ORIGINAL RESEARCH

Risk Factors for Pneumonia in Acute Ischaemic Stroke Patients: A Retrospective Study

[1]Dr. Sakib Mo Yusuf Bombe, [2]Dr. Neha Singla

[1]Associate Professor, Department of General Medicine, Rama Medical College Hospital and Research Centre, Hapur, Uttar Pradesh, India
[2]Associate Professor, Department of Psychiatry,Narayan Medical College and Hospital,Jamuhar, Rohtas, Bihar, India

Corresponding author: Dr. Neha Singla
Associate Professor, Department of Psychiatry,Narayan Medical College and Hospital,Jamuhar, Rohtas, Bihar, India

Received: 10December, 2022 Accepted: 15January, 2022

ABSTRACT

Background: Even though the primary causes of death in acute stroke are neurologic issues, other medical complications may claim the lives of up to half of all acute stroke patients. The present study was conducted to assess risk factors for pneumonia in patients with acute ischaemic stroke.

Materials & Methods:120 adult patients with acute ischaemic stroke of both genders were divided into 2 groups. Group I were stroke patients without pneumonia and group II were with pneumonia. Risk factors were recorded.

Results: Out of 120 patients, 75 were males and 45 were females. GCS ≤13 was seen in 12% and 47%, NIHSS score ≥5 in 32% and 70%, water swallow test score ≤2 in 6.5% and 72% and modified Barthel ADL score <10 in 35% and 42% in group I and II respectively. The difference was significant (P< 0.05). Lesions were supratentorial in 40 and 18, infratentorial in 22 and 12, supra+ infra tentorial in 18 and 10 patients in group I and II respectively. Co-existing conditions were hypertension in 20 and 11, diabetes in 16 and 8, ischaemic heart disease in 14 and 9, dyslipidemia in 12 and 5, COPD in 9 and 13 and renal dysfunction in 5 and 7 patients in group I and II respectively. The difference was non- significant (P> 0.05). Bed ridden status and water swallow test score ≤2 were independent risk factors of developing pneumonia in patients with acute ischaemic stoke.**Conclusion:** The results of the water swallow test and bedridden status were important risk factors for ischemic stroke linked to pneumonia. Therefore, a greater understanding of these characteristics and their early detection may aid in improving care and preventing pneumonia in acute stroke patients.

Keywords: Ischaemic stroke, Pneumonia, Supratentorial

INTRODUCTION

Even though the primary causes of death in acute stroke are neurologic issues, other medical complications may claim the lives of up to half of all acute stroke patients. Infection is the most frequent non-neurological consequence of stroke. The two most common ones are urinary tract infections and pneumonia.[1]The leading cause of death in the first month following an acute stroke was determined to be pneumonia. This infectious complication was seen in 9.5–56.6% of cases. This deteriorates a primary cause of stroke and has an impact on neurorehabilitation. Patients who acquire stroke-related pneumonia typically have poor clinical outcomes, such as increased death or long-term impairment.[2]

By identifying the risk factors for pneumonia linked to ischemic stroke, preventive and therapeutic measures could be improved.[3] Better patient outcomes and quality of life would result from this. Implementing and planning stroke care strategies will be made easier with agreater awareness of these elements.[4] According to certain research, the following risk factors may increase the likelihood of severe neurological impairments, diabetes mellitus, dysphagia, and pneumonia in the older population linked to early stroke. Given the high significance of this consequence (pneumonia), more factors that lead to pneumonia associated with stroke must be found.[5]

AIM AND OBJECTIVES

The present study was conducted to assess risk factors for pneumonia in patients with acute ischaemic stroke.

MATERIALS & METHODS

Theretrospective study was carried out on 120 adult patients with acute ischaemic stroke of both gendersin the Department of General Medicine, Rama Medical College Hospital and Research Centre, Hapur, Uttarpradesh, India in collaboration with Department of Psychiatry,Narayan Medical College and Hospital,Jamuhar, Rohtas, Bihar, India. All gave their written consent to participate in the study. The duration of study was from May2021 to November 2021.The Institutional Ethics Committee gave the study its approval.Data such as name, age, gender etc. was recorded.

Patients were divided into 2 groups:

- Group I were stroke patients without pneumonia and
- Group II were with pneumonia.

Parameters such as stroke location (supratentorial, infratentorial, and supra-and-infratentorial), vascular risk factors (hypertension, diabetes, dyslipidemia, , angina/Myocardial infarction (MI), history of prior vascular events, co-existing conditions, stroke severity as measured by GCS, NIHSS scale, and ADL score using the Modified Barthel ADL index and water swallow test score was recorded.

