
Predicting Functional Outcome Following Acute Stroke Using a Standard Clinical Examination


SUMMARY In a series of 149 patients admitted to a stroke unit, the outcome of the acute phase of stroke rehabilitation, assessed by the patients' return to independence, was found to be related to the results of standardized weekly clinical examinations of mental, motor, sensory and communication function. The prediction of subsequent independence was estimated just as accurately using the results from three of these tests (upper limb motor function, postural function and proprioception) as when using the entire set of tests. A group of patients with little chance of responding to rehabilitation was identified.

Stroke, Vol 13, No 5, 1982

PREDICTING FUNCTIONAL OUTCOME following stroke remains a problem to which there is not yet a satisfactory solution. The emphasis in neurological examination has always been on diagnosis and the localization of the lesion rather than prognosis. Prognostic indicators based on neurological examination have not been clinically useful, even when analyzed statistically.1 Others have concluded2 that no single group of predictors was accurate enough to predict rehabilitation gains in the individual patient, and that they could only be used to describe in general terms those who would do better and those who could do worse. However, such studies have usually been based on reviews of medical records or on the results of traditional diagnostic neurological examinations. Newman,3 among others, has pointed out that such examinations are insufficient to give useful data about the process of recovery in hemiplegia. He has advocated a simple numerical assessment of motor and sensory function as well as higher mental function. This approach has been confirmed by Isaacs and Marks4 who found that simple cognitive tests proved effective in determining which of a series of severely disabled patients were likely to be able to go home following rehabilitation, whereas conventional clinical examination did not.

Rehabilitation of stroke patients can be highly labour intensive and in times of financial stringency there is likely to be a limit to the amount of resources available. Therefore, it may be important for clinicians to apply the available resources to patients who are most likely to derive maximum benefit and be returned to independence. This principle was followed in adopting a simple system of triage to select a 'middle-band' of patients of intermediate prognosis likely to derive the most benefit from rehabilitation for admission to a trial of a stroke unit versus medical units in the management of acute stroke in the elderly.5 A simple series of tests able to differentiate between those patients within this group able to respond to rehabilitation and those unable to do so would have considerable practical value in patient management. In this paper we investigate the extent to which simple clinical tests, administered weekly, can achieve this.

Methods

The data were obtained from a randomized controlled trial, with patients being admitted to a stroke unit or to one of 12 medical units on call for emergency admissions.6 Patients who were unconscious at the onset of stroke or who were previously dependent in daily activities were excluded from the trial as their prognosis for rehabilitation to independence was poor. Those who were able to walk without assistance after their stroke or had no demonstrable hemiplegia were also excluded as they were unlikely to require prolonged rehabilitation. Thus entry to the trial was restricted to a group of 'middle-band' of strokes of intermediate prognosis. Attention in this paper is concentrated on those patients who were randomized to rehabilitation in the stroke unit and were thus subjected to a uniform rehabilitation policy. Clinical tests were administered weekly to all patients in the trial. A detailed description of the tests and their scoring is given in an Appen-
The tests covered memory recall, simple problem solving, proprioception, spatial orientation, upper and lower limb motor function, postural function, expressive and receptive language and two point discrimination on the affected and unaffected hands. The development of the tests and the variability present in their use have already been described. The weekly clinical tests continued for 16 weeks after admission to hospital, or until the time of hospital discharge. At this point, the outcome of the acute phase of rehabilitation was assessed on the ability of the patient to perform basic activities of daily living: getting in and out of bed, dressing, mobility indoors, toileting and personal hygiene, cooking a simple meal, feeding themselves and controlling their environment. They were assessed on a seven point scale running from fully independent without aids to completely dependent. For simplicity of presentation the notions of ‘independence’ and ‘dependence’ are also used. A patient was classified as dependent if human assistance was required to complete at least one of these activities of daily living or if the activity could not be carried out at all. In figures 2 and 3, which present in various subgroups the percentage of patients regaining independence, only percentages based on 10 or more patients are included.

