

PROCESS INDICATORS IN CLINICAL OUTCOME OF STROKE

Amjad Ali, Mohammad Faheem

Department of Medicine,
Postgraduate Medical Institute, Lady Reading Hospital, Peshawar

ABSTRACT

Objective: To evaluate the value of process indicators in outcome assessment of stroke patients.

Material and Methods: This study was conducted at the Department of Medicine, Lady Reading Hospital, Peshawar from June 2002 to Nov 2002. Sixty patients with acute stroke were included in this study. Detailed history and full clinical examination was carried out. Data were recorded on standard proforma regarding the frequency of pressure sores, multidisciplinary involvement, distribution of Barthel Index of Activities of Daily Living (ADL) and formal swallowing assessment. These indicators were measured during admission and at six weeks follow up.

Results: Neurologist and physiotherapist examine all the patients. Speech and Language Therapist (SALT) saw 50% of cases while 12 (20%) were examined each by a neurosurgeon and a psychologist. Four (6.66%) patients developed pressure sores. Formal swallowing assessment identified 17 patients to have dysphagia and those treated by SALT showed low rate of aspiration pneumonia. Distribution of Barthel score showed very low score for those patients whose both sides were involved. Patients with right sided weakness were more dependent with an average score of 14.2 (moderately dependent) as compared to patients with left-sided weakness as they had an average score of 17 (mild dependency) at six weeks.

Conclusion: With routine measurement of process indicators can prevent complications like pressure sores and aspiration pneumonia. This can help in selection of patients who will benefit from secondary stroke services and rehabilitation.

Key Words: Stroke. Outcome Indicators, Pressure Sores, Multidisciplinary Involvement, Barthel Index of ADL, Formal Swallowing Assessment.

INTRODUCTION

Stroke is the third leading cause of death in the western world after heart diseases and cancer.¹ It is a major cause of death, disability and loss of quality of life. It has a major impact on patients, their families, health care professionals and social services.^{2,3}

The main pathological types of stroke are cerebral infarction, primary intracerebral hemorrhage and subarachnoid hemorrhage. About 80% of stroke cases are caused by cerebral infarction and 20% are due to intracranial bleeding.^{4,5} Due to high mortality, severe disability and a major socio-economic impact, it is essential to develop strategies for prevention and treatment of stroke. One of such important strategies is the use of outcome indicators.⁶ With the measurement of these indicators we can effectively predict and influence the outcome of stroke. This study was

conducted to evaluate the value of process indicators in outcome assessment of stroke patients. The following outcome indicators were used in this study to measure the clinical outcome of patients with primary diagnosis of stroke in acute setting:

1. Incidence of pressure sores during hospital stay.
2. Multiprofessional expertise involvement in the week following admission.
3. Distribution of the Barthel Index of Activities of Daily Living (ADL).
4. Formal swallowing assessment within 24 hours of a stroke.

MATERIAL AND METHODS

This study was conducted at the Department of Medicine, Government Lady

DISTRIBUTION OF BARTHEL INDEX OF ADL*

Category	Score
Very severely dependent	0-4
Severely dependent	5-9
Moderately dependent	10-14
Mildly dependent	15-19
Independent	20

*ADL: Activities of Daily Living

Table 1

Reading Hospital Peshawar. Sixty patients with stroke were included in the study. Period of study was from 1st June 2002 to 30th November 2002. All patients were above 18 years of age. Only those cases were included who presented in the first 24 hours of onset. Patients with recurrent stroke were not included in the study. Swallowing assessment was undertaken according to the Initial Safe Swallowing Ability Check (ISSAC).⁷ Pressure sores were graded according to Sterling Scale. Barthel Index of ADL⁸ was recorded on admission and after six weeks follow-up. All this data was recorded using Stroke Minimum Data Set (MDS) proforma.⁹