Statistical Analysis

The data obtained was subjected to statistical analysis using a Microsoft Excel spreadsheet and analysed using software Statistical Package for the Social Sciences (SPSS) 22.0 version. The data were represented in tables and graphs. Categorical variables were summarised in frequency and percent distribution, and a chi-square test was performed by a statistician. P value less than 0.05 was considered significant.

RESULTS

Table I: Gender wise distribution of patients

Total- 120		
Gender	**Male**	**Female**
Number	75 (62.5%)	45 (37.5%)

Figure 1: Percentage wise distribution of the patients

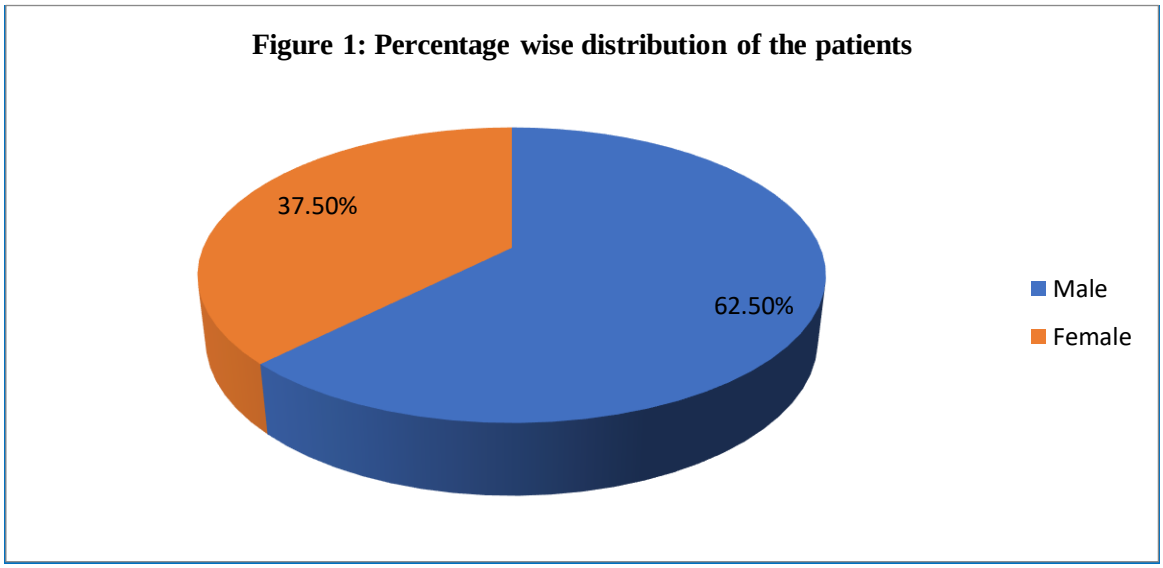

Table I and figure 1, shows that out of 120 patients, 75 were males and 45 were females.

Table II:Scores at admission

Scores at admission	Group I (80)	Group II (40)	P value
GCS ≤13	12%	47%	0.04
NIHSS score ≥5	32%	70%	0.03
Water swallow test score ≤2	6.5%	72%	0.01
Modified Barthel ADL score <10	35%	42%	0.75