Statistical Methods

In this paper we are interested in relating functional outcome after stroke rehabilitation to the results of the weekly clinical tests. While the association of outcome with the results of a particular test may be of some interest, in determining prognosis we would wish to use results from a combination of tests rather than considering them in isolation. Several methods may be of value but in this paper we concentrate on two well-known techniques. In the main we use multiple regression, where the detailed categories of degree of function on the seven point scale are used as our measures of outcome; but as an investigative tool we also use discriminant analysis, where the outcome is dichotomized as independent or dependent. In assessing prognosis at any point during follow-up, say 4 weeks, we have available the results of tests in that week and those from the previous 3 weeks. However, at analysis, neither of the above statistical methods, nor a visual inspection of the serial data showed any clear predictive value in including the results of earlier tests. Thus the results of each week’s tests were examined separately in relation to eventual outcome using the multivariate methods referred to above. Attention was concentrated on the results from the first six weeks of follow-up where the number of patients available for clinical examination was still relatively large. Those tests which did not contribute significantly to the predicted outcome were dropped from further consideration. Also, it is inconsistent to propose a series of formulae for prediction at different stages of follow-up, in which certain coefficients may vary appreciably from week to week. Thus tests which gave unstable coefficients were also dropped. Eventually, a set of tests was identified where the corresponding multiple regression coefficients (and discriminant function coefficients) showed only minor differences from week to week and from subjective inspection of coefficients a very simple predictive formula was obtained for use throughout the period of follow-up.

Results

During the study 584 patients were assessed by the study's physicians. Thirty-nine of these had no stroke, 118 were excluded because of a poor prognosis and 116 were excluded as they were unlikely to require prolonged rehabilitation. The patients satisfying the conditions for entry into the trial were randomized to rehabilitation in the Stroke Unit (155 patients) or in General Medical Units (156 patients). The clinical features of these two groups were broadly similar. The mean age of the patients studied was 72.9 years with a range from 60 to 91 years. Forty-seven percent were males. Fifty-three percent had a right hemiplegia. All but 10 of the patients had the diagnosis recorded as I.C.D. code 436, and the remaining patients had another stroke-related diagnosis recorded (I.C.D. 430–435, 436, 437). Almost all patients had at least 1 stroke-related investigation performed with a mean of 4.6 investigations in the Stroke Unit and 3.8 in the General Medical Units. Only a very small proportion received any specialized neurological investigations.

To determine the predictive value of the weekly clinical tests we now consider only those patients rehабilitated in the Stroke Unit where a uniform policy was applied. Patients were discharged from hospital throughout the 16 week period of follow-up (fig. 1). Of the 155 patients randomized to the Stroke Unit, 6 had died prior to the first examination leaving a maximum of 149 patients available for analysis at week 1. Of these, a substantial proportion had mild strokes and were quickly discharged from hospital as independent. A further group of severely ill patients soon died. Thus by four weeks after hospital admission the number of patients available for assessment had been reduced to 100 and their clinical profile was markedly different from that of the original population. Thereafter, patients were discharged at a steady rate and included an increasing proportion who were assessed as dependent at discharge from hospital. At the sixteen week cut-off point 12 patients were still in hospital. Of these only one was assessed as functionally independent.

To illustrate the association of the results of each of the clinical tests with subsequent outcome we present the results from the clinical examination at 4 weeks (table 1). These data reveal immediately a difficulty in administering the tests. Thirty-one of the 100 stroke unit patients examined at 4 weeks could not be assessed on at least one test. A language problem was the most common cause (18 cases) and 8 patients were confused. Two patients were uncooperative, two were unconscious and one was too disabled. The outcome of these patients was generally poor and for purposes of prognosis there is a case for classifying a patient who is
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The upper limb motor function test is the best single indicator of prognosis at 4 weeks, with only one of 23 paralyzed patients subsequently regaining independence. The results from each of the other tests showed some association with the exception of two-point discrimination which appears to have no prognostic value in determining a patient's potential for regaining his or her independence. This test and that for spatial orientation, where only one patient had significant neglect, were omitted from subsequent analysis.

Initial application of the multiple regression and discriminant function methods as described in statistical methods, led to the dropping of the tests which assessed the communication functions of expression and comprehension. In a second stage, the lower limb motor function test and the problem solving test were also dropped. Memory recall did not appear to be of prognostic value after the first two weeks and this in turn was dropped leaving only 3 variables: upper limb motor function, proprioception and postural function. As the coefficients corresponding to each test did not differ appreciably among themselves, it was decided to test a very simple predictive formula obtained by subjective inspection of the multiple regression coefficients obtained for the first six weeks of follow-up. This was

$$Y = 1.6 + 0.4 \times (MFU + PROP + POSTF)$$

where $Y$ represents the predicted independence score and MFU, PROP and POSTF denote the scores on the upper limb motor function test (0-4), test of proprioception (0-3) and postural function (0-3) respectively. The better outcome on any test is associated with the lower score and the definition of each category is given in the Appendix.

