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Original Research Article

Frequency of Pneumonia Among Patients with Stroke Attending Saidu Group of Teaching Hospital Swat

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Abstract: *Aspiration pneumonia is a common and potentially life-threatening complication of stroke, contributing significantly to morbidity, prolonged hospitalization, and mortality. Early identification of patients at risk is essential for timely intervention and improved clinical outcomes.* ***Objective:*** *To determine the frequency of aspiration pneumonia among patients with stroke attending Saidu Group of Teaching Hospital, Swat.* ***Methods:*** *This cross-sectional study was conducted on 111 patients aged 35–75 years of either gender diagnosed with stroke from 02-July-2024 to 02-January-2025 in the department of General medicine, Saidu Group of Teaching Hospital, Swat. The diagnosis of stroke was confirmed by computed tomography (CT) of the brain demonstrating findings such as hypodensity, loss of gray-white matter differentiation, hematoma, or sulcal effacement. Patients with a history of chronic lung disease, congestive cardiac failure, diabetic ketoacidosis, hypoglycemia, hyperosmolar coma, septicemia, or encephalopathy were excluded. All patients were evaluated for aspiration pneumonia, which was diagnosed based on chest radiographic findings. Data were analyzed using SPSS version 25. Frequencies and percentages were calculated, and associations between variables were assessed using appropriate statistical tests, with a p-value <0.05 considered statistically significant.* ***Results:*** *The mean age of the participants was 53.97 ± 11.52 years, and the mean body mass index was 24.91 ± 2.18 kg/m². There were 64 (57.7%) male and 47 (42.3%) female patients. A history of smoking was present in 27 (24.3%) patients. Aspiration pneumonia was diagnosed in 22 patients, yielding a frequency of 19.8%. Age greater than 50 years was significantly associated with the development of aspiration pneumonia (p = 0.017).* ***Conclusion:*** *Aspiration pneumonia occurred in approximately one-fifth of stroke patients in this study. Patients older than 50 years were at significantly higher risk of developing aspiration pneumonia. Early screening and preventive measures should be prioritized in older stroke patients to reduce the burden of this serious complication.*

Keywords: Aspiration Pneumonia, Stroke, Cerebrovascular Accident, Cross-Sectional Study

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Introduction

A stroke is an abrupt cessation of blood flow to the brain, is a multifaceted medical occurrence that can have severe effects. It is an elusive predator, frequently attacking unexpectedly, with the ability to dramatically change lives in a moment (1). During a stroke, the brain experiences a lack of oxygen and vital nutrients, resulting in the swift demise of brain cells. The manifestations of this condition exhibit a broad range, spanning from minor impairments to significant disability or even fatality (2). Ischemic strokes, which occur when a blood vessel supplying the brain is blocked, are the most common type. Hemorrhagic strokes, on the other hand, are less common but more severe because they involve bleeding into the brain. After the initial stage, stroke recovery typically entails a lengthy and challenging process that includes extensive rehabilitation, adjustments to one's lifestyle, and mental assistance (3).

Physical and occupational therapy have the goal of recovering lost abilities and promoting self-sufficiency, whereas speech therapy focuses on addressing difficulties in communication (3). A study conducted in Pakistan on total 105 patients with stroke. Mean age of the patients was 51.2±8.4 years, and 69.5% of the patients were male. Mean Body Mass Index was 29.3±2.9 kg/m^2. Hyperlipidemia was the most common risk factor as seen in 50.5% of patients with stroke followed by obesity in 45.8% patients, smoking in 40.9%, hypertension 39.1%, and diabetes mellitus in 39.1% patients (4).

Pneumonia in stroke patients poses a complicated problem, combining the subtleties of cerebrovascular disease with the complications of respiratory infection (5). Pneumonia is a common problem that greatly increases the rates of illness and death in people who have had a stroke. This creates considerable challenges for both immediate medical care and long-term recovery (5). Patients with stroke-induced dysphagia, which is typically worsened by decreased cough reflexes and altered consciousness, are more likely to develop aspiration, which is a major cause of pneumonia in this group of individuals (6). The situation is further complicated by diagnostic challenges, since symptoms of pneumonia in stroke patients may coincide with neurological abnormalities, resulting in delayed identification and commencement of therapy (7). A study reported the frequency of pneumonia among patients with stroke was 10% (8).

