



OUTCOME OF DIFFERENT TYPES OF STROKE PATIENTS AND THEIR FUNCTIONAL STATUS AT 3 MONTHS - A PROSPECTIVE FOLLOW UP STUDY

Physiotherapy

Jayaprakash Jayavelu*	Chief Physiotherapist, Medanta Institute Of Neurosciences, Medanta The Medicity, Gurgaon *Corresponding Author
Shaikh Mohammed Irfan J	Physiotherapist, Medanta Institute Of Neurosciences, Medanta The Medicity, Gurgaon
Srishti Saxena	Junior Physiotherapist, Medanta Institute Of Neurosciences, Medanta The Medicity, Gurgaon
Sachin Jain	Junior Physiotherapist, Medanta Institute Of Neurosciences, Medanta The Medicity, Gurgaon
Jyoti Sehgal	Senior Consultant, Neurology, Medanta Institute Of Neurosciences, Medanta The Medicity, Gurgaon
Arun Garg	Director, Neurology, Medanta Institute of Neurosciences, Medanta the Medicity, Gurgaon
Ajaya Nand Jha	Chairman, Medanta Institute of Neurosciences, Medanta the Medicity, Gurgaon

ABSTRACT

Introduction: The purpose of the study is to find out the functional outcome of stroke patients over the period of 3 months.

Methodology: A total of 397 stroke patients admitted in Medanta between Jan 2015 to Dec 2015 were included in the study. Comprehensive Evaluation of the patients were done including their Barthel Functional Index and Modified Rankin Scale scores at the time of admission, discharge and 3 months follow up.

Results: There were around 89 hemorrhagic patients and 308 ischemic stroke patients. Mortality during hospital stay were around 7.29% in ischemic stroke patients and 7.8% in hemorrhagic stroke. Patients who underwent thrombolysis were excluded in the study. For analysis of dependent variables, patient who died in the hospital as well as patient who died after discharge were excluded. In ischemic stroke patients, mean mRS scores of the patients were 3.51, 2.87, 1.78 and mean Barthel Scores were 45.98, 64.22, 80.94 at admission, at discharge and at 3 months follow up respectively. In Hemorrhagic stroke patients, mean mRS scores were 3.94, 3.31, 2.08 and mean Barthel Scores were 32.5, 54.38, 77.19 at admission, at discharge and at 3 months follow up respectively. There was significant improvement in patients condition over the period of 3 months in both ischemic and hemorrhage stroke patients with respect to Modified Rankin Scale and Barthel Index ($p < 0.05$). Comparative analysis of mean improvement over the period of 3 months between both groups revealed that there is similar improvement in both groups in both mRS and Barthel scores.

Conclusion: Stroke patients improve significantly over the period of 3 months.

KEYWORDS

Stroke, Ischemic Stroke, Hemorrhagic Stroke, Modified Rankin Scale (mRS), Barthel Functional Index

Introduction

Stroke is one of the leading cause of disability in the world. First question asked at a stroke patient's bedside in the acute care setting is "What is the prognosis?" After discharge from the acute hospitalization and during outpatient follow-up, additional questions arise: "What is my long-term life expectancy?" and "Will my disabilities improve over time?"¹. In order to answer these questions, one should have sound knowledge of the pathophysiology of stroke, factors influencing the outcome, and different measures or scales used to assess the outcome.

The outcome of stroke patients depends on multiple factors including age, sex, type of stroke, severity of stroke, area of involvement in the brain, co-morbidities², pre-stroke functional status of the patients, type and quality of rehabilitation, use of advanced therapeutic techniques and technology in rehabilitation, patient and family participation in the rehabilitation, socioeconomic status of the patient's family³, need for independence of the patient, etc. With the recent advancement of the technology and improvement in the therapeutics, the outcome seems to be better.³

There are a number of assessment scales available to assess the outcome of the stroke patients. Among that, modified rankin scale and barthel has been widely used for assessing the disability in stroke patients.^{4,5} Both the scales show good clinicometric properties for measuring disability in stroke patients.^{6,7,8}

The clinician or therapist will be able to predict the outcome based on available evidence and personal experience. Though there are ample

evidences available, the purpose of the study is to find out the outcome of different category of Stroke Patients over the period of 3 months with current advancement in therapeutics and technological support available across the world.