The success of this predictive formula at week 4 is summarized in detail in table 2. A fairly strong association between predicted score and the eventual independence category is seen, although there is still appreciable variation in outcome among patients with the same predicted score. The overall success rate in predicting independence was 75% in week 4 and did not drop below 70% until week 13. This is close to the 75-80% accuracy of prediction when all tests were included and each week's results were analysed separately. Rather than considering an overall rate of predictive accuracy, it is useful to look at outcome in three strata of patients: those with a predicted score less than 3.0, those with a predicted score greater than 4.0, and a central stratum. The percentage of patients eventually regaining independence within these three strata in relation to the timing of the tests on which the predictions are based is shown in figure 2. The predictive accuracy in the upper stratum is reasonable in the early stages after a stroke, but for patients who have been in hospital for more than two months it is not possible to identify patients with better than a 60% chance of regaining independence. At the other end of the scale, after one month in hospital it is possible to identify a group of patients, comprising around one third of the total, whose prognosis in terms of independence is extremely poor.

As a further check on the simple predictive formula, it was then applied to the clinical examinations of other patients in the trial who had been assigned to medical units (fig. 3). The results are similar apart from a relatively poor outcome from the fifth week onwards in the good prognosis group, and a consistently lower rate of patients regaining independence in the central stratum.

**Discussion**

The value of any prognostic index depends on a number of factors and one obvious factor is the accuracy of prognosis.

The accuracy in the good prognosis group is reasonable in the early period after a stroke, but soon deteriorates. On the other hand, whereas in this early period...
### Table 1: Final Outcome Category in Relation to the Results of Clinical Tests Performed 4 Weeks After Hospital Admission

<table>
<thead>
<tr>
<th>Outcome category</th>
<th>Independent 1/2 3</th>
<th>Dependent 4 5/6 7</th>
<th>Dead</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Loss of memory recall</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>27</td>
<td>5</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Slight</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Moderate</td>
<td>1</td>
<td>3*</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Untestable</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td><strong>Difficulty with problem solving</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>29</td>
<td>8</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Slight</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Moderate</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Untestable</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td><strong>Upper limb motor function</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No weakness</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Slight weakness</td>
<td>13</td>
<td>6</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Moderate weakness</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Severe weakness</td>
<td>9</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Paralysed</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td><strong>Lower limb motor function</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No weakness</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Slight weakness</td>
<td>18</td>
<td>8</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Moderate weakness</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Severe weakness</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Paralysed</td>
<td>2†</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Comprehension</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easy</td>
<td>30</td>
<td>10</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>Difficult</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Impossible</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Ability to express oneself</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>28</td>
<td>10</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>Impaired</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td><strong>2 Point discrimination: normal hand</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 20 mm</td>
<td>10</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>21–40 mm</td>
<td>13</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>&gt; 40 mm</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Untestable</td>
<td>1</td>
<td>6</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td><strong>2 Point discrimination: abnormal hand</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 20 mm</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>21–40 mm</td>
<td>17</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>&gt; 40 mm</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Untestable</td>
<td>1</td>
<td>6</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td><strong>Difficulty with proprioception</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>23</td>
<td>2</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Slight</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Moderate</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>
several patients in the poor prognosis group in fact regain independence, the chance of a patient doing so is remote if he is still in the poor prognosis group more than a month after his stroke. There are at least two ways in which improved prognostic accuracy could be obtained. One of these is the development of alternative tests which may be more closely related to subsequent outcome. The second may be to change the criterion by which outcome is assessed. In the present study practical constraints led to this being judged by the ability of the patient to perform certain activities of daily living at either the time of hospital discharge or at a 16 week cut-off point. A fixed time, perhaps later in follow-up might produce a more reliable indication of the patients' ability to regain independence. Some patients may have been discharged from hospital before independence was reached according to the definition used in the study, while others might not yet have reached their full potential for rehabilitation, even after 16 weeks.9