The objective of this study is to determine the frequency of pneumonia among patients with stroke at Saidu group of teaching hospital Swat. The results of this study will help our medical professionals in addressing pneumonia in patients with stroke, which demands a comprehensive understanding of its diverse etiology and a holistic approach encompassing prevention, early intervention, and rehabilitation, with the overarching goal of optimizing neurological and respiratory outcomes and improving quality of life for this vulnerable population.

Methodology

The present cross-sectional study was conducted from 02-July-2024 to 02-January-2025 in the department of General medicine, Saidu Group of Teaching Hospital, Swat. Ethical approval was obtained before starting the study. A sample size of 111 patients was selected by using WHO sample size calculator, considering the assumptions such as previous frequency of aspirational pneumonia 17%, (9) margin of error 7% and confidence interval 95%. Non-probability consecutive sampling was used.

Patients aged 35 to 75 years, both male and female patients presenting with stroke were included in this study. Stroke was defined as sudden onset of focal neurological deficits > 24 hours with no apparent nonvascular cause in patients presenting with all of the following

symptoms. Sudden numbness, severe headache, difficulty walking, and confusion. CT scan of brain will be performed for the diagnosis revealing all of the following findings. Hypodensity, loss of gray-white matter differentiation, presence of hematoma, and sulcal effacement. Patients with history of lung disease, congestive cardiac failure, diabetic ketoacidosis, and hypoglycemia, hyperosmolar coma, septicemia, and encephalopathy were excluded.

Written informed consent was obtained from all included patients, after verbally explaining them the purpose of this study. Patients were assured that no risk in involved while participating in this study. Demographic information including age, gender, BMI, profession, education status, residence, and socio-economic status was recorded. History of smoking was documented. Patients with stroke were examined for aspiration pneumonia, which was defined on the basis Radiographic findings (X-Ray) revealing consolidation (infiltrates) in the lung parenchyma, which appears as opacities in patients presenting with all of the following symptoms; cough, dyspnea, chest pain (VAS >3), and sputum production. Under the supervision of a consultant with minimum 5 years of post-fellowship experience whole assessment was performed. A pre-designed structured proforma was used to record the detail of each patient.

SPSS v.25 was used to analyze the data. Mean + SD or Median (IQR) were expressed for numerical data including age, BMI and duration of stroke. Frequencies and percentages were presented for categorical variables like gender, aspiration pneumonia, smoking, profession, education status, residence, and socio-economic status. Aspiration Pneumonia was stratified by age, gender, BMI, duration of stroke, smoking, profession, education status, residence, and socioeconomic status. Post stratification Chi square/Fisher's exact test was applied by keeping the p-value < 0.05 as significant. Results were shown in the form of tables.

Results

This study included 111 patients, presenting with stroke. The mean age of the patients was 53.97±11.52 years. The mean body mass index was 24.91±2.18 kg/m². Male patients accounted for 64 (57.7%) while the remaining 47 (42.3%) were female. The majority of patients belonged to a lower socioeconomic class with 49 (44.1%) followed by 43 (38.7%) from the middle class and 19 (17.1%) from the upper class. In terms residence 62 (55.9%) were from urban areas, while 49 (44.1%) were from rural settings. Smoking was reported by 27 (24.3%) of the patients (Table 1).

The frequency of aspiration pneumonia in this study was 22 (19.8%) (Table 2).

Out of the 22 cases of aspiration pneumonia, the majority were > 50 years, accounting for 18 (81.8%) while only 4 (18.2%) were between 35 and 50 years of age (p = 0.017) (Table 3).

Table 1: Baseline profile of the patients

Baseline profile		n	%
Gender	Male	64	57.7%
	Female	47	42.3%
Socio economic status	Lower Class	49	44.1%
	Middle Class	43	38.7%
	Upper Class	19	17.1%
Residence	Urban	62	55.9%
	Rural	49	44.1%
Education status	Literate	50	45.0%
	Illiterate	61	55.0%
Profession	Retired	26	23.4%
	Office work	28	25.2%
	Labour	32	28.8%
	Other	25	22.5%
Smoking	Yes	27	24.3%
	No	84	75.7%

