on/off	3
Trousers on/off	3
Shoes on/off	3
Use of shoe-laces	3
Coat on/off	1
Use of coat-hanger	1
Doing/undoing buttons	3
Use of zip	2
Gloves-mittens on/off	1
Use of belt or braces	2
Feeding	
Drink (glass, mug or cup)	3
Cut food on plate	2
Use of spoon	2
Use of knife and fork	2
Spread butter on bread	2
Eat sandwich	2
General activities	
Write name	2
Write more than name	1
Use of telephone	3
Lock/unlock with key	3
Open door, pass through, close the door	3
Open/shut window	2
Open/shut cupboard door	2
Open/shut drawers	2
Turn light switch	3
Turn on water	3
Open bottle, tube and screw-top jar	3
Pick up objects from floor	3
Light match	2
Wind up watch	1
Make bed	3
Household	
Take a glass, pour water into it	3
Pour from bottle into glass	3
Pour water into empty basin and empty it	2
Use a mixer	1
Stir mixture	2
Cut loaf into slices	3
Carry pot (with handle) filled with 1 pint of fluid	2
Carry frying pan (filled)	1
Wash the dishes (plate, glass, pan, cutlery)	3
Dry the dishes (plate, glass, pan, cutlery)	1
Clean and wipe the sink	1
Lay the table (plate, glass, cutlery)	3
Use of broom and dust-pan	2

than 10 meters started at -10 points, and a bedridden patient started at -20 points. In addition to these values negative points were given for functions the patient could not perform. The maximum negative value given was -32 points. This scale is shown in Table III.

Nursing load evaluation. The concept "nursing load" entails three components, viz. time-consumption, physical and mental demands on staff.

The degree of nursing load is influenced by such factors as e.g. impaired mobility, incontinence and demands on supervision. In dicussions with the nursing staff we tried to evaluate the importance of these factors in relation to the nursing load. When considering this, each factor was given a numerical value in degree of importance to the nursing load. The scale varied between zero and 41. The latter point was given to a patient with maximum demands on nursing and care (bedridden, disturbing, double-incontinent, need to be fed, washed and cared for completely). Time studies have shown a significant correlation between the nursing-load-points and the time consumption of staff (time consumption [minutes per diem] = $4.44 \times$ nursing load $+ 33$) (Hultén et al., 1969).

The hospital staff did not know which patients were controls to avoid any special attention, apart from the normal, to these patients.

TREATMENT METHODS

Each patient was given eight weeks of active treatment. During this period of treatment they were placed in wards where the nursing staff had been specially introduced to rehabilitation methods.

Apart from the permanent staff, the following categories were employed exclusively for the study period:

	Added time (months) per staff category
Occupational therapists	5.5
Occupational therapy aids	3.0
Physiotherapists	3.5
Physiotherapy students	2.5
Physiotherapy aids	3.5
Male orderly	3.5
Physicians	2.0
Secretary	1.0

The male orderly was engaged part-time in transports and part-time in assisting the physiotherapists.

Occupational therapy

Treatment programmes, based on findings from ADL and mobility tests were designed individually and contained as follow:

Activation aiming at stimulating the patients to spontaneous action physically and mentally. This was given individually or in groups with such activities as diversions, group-projects and games (30 patients).

Functional treatment:

1. To restore and improve functions such as co-ordination, joint motion and muscle activity (32 patients).
2. To restore and improve functions important to independence in ADL (37 patients) and household (17 patients). This included assessing the need for gadgets and training the patients in using them. It also included provision of wheel-chairs and visits.

Table III. *Point scale of functions in mobility test*

Mobility test	Negative points
Walk more than 10 meters	-0
Walk with: stick	1
1–2 crutches	1
2 quadruped walking aids	2
other type of walking aid	2
Walk outside	2
Climb the stairs	2
Wheelchair bound—walk less than 10 meters	-10
Get into standing from a chair	2
Manage wheelchair	2
Transfer from bed to chair	1
Transfer from chair to bed	1
Sit down on floor	2
Get up from floor	2
Bedridden—can not sit in chair	-20
Move up and down in bed	2
Move sideways in bed	2
Turn to one side	2
Turn to prone position	2
Swing legs over bedside	2
Get into sitting position	2

Physiotherapy

Treatment programmes were designed individually and based on findings from mobility-tests, joint-range and muscle power.

Treatment was given individually (37 patients) or in groups (33 patients). Treatments of muscle power range of motion and co-ordination as well as general treatment such as walking practice and general group activities, was given.

Patients were asked to train on their own in addition to the treatment given by the physiotherapists and the occupational therapists. The nursing staff was actively engaged in continuing treatments.

RESULTS

Effects of rehabilitation

Table IV shows the resluts in terms of ADL-points, mobility points and nursing load points regarding the treatment group as a whole, the treatment group with matched controls, the control group, and a comparison between matched pairs. In the treatment group as a whole, all three parameters showed a significant improvement after eight weeks of intensive rehabilitation although four of the patients could not fulfil the rehabilitation programme. This was due to complicating diseases occurring during this period (in three cases cerebro-vascular accidents and in one case a fracture of the femoral neck).