Even if a reliable prognostic index can be derived, there is the question of how this should affect clinical practice. Should resources be concentrated on patients with a good prognosis or will such patients regain independence without a program of rehabilitation? Do the patients with a poor prognosis need an increased share of resources? Is it the central stratum of patients, whose outcome is difficult to predict, which will be most greatly benefited by an intensive rehabilitation program? The results from this study can do no more than offer a pointer, particularly since intake to the study was already limited to a middle-band of patients assessed initially to have a good prognosis for survival but an uncertain prognosis for full rehabilitation. All patients in the stroke unit were rehabilitated using the specialized experience of members of the unit and the full range of rehabilitation services. It is unlikely therefore that the outcome of those patients failing to respond could have been improved substantially, however much in the way of extra resources were employed. As it was, patients who were still in the 'poor prognosis' category more than a month after

<table>
<thead>
<tr>
<th>Table 1 (continued)</th>
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</thead>
<tbody>
<tr>
<td>Severe</td>
</tr>
<tr>
<td>Untestable</td>
</tr>
<tr>
<td>Postural function</td>
</tr>
<tr>
<td>Walking</td>
</tr>
<tr>
<td>Standing</td>
</tr>
<tr>
<td>Sitting</td>
</tr>
<tr>
<td>Lying</td>
</tr>
</tbody>
</table>

*Includes 1 patient classified as severe.
†Includes 1 patient on whom the test could not be carried out.

<table>
<thead>
<tr>
<th>Table 2 Final Outcome Category in Relation to the Predicted Outcome Score, Based on Clinical Tests Carried Out 4 Weeks After Hospital Admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predicted outcome score</td>
</tr>
<tr>
<td>Independent</td>
</tr>
<tr>
<td>Dependent</td>
</tr>
<tr>
<td>Dead</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

*Outcome categories.
1 = Fully independent.
2 = Independent with prescribed aids.
3 = Independent with supervision.
4 = Dependent on light help.
5 = Dependent on heavy help from one person.
6 = Dependent on help from 2 persons.
7 = Failure.
their stroke rarely regained their independence despite intensive rehabilitation. The benefit of the stroke unit’s policy compared to the experience of medical units is more pronounced in the central stratum of patients, where the proportion who regained independence is around twice as high in the stroke unit. It may be that it is this group which will show most benefit from the provision of adequate resources in rehabilitation and nursing etc. However, only a trial in which the extent of rehabilitation services was varied could satisfactorily confirm these suggestions.

Further research is also needed to establish more accurate predictors of response to rehabilitation. This may be done by means of descriptive studies rather than randomized controlled trials. Alternative tests for the various functions such as proprioception could be compared with a view to establishing a small series of tests which are easy to perform, reproducible in the hands of different observers, and closely related to subsequent independence. The interval since the stroke could also be incorporated into a predictive formula. The simple scores of 0, 1, 2 etc., attached to the results of tests such as that of upper limb motor function grading is severe loss (score = 3) 3–4 questions, the mental function grading is moderate loss (score = 2) 5–6 questions, the mental function grading is mild (score = 1) 7–8 questions, no apparent loss of mental function is present (score = 0)

(b) Problem Solving Ability
Three consecutive building blockers are placed before the patient with the largest beaker in the middle, and the patient is asked to build them into a column which is as high as possible.

Severe difficulty (score = 3): The patient does not even begin to tackle the problem.
Moderate difficulty (score = 2): The patient tackles the problem, but is unable to solve it within 90 seconds.
Mild difficulty (score = 1): The patient solves the problem in 60–90 seconds.
No difficulty (score = 0): The patient is able to solve the problem within 60 seconds.

Sensory Function
(a) Proprioception
After confirming normal proprioception in the unaffected arm, by the patient touching the nose while their eyes closed, the examiner lifts the affected arm to eye level. The patient is then asked to grasp the thumb of the affected hand with the good hand, and this is repeated. The examiner then places a hand over the patient’s eyes and raises the patient’s affected hand to well above the patient’s head. The patient is then asked to grasp the thumb as before.

Severe difficulty (score = 3): The patient is unable to find his thumb and does not climb up the affected arm in order to locate it.
Moderate difficulty (score = 2): The patient finds the affected arm and then this leads him to the affected thumb.
Slight difficulty (score = 1): The patient aims in the right general direction but misses the affected thumb by no more than 3 inches, and is able to locate it within 5 seconds.
No difficulty (score = 0): The patient is able to locate the affected thumb accurately.

(b) Spatial Orientation Involving the Left Half of Space
This test is only applied to patients with left-sided hemiplegia. Two pencils of different colours are held one foot apart in front of patient’s eyes. If only one can be seen, their positions are interchanged before the patient’s eyes. If the patient is unaware of the pencil in the left visual field, the patient has significant neglect.