Table 2: Frequency of aspiration pneumonia

Aspiration Pneumonia	n	%
Yes	22	19.8%
No	89	80.2%

Table 3: Stratification of aspiration pneumonia with baseline profile

Baseline profile		Aspiration Pneumonia				p value
		Yes		No		
		n	%	n	%	
Age distribution (Years)	35 to 50	4	18.2%	41	46.1%	0.017
	> 50	18	81.8%	48	53.9%	
BMI distribution (Kg/m^2)	18.5 to 24.9	12	54.5%	47	52.8%	0.884
	> 24.9	10	45.5%	42	47.2%	
Gender	Male	15	68.2%	49	55.1%	0.265
	Female	7	31.8%	40	44.9%	
Socio economic status	Lower Class	6	27.3%	43	48.3%	0.072
	Middle Class	9	40.9%	34	38.2%	
	Upper Class	7	31.8%	12	13.5%	
Residence	Urban	11	50.0%	51	57.3%	0.537
	Rural	11	50.0%	38	42.7%	
Education status	Literate	9	40.9%	41	46.1%	0.663
	Illiterate	13	59.1%	48	53.9%	
Profession	Retired	5	22.7%	21	23.6%	0.995
	Office work	6	27.3%	22	24.7%	
	Labour	6	27.3%	26	29.2%	
	Other	5	22.7%	20	22.5%	
Smoking	Yes	8	36.4%	19	21.3%	0.142
	No	14	63.6%	70	78.7%	
Duration of stroke (Hours)	25 to 30	12	54.5%	46	51.7%	0.810
	> 30	10	45.5%	43	48.3%	

Discussion

The present study was conducted to determine the frequency of aspiration pneumonia among patients with stroke presenting at Saidu Group of Teaching Hospital Swat. The frequency of aspiration pneumonia in this study was 19.8% (22 out of 111) in stroke patients. The mean age of patients was 53.97±11.52 years. Male patients were in majority 64 (57.7%) compared to 47 (42.3%) females. The mean body mass index was 24.91±2.18 kg/m^2. Among those who developed pneumonia the majority were > 50 years of age making up 18 (81.8%) of cases. Male gender was more commonly affected with 15 (68.2%) of pneumonia cases occurring in males, but this association did not reach statistical significance. Smoking history was present in 8 (36.4%) of pneumonia patients, but the association with penumonia was insignificant.

The frequency of aspiration pneumonia observed in this study is comparable to Adrees et al. who conducted their study in Faisalabad and reported stroke associated pneumonia in 17.89% of patients which aligns with 19.8% found in the current study (10). Similarly, Ning et al. documented pneumonia in 17.89% of acute ischemic stroke patients in their study conducted in Lahore. These consistent figures suggest that approximately one in five to one in six stroke patients in Pakistani tertiary care settings develops pneumonia as a complication (11).

However, the present frequency of 19.8% of aspirational pneumonia is lower than the 54% reported by Jamal et al. from their study conducted in Abbottabad. That particular study focused specifically on patients who had already developed dysphagia after stroke (12). Dysphagia is a well-established risk factor for aspiration. The higher frequency in that study reflects a selected high-risk population rather than all stroke patients.

The frequency of aspiration pneumonia observed here is higher than the pooled frequency of 12.3% reported in the large systematic review and meta-analysis by Badve et al. which included over 139,432 patients across 47 studies (13). This difference may be explained by several factors. The meta-analysis included many studies from high income countries where stroke unit care is standard. Such specialized care has been shown to reduce pneumonia rates.

When examining age distribution, the finding that 81.8% of pneumonia patients were above 50 years is consistent with Badve et al. as they reported a mean age of 68.3 years across included studies (13). Sellars et al. identified older age as an independent risk factor for chest infection after stroke. Advanced age is associated with weaker cough reflex's poorer immune function and higher likelihood of dysphagia (14).

The frequency of 19.8% of aspiration pneumonia means that nearly one in five stroke patients admitted to hospital will develop aspiration pneumonia. This is a preventable complication. Hospitals caring for stroke patients must implement systematic dysphagia screening protocols before any oral intake is allowed. Simple bedside screening tools such as the water swallow test can identify at risk patients.

Conclusion

From the present study it is concluded that the frequency of aspiration pneumonia among patients with stroke was 19.8%. In the subgroup analysis, the study further observed that patients older than 50 years of age were at higher risk of developing aspiration pneumonia. Male gender had higher cases of aspiration pneumonia, but this difference was not significant.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (94-ERB/024)

Consent for publication

Approved

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Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

SHS (Postgraduate Resident)
Contributed to study design, data collection and initial manuscript drafting
Assisted in data acquisition, literature review and manuscript editing
Performed statistical analysis and contributed to interpretation of results
Helped in methodology development, data organization and manuscript formatting
***MK** (Associate professor)*
Results compilation, proofreading and final revisions of the manuscript
Provided guidance in study execution and critically reviewed the manuscript
Supervised the research, coordinated among authors, finalized the manuscript and approved the final version

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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