RESULTS

Male to female ratio was 1.7:1. Twelve (20%) cases presented with hemorrhage (2 cases of subarachnoid hemorrhage and 10 cases of intracerebral hemorrhage). Forty-eight (80%) patients presented with cerebral infarction. Four (6.66%) out of sixty patients developed pressure sores. All these patients died in the first three weeks after the onset of stroke. Seventeen patients were found to have dysphagia on formal

swallowing assessment. They were referred to Speech and Language Therapist (SALT). Ten of them were assessed and treated by SALT while the other seven patients were seen by SALT after a delay of a few days. During that time they were fed with the help of a nasogastric tube. Other professionals, apart from the physician, who saw all the patients, were nurse, physiotherapist and neurologist. SALT was involved in half of the cases. Neurosurgeon and clinical psychologist helped in the management of 12 patients each. Dietician was also involved in the management of 15(25%) patients. Barthel Index is categorized according to table I. The results of Barthel Index of ADL are shown in tables 2A and 2B. All the patients had premorbid scores of 18-20. Acute scores (0-7 days during hospital stay) were much lower for those patients whose both sides were involved (scores of 0-4) and also at six weeks follow up. Patients with right sided weakness were more dependent at six weeks as compared to patients with left sided weakness. Those stroke patients who had normal CT scans (8 patients) were having higher Barthel scores both on admission and at six weeks (11.5 and 15.1 respectively). 87.5% of them were having scores of 16 or above. Chi Square test was applied to test the difference between the two sides of stroke on Barthel Index of ADL. No statistically significant difference was observed in respect of any of the variables/criteria.

DISCUSSION

Stroke is a neurological emergency (experts call it as a brain attack). Like a heart attack it should be treated in an intensive care unit or ideally in a stroke unit with a multidisciplinary team. The rationale for using this outcome indicator is that multidisciplinary rehabilitation increases the rate of improvement.^{10, 11} However as

BARTHEL INDEX OF ACTIVITIES OF DAILY LIVING AT 0-7 DAYS

Characteristic	Barthel Index of ADL*			
	Right side (% of Pts)	Left side (% of Pts)	Total	p-value
Category	0-7 days	0-7 days		
Very severely dependent	11 (36.6 %)	3 (12 %)	19 (31.6 %)	0.07
Severely dependent	10 (33.3 %)	6 (24 %)	16 (26.6 %)	0.64
Moderately dependent	7(23.3%)	13(52%)	20(33.3%)	0.06
Mildly dependent	2(6.6%)	3(12%)	5(8.3%)	0.83

Table II (A)

* ADL: Activities of Daily Living

1. Right side involvement 30 cases (20 at Six weeks.....10 died)
2. Left side involvement 25 cases (18 at Six weeks.....7 died)
3. Total 60 cases (39 at Six weeks21 died)

BARTHEL INDEX OF ACTIVITIES OF DAILY LIVING AT 0-7 DAYS AND AT 6 WEEKS

Category	Barthel Index of ADL*					
	Right side			Left side		
	Acute 0-7 days	at six weeks	p-value	Acute 0-7 days	at six weeks	p-value
Very severely dependent	11	0	0.006	3	0	0.35
Severely dependent	10	2	0.12	6	0	0.07
Moderately dependent	7	9	0.19	13	3	0.04
Mildly dependent	2	8	0.01	3	14	0
Independent	0	1	0.83	0	1	0.86

Table 2 (B)

* ADL: Activities of Daily Living

1. Right side involvement 30 cases (20 at six weeks-----10 died)
2. Left side involvement 25 cases (18 at six weeks----- 7 died)

we have no stroke units (due to limited resources), it is very difficult to follow and record data because stroke patients are treated by many different clinicians, often on several wards within a hospital. Patients with right-sided involvement had an average score of 14.2 (moderately dependent) as compared to those with left-sided weakness, as they had an average score of 17 (mildly dependent) at six weeks. Wade et al and Alexander et al have made the same observations.^{12, 13} By recording the Barthel Index of ADL, we can identify those patients who can benefit from rehabilitation and also those cases who can be referred to nursing homes or secondary services for long-term management. Pressure sores are still a problem although more pronounced in chronic bedridden stroke patients. In our study pressure sores complicated 4 (6.66%) of stroke patients. This can be compared to other studies.^{14,15} Although dependent on case-mix, pressure sore is a good outcome indicator. Because it occurs only in high risk patients with poor outcome, as was the case in present study, all the four patients died. Patients found to have dysphagia on formal swallowing assessment should be referred to SALT in the first 24 hours of admission. Because there was low incidence of aspiration pneumonia in those cases SALT. Ten of the 17 patients with dysphagia were assessed and managed by SALT. The other seven were fed by a naso-gastric tube. Only two from the first group while four from the latter developed aspiration pneumonia. These results are comparable to other studies.^{16, 17}

Incontinence is a good outcome indicator as well. Those patients (38) who were initially incontinent made lesser progress and 21 (55.2%) of them died (majority of them during the first month). The other group who were continent performed well at six weeks follow up (average Barthel score of 17.2). No death occurred in this

group. Lincoln et al and Ween et al have also described this.^{18,19}

CONCLUSION

As we can effectively prevent complications like pressure sores & aspiration pneumonia and pick up patients who will benefit from rehabilitation, therefore these indicators, if measured and applied routinely, can predict and also affect the outcome of stroke patients. Measurement of outcome indicators should be a part of the management of stroke patients.