Figure 3. Outcome of patients in Medical Units in relation to weekly assessments of prognosis.

Acknowledgments
We are grateful to our very many colleagues who participated in this study. In particular thanks are due to Mrs. Linda Boyd who handled the data processing.

The study was supported by a grant from the Scottish Home and Health Department grant number K/OPR/212/C298.

Appendix

Definition of the Clinical Tests and Their Outcome Categories

Mental Function
(a) Memory recall
The Isaac Walkey mental impairment measurement is used to test orientation and memory. The patient is asked the following questions:
1. What is the name of this place?
2. What day is it today?
3. What month is it?
4. What year is it?
5. What age are you? (Allow 1 year error)
6. In what year were you born?
7. In what month is your birthday?
8. What time is it? (Allow 1 hour error)
If the patient scores correct answers to 2 questions or less, the mental function grading is severe loss (score = 3)
3–4 questions, the mental function grading is moderate loss (score = 2)
5–6 questions, the mental function grading is mild (score = 1)
7–8 questions, no apparent loss of mental function is present (score = 0)

(b) Problem Solving Ability
Three consecutive building blockers are placed before the patient with the largest beaker in the middle, and the patient is asked to build them into a column which is as high as possible.

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This test is only applied to patients with left-sided hemiplegia. Two pencils of different colours are held one foot apart in front of patient’s eyes. If only one can be seen, their positions are interchanged before the patient’s eyes. If the patient is unaware of the pencil in the left visual field, the patient has significant neglect.
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(c) Two Point Discrimination

The points of a divider are set 25 mm apart and are simultaneously applied to the back of the patient’s hand in the horizontal axis of the body. The distance is then increased 2 mm at a time until the patient is able to appreciate the points of the divider separately.

Motor Function

(a) Upper Limb

Complete paralysis (score = 4): When the patient is unable to move the affected limb and no flicker of muscular contraction is visible.

Severe weakness (score = 3): When the patient is able to move the affected arm, but is unable to lift it to shoulder height and is unable to push against the examiner’s hand.

Moderate weakness (score = 2): When the patient is able to lift the affected arm to shoulder level but is unable to push against the examiner’s hand.

Slight weakness (score = 1): When the patient is able to lift the arm to shoulder height and is able to push the examiner’s hand, but the affected limb is weaker than the unaffected.

No weakness (score = 0): There is no difference in the ability of the affected and unaffected limbs to push against the examiner’s hand.

(b) Lower Limb

Complete paralysis (score = 4): When the patient is unable to move the affected limb and no flicker of muscular contraction is visible.

Severe weakness (score = 3): When the patient is able to move the limb.

Moderate weakness (score = 2): When the patient is able to lift the heel from the bed but is unable to push against the examiner’s hand.

Slight weakness (score = 1): When the patient is able to lift the heel from the bed and push the examiner’s hand but the affected limb is weaker than the unaffected one.

No weakness (score = 0): Contraction against powerful resistance with normal power; no loss of function when both lower extremities are equally powerful.

Postural Capability

Lying: When the patient is unable to sit up without help, and once sat up is unable to maintain the sitting position with their legs together and flexed over the side of the bed unsupported.

Sitting: When the patient is able to maintain the sitting position with their legs together and flexed over the side of the bed without support but is unable to stand.

Standing: When the patient is able to maintain the standing position without support but cannot walk without human assistance.

Walking: When the patient can walk without human assistance for a distance of about ten feet.

Communication Function

(a) Comprehension of Speech

Communication easy (score = 0): The patient is able to obey the verbal command to touch the ear of the affected side with the unaffected forefinger.

Communication possible but difficult (score = 1): The patient cannot follow the verbal command but is able to imitate the physician carrying out the maneuver.

Communication not possible (score = 2): The patient is totally unable to follow the command.

(b) Expression

The patient is asked questions about the onset of his illness, his present whereabouts and his home situation.

Absent (score = 2): The patient is unable to convey any meaning.

Impaired (score = 1): The patient is able to convey meaning but word formation is poor.

Normal (score = 0): The patient’s expression is normal.

References

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Stroke. 1982;13:641-647
doi: 10.1161/01.STR.13.5.641

Stroke is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
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Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://stroke.ahajournals.org/content/13/5/641