Frequency of Stroke Acquired Pneumonia in Patients Admitted In Intensive Care Unit with Stroke

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ABSTRACT: Stroke is a highly morbid entity and it can be fatal directly due to neurological damage and affecting the respiratory system or can add to over all morbidity and mortality due to its associated complications like stroke associated pneumonia (SAP).
Objective: To determine the frequency of stroke acquired pneumonia in ICU patients.
Study Design: Descriptive case series.
Settings: Department of Medicine, THQ Hospital, Sargodha.
Period: Six months from October, 2020 to April, 2021
Material & Methods: In this study, the cases of either gender and age 30 to 70 years suffering from stroke within 12 hours were included. SAP was labelled on the basis of fever, cough and non homogenous opacities on chest X-ray.
Results: In the present study, 160 cases of stroke were included and out of these 82 (51.25%) were males and 78 (48.75%) females. The mean age of the subjects was 54.24 ± 7.15 years and mean duration of stroke was 7.05 ± 2.54 hours. There were 35 (21.88%) cases that had DM, 28 (17.50%) had HTN and 30 (18.75%) of cases had history of smoking. Stroke acquired pneumonia (SAP) was seen in 20 (12.50%) of the cases. SAP was seen in 12 (15.38%) female cases as compared to 8 (9.75%) males with p= 0.34. SAP was more seen in cases with DM where this was observed in 7 (20%) of the cases as compared to 13 (10.4%) with no DM with p= 0.15. SAP was seen in 5 (17.85%) cases with HTN and 4 (13.33%) cases with history of smoking with p values of 0.35 and 1.0 respectively. SAP was seen in 15 (14.42%) cases with duration of stroke 6-12 hours in contrast to 5 (8.92%) cases with duration less than this with p= 0.45.
Conclusion: Stroke acquired pneumonia is not uncommon and is seen in more than 1 out of every 10 cases and it is more seen in females and those with history of DM, HTN and duration of stroke 6 to 12 hours; though none of this variable was found statistically significant.

KEYWORDS: DM, HTN, SAP, Smoking.

INTRODUCTION

Acute ischemic stroke is associated with poor clinical outcome due to its complications. These complications can be prevented by recognizing the frequency and implementing appropriate treatment options. Pneumonia is one of the most common respiratory complications of acute stroke, occurring in about 4 to 9 percent of patients. Stroke-related pneumonia appears to be higher in patients who are admitted to a neurologic intensive care unit with acute ischemic stroke and in those who require nasogastric tube feeding (21%nd 44%, respectively).[1-2] Patients with stroke-related pneumonia have a higher mortality and a poorer long-term outcome when compared with patients without pneumonia. Pneumonia manifests with fever within the first 48 hours of acute stroke, and it is the most common medical complication two to four weeks after a supratentorial ischemic infarction. In addition, retrospective data suggest that pneumonia and respiratory illness are the most frequent conditions leading to hospital readmission in stroke survivors in the first five years after ischemic stroke.[2-3] In a prospective study, 412 patients with acute stroke were included. Amongst this population age >65 years, dysarthria or aphasia, severe poststroke disability, cognitive impairment, and an abnormal water swallow test were considered as independent risk factors causing stroke associated pneumonia. In another prospective study of 124 patients with acute stroke who were treated in the intensive care unit. Risk factors in this study were mechanical ventilation, abnormal chest radiograph on admission, and dysphagia. Patients with facial palsy and decreased level of consciousness were independent risk factors requiring nasogastric feeding leading to pneumonia.[3-4]