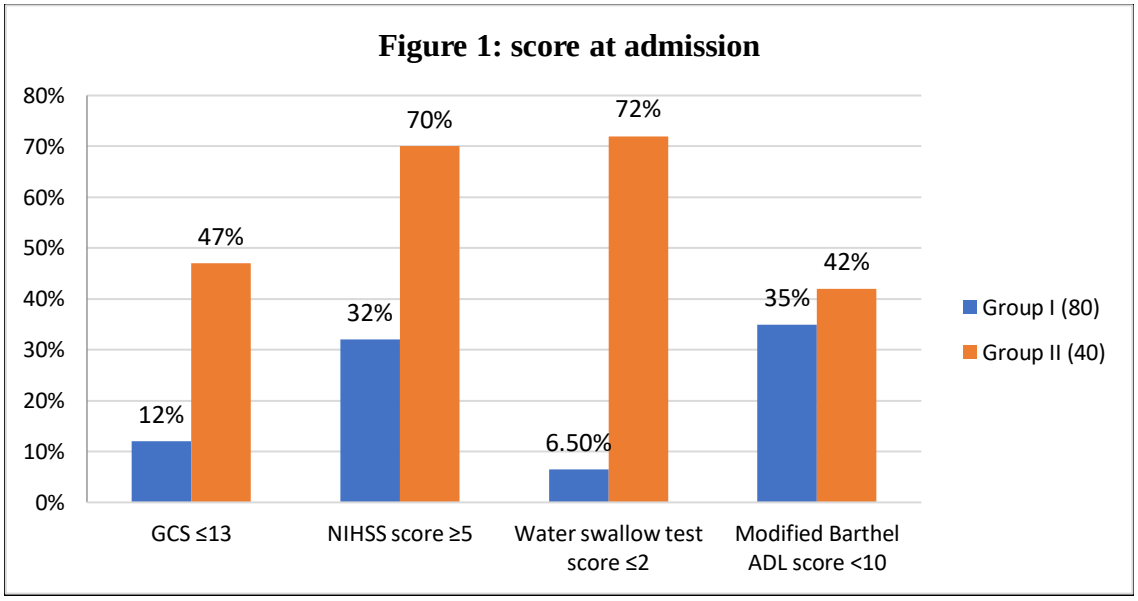

Table II, Figure 2, shows that GCS ≤13 was seen in 12% and 47%, NIHSS score ≥5 in 32% and 70%, water swallow test score ≤2 in 6.5% and 72% and modified Barthel ADL score <10 in 35% and 42% in group I and II respectively. The difference was significant (P< 0.05).

Table III: Comparison of parameters

Parameters	Variables	Group I (80)	Group II (40)	P value
Lesions	Supratentorial	40	18	0.73
	Infratentorial	22	12	
	Supra+ Infra tentorial	18	10	
Co-existing conditions	Hypertension	20	11	0.82
	Diabetes	16	8	
	Ischaemic heart disease	14	9	
	Dyslipidemia	12	5	
	COPD	9	13	
	Renal dysfunction	5	7	

Table III, shows that lesions were supratentorial in 40 and 18, infratentorial in 22 and 12, supra+ infra tentorial in 18 and 10 patients in group I and II respectively. Co-existing conditions were hypertension in 20 and 11, diabetes in 16 and 8, ischaemic heart disease in 14 and 9, dyslipidemia in 12 and 5, COPD in 9 and 13 and renal dysfunction in 5 and 7 patients in group I and II respectively. The difference was non- significant (P> 0.05).

Table IV:Logistic regression modelling of risk factors

Variables	OR	P value
Age (>70 years)	2.1	0.46
GCS ≤13	0.65	0.91
NIHSS score ≥5	0.61	0.58
Water swallow test score ≤2	70.3	0.04
Bed ridden	40.5	0.01

Table IV, shows that bed ridden status and water swallow test score ≤2 were independent risk factors of developing pneumonia in patients with acute ischaemic stoke.

DISCUSSION

Despite significant achievements in the acute management and treatment of stroke, it remains the third leading cause of death in industrialized countries.[6] The incidence of stroke has decreased over the past 50 years but the lifetime risk has not declined to the same degree, perhaps due to improved life expectancy.[7,8] There is currently little information on independent predictors of pneumonia in acute stroke patients who are treated in the emergency room, despite the well-established link between infections linked to stroke and higher mortality and worse long-term outcomes.[9] For clinicians to apply targeted medicines and care methods to patients at high risk of death, it is critical to identify early predictors.[10,11] The present study was conducted to assess risk factors for pneumonia in patients with acute ischaemic stroke.