The control group showed no significant im-

Table IV. *Changes in ADL-points, mobility points and nursing load points in the entire treatment group, the group of treated patients with matched controls and the control group, as well as a comparison between the changes of the matched pairs at the end of the treatment period and at the one year follow-up*

I = before the treatment period   II = immediately after the eight-week treatment period
III = one year after the end of the treatment period

	Treatment group			Group of treated patients with matched controls			Control group			Comparison of treatment group to control group (matched pairs)		
	n	Mean (S.E.)	p	n	Mean (S.E.)	p	n	Mean (S.E.)	p	n	Mean (S.E.)	p
ADL-points												
I	39	71 (5)		17	79 (6)		17	81 (8)				
II	39	30 (6)					17	73 (10)				
III	28	42 (7)					14	78 (9)				
I–II	39	41 (5)	0.001	17	46 (8)	0.001	17	8 (4)	NS	17	45 (10)	0.01
I–III	28	29 (6)	0.001				14	1 (5)	NS			
				10	27 (7)	0.01	10	0 (4)	NS[a]	10	28 (8)	0.01
Mobility points												
I	39	18.8 (1.2)		17	20 (1.7)		17	22.5 (1.8)				
II	39	12.1 (1.6)					17	20.5 (1.8)				
III	28	14.3 (1.9)					14	23.1 (2.2)				
I–II	39	6.7 (1.1)	0.001	17	4.6 (1.5)	0.01	17	2.0 (1.0)	NS	17	2.6 (1.9)	NS
I–III	28	4.3 (1.6)	0.02				14	−0.7 (2.8)	NS			
				10	2.1 (2.9)	NS	10	−2.7 (1.7)	NS[a]	10	4.9 (2.5)	NS
Nursing load points												
I	39	10.7 (1.3)		17	12.8 (1.9)		17	12.8 (1.2)				
II	39	6.9 (1.2)					17	11.9 (1.5)				
III	28	8.8 (1.3)					14	12.9 (1.5)				
I–II	39	3.7 (1.2)	0.01	17	4.1 (2.1)	NS	17	0.8 (0.8)	NS	17	3.1 (2.6)	NS
I–III	28	0.9 (1.5)	NS				14	0.0 (1.4)	NS			
				10	−0.4 (2.0)	NS	10	0.0 (1.6)	NS[a]	10	−0.4 (2.7)	NS

[a] Controls with matched treated patients.

provement in any of the test methods. When comparing the matched pairs of patients, a significant difference in improvement was observed in ADL-points.

One-year follow up

In those treated patients in whom reexamination was possible, a significant improvement compared with the state before the study was shown in ADL and mobility points. The control group showed no significant change compared with the initial state.

Comparison between the matched pairs showed a significant difference in improvement only in the ADL-points.

At the one year follow-up, five of the treated pa-

tients with matched controls and two controls lived at home or in homes for aged people.

DISCUSSION

In the present investigation, we have presented only those results which were obtained by objective test methods. We are fully aware of the fact that there are gains from this type of treatment that are not possible to evaluate in figures, however. Thus, according to the nursing staff, most patients became easier to manage and more positive in their increased activity. Most patients also became actively interested in and pleased with the treatment given.

The methods used for the registration of the functional capacity of the patients show, in some respects, similar functions, in other respects different ones. ADL and mobility tests register in detail the physical capacity, while the nursing load method reflects mainly factors influencing the time needed for the direct nursing of a patient in the hospital. The nursing load points thus include other factors such as urinary and faecal incontinence, bedsores and whether the patient is disturbing or not. Furthermore, the nursing load methods takes into consideration whether the patient can manage his functionals within time acceptable to the hospital routine. The registration of nursing load is a simple and rough method and suitable if assessment is wanted on a large group of patients without a complicated and time-consuming registration.

The ADL and mobility tests give a detailed registration of each function and include largely two groups of functions. One group deals with the same function as in the nursing load method but is far more detailed. The other group deals with functions not affecting the nursing load but rather functions important to the self-care of the patient outside the institution. These functions are such as walking outside, using the telephone, cooking etc.

It should be noted that these methods (ADL test and mobility test) do not characterise the type but rather the degree of handicap. They do not give a graded measure of improvement in each function as regards e.g. the time factor. Thus, a patient managing to dress in 30 min before treatment and in 5 min after treatment in both instances was regarded to manage within

acceptable time. Therefore this improvement will not show in reduction of points given.

Considering the mentioned differences between the three methods it is not surprising that the registration of treatment effects, with these methods, give different results. Some factors should be mentioned that explain, to some extent, the different results. In some patients, an increase in nursing load points may be caused by urinary or faecal incontinence. Another important point is that improvement in some activities may give a greater load on the nursing staff, i.e. a patient, previously wheelchairbound, gets an increase in nursing load when he has been rehabilitated to walk with help, thus needing more attention and help from nursing staff. Also the improvement in ADL and mobility that occurred in almost all treated patients was sometimes not great enough to enable the patient to manage within time acceptable to the hospital routine.

The fact that the treated patients at the one-year follow-up showed less good results with respect to all the parameters compared with the state at the end of the treatment period may be due to either a natural course in these age groups and/or to the fact that the gains of the rehabilitation need continuous supervision, training and encouragement for a longer period.

Certain tendencies were noted during the study: patients with well-defined conditions, e.g. cerebral vascular disease and rheumatoid arthritis gave the best results. Patients with several diseases, with general decrepitude and especially those with some mental impairment gave less good results. Patients suffering from general decrepitude improved during the first few weeks only. It seems plausible that shorter rehabilitation periods should be given at intervals to keep the ADL-function of these patients on as high a level as possible. This could very well in many cases have been done in a day unit.

The present study shows that active rehabilitation is of great medical and humanitarian importance also in geriatric, chronically ill patients.

REFERENCE

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