Several studies have noted that gastric acid suppression using H_2 receptor antagonists or proton pump inhibitors leading to an increased incidence of hospital-acquired pneumonia. In a report of 1676 hospitalized patients admitted with acute stroke, it was seen that these medications were ordered in 80% of the patients and hospital-acquired pneumonia developed in 17% of this population. Compared with the unexposed group, the incidence of hospital-acquired pneumonia was significantly higher in the group exposed to acid-suppressive medications (21 Vs 4 percent, adjusted odds ratio 2.3, 95% CI 1.2-4.6).[5] Aspiration of gastric contents is the cause of about 60 percent of stroke associated pneumonia. Aspiration pneumonitis refers to the pulmonary consequences resulting from the abnormal entry of fluid, particulate exogenous substances, or endogenous secretions into the lower airways. Pneumonia results from the "aspiration" of microorganisms from the oral cavity or nasopharynx. Aspiration pneumonia following stroke is usually due to stroke-related impairment of motor and sensory mechanisms involved in deglutition or to a decreased level of consciousness that results in compromise of the cough reflex and glottic closure.[1] Dependent pulmonary segments are usually affected in aspiration pneumonia. The most common sites of involvement are the posterior segments of the upper lobes or apical segments of the lower lobes if aspiration occurs while recumbent, and the lower lobes if the patient aspirates while upright or semi-upright. The pneumonia that develops in the outpatient setting or within 48 hours of admission to a hospital in patients with increased risk of exposure to multidrug resistant bacteria as a cause of infection is labelled as Healthcare associated Pneumonia (HCAP). Risk factors for exposure to multidrug resistant bacteria in HCAP include the hospitalization for two or more days in an acute care facility within 90 days of current illness, exposure to antibiotics, chemotherapy, or wound care within 30 days of current illness; hemodialysis or clinic nosocomial infections. The term nosocomial pneumonia has been replaced by clinical entities of hospital-acquired pneumonia (HAP) and ventilator-associated pneumonia (VAP). However, the term nosocomial pneumonia still has an appropriate place in the nomenclature of pneumonia. Nosocomial infections have been viewed as a "tribute to pay to the more aggressive management of the population, characterized by the use of sophisticated technologies and invasive devices," an important consideration in the pulmonary care of critically ill patients. [11] Hospital-acquired pneumonia (HAP) is labelled when pneumonia develops at least 48 hours after admission to a hospital and is characterized by increased risk of exposure to multidrug resistant organisms, [6] as well as gram-negative organisms. [12] Risk factors for exposure to such organisms in HAP include the following [6] :

- Antibiotic therapy within 90 days of the hospital-acquired infection
- Current length of hospitalization of five days or more
- High frequency of antibiotic resistance in the local community or within the specific hospital unit
- Immunosuppressive disease or therapy
- Presence of HCAP risk factors for exposure to MDR bacteria.

MATERIAL & METHODS

Study Design: This was a descriptive case series.

Settings: Department of Medicine, THQ Hospital, Sargodha.

Duration: October, 2020 to April, 2021

Sample Size: Sample size of 160 cases was calculated with 95% confidence level, 5% margin of error and taking expected percentage of SAP i.e. 11.7% in patients of stroke.[5]

Sampling Technique: Non-probability, consecutive sampling.

Inclusion Criteria: Patients aged 30 – 70 years of either gender presenting within 12 hours of stroke and admitted in ICU were included in this study.

Exclusion Criteria: Patients with co-morbid conditions like liver problems (AST>40IU, AST>40IU), renal problems (serum creatinine >1.2gm/dl), asthma (on medical record), previous ACS (on medical record) and patients with pneumonia before stroke (on history) within last 1 month of stroke were excluded.

Data Collection Procedure: After the acceptance from the institutional ethical review committee, patients fulfilling the inclusion criteria were selected from emergency of Department of Medicine, DHQ Hospital, Sargodha. Informed consent was obtained.

Demographic information like name, age, gender, duration of stroke and documented history of hypertension, diabetes and smoking was also obtained and recorded on a predesigned Proforma. Then patients were admitted in ICU and followed-up there for 72 hours. If patient developed stroke associated pneumonia as per operational definition within 72 hours data was collected. All this information was recorded on Proforma.

Data / Statistical Analysis: The collected information was entered into SPSS version 21.0 and analyzed through it. Quantitative variables like age and duration of stroke were calculated at mean & SD. Qualitative variable like gender, DM, HTN, smoking and outcome variable i.e. SAP were calculated as frequency and percentage. Data was stratified for age, gender, duration of stroke, hypertension, diabetes and smoking to see its effect on outcome variable. Post stratification chi square test was applied and p-value < 0.05 was considered as significant.

RESULTS

In the present study, 160 cases of stroke were included and out of these 82 (51.25%) were males and 78 (48.75%) females (figure 03). The mean age of the subjects was 54.24 ± 7.15 years and mean duration of stroke was 7.05 ± 2.54 hour. There were 35 (21.88%) cases that had DM, 28 (17.50%) had HTN and 30 (18.75%) of cases had history of smoking as shown in figures 04-06.

Stroke acquired pneumonia was seen in 20 (12.50%) of the cases as displayed in figure 07. SAP was seen in 12 (15.38%) female cases as compared to 8 (9.75%) males with p= 0.34. There was no significant difference in terms of SAP with different age groups (p= 1.0). SAP was more seen in cases with DM where this was observed in 7 (20%) of the cases as compared to 13 (10.4%) with no DM with p= 0.15. SAP was seen in 5 (17.85%) cases with HTN and 4 (13.33%) cases with history of smoking with p values of 0.35 and 1.0 respectively. SAP was seen in 15 (14.42%) cases with duration of stroke 6-12 hours in contrast to 5 (8.92%) cases with duration less than this with p= 0.45.