Methodology:

All stroke patients with the onset of stroke less than one week admitted in the Medanta Institute of Neurosciences during the period of Jan 2015 to Dec 2015 were recruited for the study after getting informed consent signed. Patients who underwent thrombolysis were excluded in the study. Comprehensive Evaluation of the patients were done and their functional capacity were assessed by means of Barthel Functional Index and disability score with respect to Modified Rankin Scale. All patients were provided comprehensive neuro rehabilitation by team of physical therapist, occupational therapist and speech therapist as per the hospital protocol, which includes but not limited to chest physiotherapy, mobilization, passive exercises, active assisted limb exercises, trunk stability exercises, weight shifting exercises, upper limb retraining, ADL training, balance training, NDT approach.. Speech and swallowing therapy were provided as per the needs of the patients. At the time of the discharge, the patient were evaluated for their functional capacity and disability by means of Barthel Functional Index and Modified Rankin Scale respectively. All patients were telephonically followed up at 3 months. An assessment done by telephone is reliable to face to face assessment.^{9,12}

Data Analysis:

Quantitative data were presented in terms of means and standard deviation. Categorical data were presented as absolute numbers and

proportions. Paired Student t test were used for comparison at admission Vs. discharge, admission Vs. follow-up and discharge Vs. follow-up of mRS and Barthel. P-value < 0.05 is considered statistically significant. Independent t test was used for between-group analysis. SPSS software Version 24.0 was used for analysis.

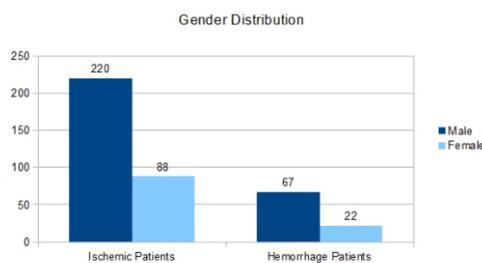
Results:

A total of 397 patients admitted in the Medanta Institute of Neurosciences in the period between Jan 2015 to Dec 2015 were included for analysis. Among the patients, 308 patients were ischemic stroke patients and 89 patients were Hemorrhagic stroke patients. Patients who underwent thrombolysis were excluded in the study. For analysis of dependent variables, patient who died in the hospital as well as patient who died after discharge were excluded.

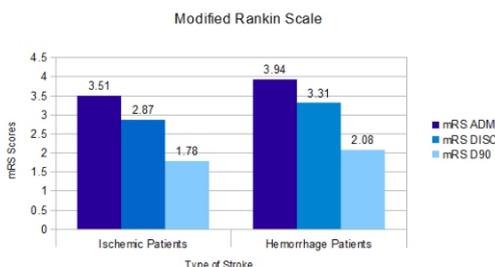
Table 1: Characteristics of the patient.

	Ischemic	Haemorrhage
Total Number of Stroke Patients	308	89
Male: Female	220:88 (71.4% : 28.6%)	67 : 22 (75.3%: 24.7%)
Age	59.6+14.4	58.7+13.2
Age - Range	13- 96	26- 87
Age - Median	60.5	60
Duration of the stay	13	11.9
Comorbidities – Risk Factors		
Diabetes	119 (38.6%)	38 (42.6%)
Hypertension	145 (47%)	64 (71.9%)
Heart Disease	80 (25.9%)	10 (11.2%)
Heart Disease – Atrial Fibrillation	24 (7%)	0
Data for Analysis		
No. of Patients Thrombolysed	20	-
Mortality in Hospital	21 (7.29%)	7 (7.86%)
Total Number of Patients Discharged Alive (Excluding Thrombolysis)	267	82
Total Number of Patients Followed Up – Day 90 Scores	153 (57.3%)	58 (70.73%)
Mortality after discharge due to unknown reason	19	10
Patients analysed Admission - Discharge - Followup (A - D – F) (excluding death)	134	48

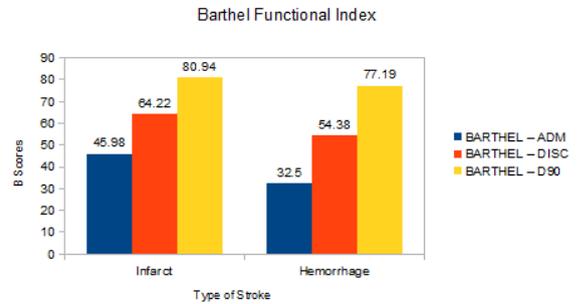
Graph 1: Gender Distribution in Ischemic and Hemorrhagic Stroke



Graph 3: Modified Rankin Scale of the ischemic and hemorrhagic patients at admission, discharge and 3 month follow-up



Graph 5: Barthel Functional Index of the ischemic and hemorrhagic patients at admission, discharge and 3 month follow-up



Discussion:

The results of the study showed that there is significant improvement in Barthel Functional Index and Modified Rankin Scale in both the groups, whereas analysis between the groups revealed similar improvement in ischemic and hemorrhagic stroke patients.