We found that out of 120 patients, 75 were males and 45 were females. We observed that GCS ≤13 was seen in 12% and 47%, NIHSS score ≥5 in 32% and 70%, water swallow test score ≤2 in 6.5% and 72% and modified Barthel ADL score <10 in 35% and 42% in group I and II respectively. Thomas et al[12] identified the risk factors of pneumonia in acute ischaemic stroke patients. Among them, 173 had stroke associated with pneumonia. The clinical parametersage, gender, lesion location, stroke severity (Glasgow Coma Scale (GCS)), National Institute of Health Stroke Scale (NIHSS), Modified Barthel Activities of Daily Living (ADL) index, water swallow test, vascular risk factors and co-existing conditions (pre-existent Chronic Obstructive Pulmonary Disease (COPD), atrial fibrillation, renal electrolyte dysfunction, hypoproteinaemia) were compared. In this study, the following factors were associated with increased risk of developing pneumonia-age >70 years, bed ridden status, GCS ≤13, NIHSS ≥5, water swallow test score ≤2. Among them, multivariate analysis identified bed ridden status and water swallow test as independent predictors. We found that lesions were supratentorial in 40 and 18, infratentorial in 22 and 12, supra+ infra tentorial in 18 and 10 patients in group I and II respectively. Co-existing conditions were hypertension in 20 and 11, diabetes in 16 and 8, ischaemic heart disease in 14 and 9, dyslipidemia in 12 and 5, COPD in 9 and 13 and renal dysfunction in 5 and 7 patients in group I and II respectively. We observed that bed ridden status and water swallow test score ≤2 were independent risk factors of developing pneumonia in patients with acute ischaemic stoke. Almeida et al[13] evaluated the risk factors and comorbid conditions associated with the development of pneumonia in patients with acute stroke. To determine the independent predictors of pneumonia.159 patients (18-90 years) were admitted. Prevalence of pneumonia was 32%. Pneumonia was more frequent in patients with hemorrhagic stroke (OR: 4.36; 95%CI: 1.9-10.01, $p < 0.001$), higher National Institute of Health Stroke Scale (NIHSS) ($p = 0.047$) and, lower Glasgow Coma Score (GCS) ($p < 0.0001$). Patients with pneumonia had longer hospitalization ($p < 0.0001$). Multivariable logistic regression analysis identified NIHSS as an independent predictor of pneumonia (95%CI: 1.049-1.246, $p = 0.002$).

LIMITATION OF THE STUDY: The shortcoming of the study is small sample size.

CONCLUSION

Authors found that the results of the water swallow test and bedridden status were important risk factors for ischemic stroke linked to pneumonia. Therefore, a greater understanding of these characteristics and their early detection may aid in improving care and preventing pneumonia in acute stroke patients.

REFERENCES

1. Katzan IL, Cebul RD, Husak SH, Dawson NV, Baker DW. The effect of pneumonia on mortality among patients hospitalized for acute stroke. Neurology. 2003;60:620-25.
2. Saposnik G, Fang J, O'Donnell M, Hachinski V, Kapral M, Hill MD. Escalating levels of access to in-hospital care and stroke mortality. Stroke. 2008;39:2522-30.
3. Sellars C, Bowie L, Bagg J, Sweeney MP, Miller H, Tilston J, et al. Risk factors for chest infection in acute stroke: A prospective cohort study. Stroke. 2007;38:2284-91.
4. Helmy TA, Abd-Elhady MA, Abdou M. Prediction of ischemic stroke-associated pneumonia: A comparison between 3 scores. J Stroke Cerebrovasc Dis. 2016;25:2756-61.
5. Mao L, Liu X, Zheng P, Wu S. Epidemiologic features, risk factors, and outcomes of respiratory infection in patients with acute stroke. Ann Indian Acad Neurol. 2019;22(4):395-400.
6. Osawa A, Maeshima S, Tanahashi N. Water-swallowing test: Screening for aspiration in

stroke patients. Cerebrovasc Dis. 2013;35:276-81.
7. Mlinac ME, Feng MC. Assessment of activities of daily living, self-care, and independence. Arch ClinNeuropsychol. 2016;31:506-16.
8. Finlayson O, Kapral M, Hall R, Asllani E, Selchen D, Saposnik G, et al. Risk factors, inpatient care, and outcomes of pneumonia after ischemic stroke. Neurology. 2011;77:1338-45.
9. Smithard DG, O'Neill PA, England RE, Park CL, Wyatt R, Martin DF, et al. The natural history of dysphagia following a stroke. Dysphagia.1997;12:188-93.
10. Hannawi Y, Hannawi B, Rao CP, Suarez JI, Bershad EM. Stroke-associated pneumonia: Major advances and obstacles. Cerebrovasc Dis. 2013;35:430-43.
11. Hilker R, Poetter C, Findeisen N, Sobesky J, Jacobs A, Neveling M, et al. Nosocomial pneumonia after acute stroke: Implications for neurological intensive care medicine. Stroke. 2003;34:975-81
12. THOMAS R. Risk Factors for Pneumonia in Patients with Acute Ischaemic Stroke-A Retrospective Study. Journal of Clinical & Diagnostic Research. 2021 Jan 1;15(1).
13. Almeida SR, Bahia MM, Lima FO, Paschoal IA, Cardoso TA, Li LM. Predictors of pneumonia in acute stroke in patients in an emergency unit. ArqNeuro-Psiquiatr. 2015;73(5):415-19.