Risk Factors stratification		STROKE ACQUIRED PNEUMONIA (SAP)			p-Value
		YES	NO	Total	
Age group	30-49Y	5(11.11%)	40(88.89%)	45(100.0%)	
	50-70Y	15(13.04%)	100(86.96%)	115(100.0%)	1.0
	Total	20(12.5%)	140(87.50%)	160(100.0%)	
Gender	Male	8(9.75%)	74(90.25%)	82(100.0%)	
	Female	12(15.38%)	66(84.62%)	78(100.0%)	0.34
	Total	20(12.50%)	140(87.50%)	160(100.0%)	
Hypertension	Yes	5(17.85%)	23(82.15%)	28(100.0%)	
	No	15(11.36%)	117(88.64%)	132(100.0%)	0.35
	Total	20(12.5%)	140(87.5%)	160(100.0%)	
Diabetes	Yes	7(20%)	28(80%)	35(100.0%)	
	No	13(10.4%)	112(89.6%)	125(100.0%)	0.15
	Total	20(12.5%)	140(87.5%)	160(100.0%)	
Smoking	Yes	4(13.33%)	26(87.67%)	30(100.0%)	
	No	16(12.3%)	114(87.7%)	130(100.0%)	0.35
	Total	20(12.5%)	140(87.5%)	160(100.0%)	
Duration of SAP	<6 hr	5(8.92%)	51(8.92%)	56(100%)	
	6-12 hr	15(14.42%)	89(85.59%)	104(100%)	0.45
	Total	20(12.5%)	140(87.5%)	160(100%)	

AGE IN STUDY SUBJECTS
n=160

	Age (years)
Mean	54.24
Std. Deviation	7.15
Minimum	34
Maximum	70

DISCUSSION

Stroke is a major cause of disability leading to high morbidity and mortality and it can impact the one with a wide variety of entities having a direct or indirect impact on life and quality of life.[11-15] A recent survey in Pakistan estimated 21.8% cases with stroke and/or Transient Ischemic Attack.[16]

Mortality ranges 7 to 20% in various studies in our country related to stroke. Approximately 60% of patients with stroke are at higher risk of complications and a significant proportion (89%) are not able to perform routine activities independently. The causes of stroke in our population are similar to other Western countries where majority of the cases have risk factors like diabetes mellitus, cardiac disease, smoking, hypertension and dyslipidemia.[16-17] Pneumonia besides other medical and neurological complications are found to be major causes of death following stroke.[18]

The rate of stroke-related pneumonia is higher among cases with acute ischemic stroke and who are under treatment in intensive care unit of neurology i.e. 21% and 44% requiring nasogastric tube feeding. Pneumonia is a predominant cause of fever during first 48 hours of acute stroke, it is also recorded in majority of the cases with common medical complications within 30 days of supra-tentorial ischemic infarction.[19]

In the present study, stroke acquired pneumonia was seen in 20 (12.50%) out of the 160 cases admitted with stroke. These results were comparable to the findings of the studies done in the past; however, a wide variable prevalence of this is seen in the past. SAP was seen in 12 (15.38%) female cases as compared to 8 (9.75%) males with p= 0.34 in the present study. According to various study done in the past on stroke patients, frequency of stroke acquired pneumonia ranged from 3.9 to 44% of cases that were admitted in the stroke units.[20] According to a study done by Dziewas R et al, pneumonia related to stroke was diagnosed in 44% of the patients with acute stroke admitted in ICU.[21] According to another study done by Teh WH et al it was seen in 11.7% of the cases.[22] In a study overall prevalence of the stroke associated pneumonia was seen in 18 (18%) out of 100 cases admitted with stroke and out of these cases that had this there was no significant difference in terms of gender and 51% of the cases were males and 49% females. They further described that the chance of SAP was highest in cases that had higher age groups where 3/4th of the cases were having age more than 50 years. However, there was no significant difference in both the age groups of the present study with p value of 1.0.[23]

CONCLUSION

Stroke acquired pneumonia is not uncommon and is seen in more than 1 out of every 10 cases and it is more seen in females and

those with history of DM, HTN and duration of stroke 6 to 12 hours; though none of this variable was found statistically significant.

LIMITATION OF THE STUDY

There were few limitations of this study, as this study did not look for the types of stroke i.e. ischemic or hemorrhagic and also for the prior history of fever and the feeding trends in such cases.

However, there were many strengthening points as well, as this study highlighted a much neglected aspect of stroke which has a great impact on overall morbidity and mortality in such cases.

CONFLICT OF INTEREST / DISCLOSURE

There is no conflict of interest in the present study.

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