Modified Rankin Scale:

There is significant improvement in Modified Rankin Scale over the period of three months and their admission, discharge and 3 months follow up scores were 3.51, 2.87, 1.78 in ischemic stroke patients and 3.94, 3.31, and 2.08 in Hemorrhagic stroke patients respectively. The outcome were similar to the study done by Stefano Paolucci et al. (2003)¹¹

Barthel Functional Index:

There is significant improvement in Barthel Functional Index over the period of three months and their admission, discharge and follow up scores were 45.98, 64.22, and 80.94 in ischemic stroke patients and 32.5, 54.38, 77.19 in Hemorrhagic stroke patients, respectively. Our results were similar to the study done by Susan Rouillard et al¹⁰ and better in comparison to study done by Stefano Paolucci et al. (2003)¹¹.

Mortality:

In the ischemic stroke patients, there is 7.29% mortality during the hospital stay and 12.4% after discharge. In the Hemorrhagic stroke patients, there is 7.86% mortality during the hospital stay and 17.2% after discharge. The results are better in comparison to the study done by El Saed et al.¹³ Moreover, one of the reason could be attributed to the fact that the hospital being the Tertiary Care Hospital, the number of sick patients getting admitted is comparatively high.

Conclusion:

The results of the study revealed that the stroke patients improved significantly during the first 3 months period. But since the follow up was done telephonically, the effect of adaptation and neurological recovery in the affected limb cannot be ascertained. Moreover, the results include those patients who are alive at 3 months' time since the reason for post discharge mortality were not identified.

Acknowledgement:

I thank the whole Neuro Rehabilitation team of Medanta the Medicity for their constant support. I thank our Biostatistician, Mr. Manish Kumar Singh for his appropriate guidance and completion of data analysis.

Conflict of Interest:

Authors have no conflict of interest for the study.

Source of Funding:

Nil

References

- Brett Kissela, MD et al. Clinical Prediction of Functional Outcome After Ischemic Stroke. The Surprising Importance of Periventricular White Matter Disease and Race. Stroke 2009; 40: 530-536
- Karataş M, Dilek A, Erkan H, Yavuz N, Sözüy S, Akman N. Functional outcome in stroke patients with atrial fibrillation. Arch Phys Med Rehabil. 2000 Aug;81(8):1025-9.
- Bruce Ovbiagele and Mai N. Nguyen-Huynh. Stroke Epidemiology: Advancing Our Understanding of Disease Mechanism and Therapy. Neurotherapeutics. 2011 Jul; 8(3): 319–329.
- Geert Sulter, MD; Christel Steen, MS; Jacques De Keyser, MD, PhD. Use of the Barthel Index and Modified Rankin Scale in Acute Stroke Trials. Stroke August 1999.
- Huybrechts KF1, Caro JJ. The Barthel Index and modified Rankin Scale as prognostic

- tools for long-term outcomes after stroke: a qualitative review of the literature. *Curr Med Res Opin.* 2007 Jul;23(7):1627-36.
6. D. Cioncolonia P. Piuc, R. Tassid, M. Acampad, F. Guiderid, S. Taddeia, S. Biellia, G. Martind and R. Mazzocchio. Relationship between the modified Rankin Scale and the Barthel Index in the process of functional recovery after stroke. *NeuroRehabilitation* 30 (2012) 315–32
 7. Peter R. Wilkinson, Charles D.A. Wolfe, Fiona G. Warburton, Anthony G. Rudd, Robin S. Howard, Ralph W. Ross-Russell and Roger R. Beech. A Long-term Follow-up of Stroke Patients. *Stroke.* 1997;28:507-512
 8. Nawarat Suwannapong, PhD, and Smarn Tang-aoonsin, MD, Sangkaew Rachpukdee, Msc,* Nopporn Howteerakul, PhD. Quality of Life of Stroke Survivors: A 3-Month Follow-up Study
 9. Maike Miriam Grube et al. Association Between Socioeconomic Status and Functional Impairment 3 Months After Ischemic Stroke. *Stroke.* 2012; 43: 3325-3330
 10. Susan Rouillard, Willy De Weerd, Liesbet De Wit, Jennifer Jelsma. Functioning at 6 months post stroke following discharge from inpatient rehabilitation. *The South African Medical Journal.* Vol 102, No 6 (2012)
 11. Stefano Paolucci, MD; Gabriella Antonucci, PhD; Maria Grazia Grasso, MD, PhD; Functional Outcome of Ischemic and Hemorrhagic Stroke Patients After Inpatient Rehabilitation A Matched Comparison *Stroke;* 2003; 34; 2861-2865
 12. Katia Savio, Gian Luca Della Pietra, Elodie Oddone, Monica Reggiani, Maurizio A. Leone. Reliability of the modified Rankin Scale applied by telephone. *Neurology International* 2013; volume 5:e2.
 13. veronique L. Roger et al. Heart Disease and Stroke Statistics—2011 Update: A Report from the American Heart Association. *Circulation.* 2011 February 1; 123(4):e18–e209