Stroke units should be developed in tertiary care hospitals with dedicated multidisciplinary teams.

REFERENCES

1. Office of National Statistics. Series DH 2, 24. Mortality statistics: cause. England and Wales 1997. London HMSO 1998.
2. Marten J, Meltzer H, Elliot D. Office of Population Censuses and Surveys. Survey of disability in Great Britain Report I. The prevalence of disability among adults. London: The Stationary Office, 1998.
3. Wade D. Stroke (acute cerebrovascular disease). In: Stevens A, Raftery J (eds). Health care needs assessment reviews. Oxford: Radcliff Medical Press, 1998.
4. Sudlow CLM, Warlow CP. Comparable studies of the incidence of stroke and its pathological types: Results from the International Stroke Incidence Collaboration. Stroke 1997; 28: 491-501.
5. Rehman SU. Comparison of clinical and CAT scan diagnosis of 50 cases of stroke. [Dissertation]. Karachi: College of Physicians and Surgeons Pakistan, 1996: 122.

6. Rudd A, Goldacre M, Amess M, Fletcher J (eds). Health outcome indicators: stroke. Report of a working group to the department of health. Oxford: National Centre for Health Outcomes Development, 1999:51.
7. Scottish Intercollegiate Guidelines Network. A National Clinical Guideline recommended for use in Scotland by the Scottish Intercollegiate Guideline Network (SIGN) III. Identification and management of dysphagia. Edinburgh. SIGN 1997.
8. Stone SP, Ali B, Auberleek I, Thompson A. The Barthel Index in clinical practice: Use on a rehabilitation ward for elderly people. *J R Coll Physicians* 1994; 28: 419-23.
9. Irwin P, Rudd AQ. Case mix and process indicators of outcome in stroke. *J R Coll Physicians* 1998; 32: 442-4.
10. Gowing S, Price M. Pilot of a selection of stroke outcome indicators. In: Rudd A, Pearson M, Georgio A. Measuring clinical outcome in stroke (acute care). London: R Coll of Physicians, 2000: 51.
11. Indredavik B, Bakk RPT, Slordhal SA, Rokseth R, Haheim LL. Treatment in a combined acute and rehabilitation stroke unit, which aspects are more important. *Stroke* 1999; 30: 917-25.
12. Wade DT, Langton-Hewer R, Wood VA. Influence of patient's sex and side of weakness on outcome. *Arch Phys Med Rehab* 1984; 65: 513-6.
13. Alexander MP. Stroke rehabilitation outcome: a potential use of predictive variables to establish levels of care. *Stroke* 1994; 25: 128-34.
14. Clark M, Watts S. The incidence of pressure sores within a National Health Service Trust Hospital during 1991. *J Adv Nurs* 1994; 20: 33-6.
15. Mehmood N. Clinical presentation of cerebral infarction [Dissertation]. Karachi: College of Physicians and Surgeons, Pakistan, 1991: 105.
16. Odderson IR, Mckenna. A model for management of patients with stroke during the acute phase: Outcome and economic implications. *Stroke* 1993; 24: 1823-7.
17. Barer DH. The natural history and functional consequences of dysphagia after hemispheric stroke. *J Neurol Neurosurg Psychiatry* 1989; 52: 236-41.
18. Lincoln NB, Jackson JM, Edmons JA, Walker MF. The accuracy of prediction about prognosis of patients on a stroke unit. *J Neurol Neurosurg Psychiatry* 1990; 53: 972-5.
19. Ween JE, Alexander MP, D'esposito M, Roberts M. Incontinence after stroke in a rehabilitation setting: outcome associations and predictive factors. *Neurology* 1996; 47: 659-63.

Address for Correspondence:

Dr. Amjad Ali
P.O Charsadda Town,
St. Shabi Khel,
District Charsadda,
Pakistan.