Original Article

Prevalence and Outcomes of Aspiration Pneumonia in Stroke Patients with Altered Consciousness Admittedina Medical College Hospital of Haor District of Bangladesh

***Alam MS[1], Sikandar A[2], Sultana T[3], Shaheen MMR[4]**

Abstract

Background*: Aspiration is a well-established cause of pulmonary disease and frequently occurs in patients with altered consciousness. Mortality from aspiration pneumonia ranges from approximately 1% in outpatient settings to as high as 25% in hospitalized patients. If not properly managed, mortality can reach up to 70%. Currently, there is no national-level study on aspiration pneumonia among hospitalized stroke patients with impaired consciousness.*

Objective*: This study aimed to determine the prevalence of aspiration pneumonia in stroke patients with altered consciousness admitted to the medicine department of President Abdul Hamid Medical College Hospital (PAHMCH).*

Methods and Materials*: A prospective observational study was conducted from May 2018 to March 2019, including 52 adult stroke patients with altered consciousness who developed aspiration pneumonia.*

Results*: Among them, 76.92% developed pneumonitis, 13.46% developed lung abscesses and 9.62% developed acute respiratory distress syndrome (ARDS). Radiologically, 33 patients had opacities in the right lower lung zone, 13 in the left lower zone, 6 in the right midzone and 10 patients had bilateral lower-zone opacities. The overall mortality rate was 23%. Mortality was 8.33% when only one lobe was involved, whereas involvement of two or more lobes on one or both sides was associated with mortality rangingfrom 25% to91%.*

Conclusions*: Physicians and healthcare personnel can reduce the incidence of aspiration pneumonia by ensuring that comatose patients are not left unattended, checking nasogastric tube placement, positioning patients properly, administering tube feeds at an appropriaterate to allow gastric emptying and adhering to routine patient care precautions.*

PAH Med Col J. Jul 2024; 1 (1): 2-7

Keywords: *Aspiration pneumonia, Pulmonary involvement, Stroke with altered consciousness*

Introduction

Aspiration pneumonia was first identified as a distinct clinical condition in obstetric anesthesia by Mendelson in 1944[1]. Aspiration is widely recognized as a cause of pulmonary disease and, in many clinical situations, may be the leading contributor to pulmonary complications. Diagnosing aspiration pneumonia can be challenging, especially when aspiration episodes are small, as the resulting pulmonary response is often nonspecific and difficult to attribute directly to aspiration. Even in cases of massive aspiration leading to pneumonia, confirming the cause is difficult if the aspiration event was not observed[2]. Aspiration pneumonia occurs when lung parenchyma and bronchial tubes become inflamed due to the abnormal entry of fluids, particulate materials, endogenous secretions, or gastric contents into the lower respiratory tract[3]. Two main conditions are usually required for aspiration pneumonia to develop: impairment of protective mechanisms of the lower airways (including glottic closure, cough reflex and clearance mechanisms) and the presence of an injurious inoculum, which may trigger an inflammatory response, damage lung tissue, or obstruct airways when sufficient material is aspirated[3]. Aspiration

1. *Dr. Mohammad Shafiul Alam, Associate Professor, Department of Medicine, President Abdul Hamid Medical College, Kishoreganj, Bangladesh.
2. Dr. Arif Sikandar, Junior Consultant Neurology, Department of Medicine, President Abdul Hamid Medical College, Kishoreganj, Bangladesh.
3. Dr. Tasnin Sultana, Medical Officer, 250 Bedded General Hospital Kishoreganj, Bangladesh.
4. Dr. Md. Musthafijur Rahman Shaheen, Medical Officer, Hamid Medical College Hospital, Kishoreganj, Bangladesh.

Article History: Received: 12-03-2023 **Revised:** 29-06-2023 **Accepted:** 18-07-2023

Address of Correspondence: Mohammad Shafiul Alam, Associate Professor, Department of Medicine, President Abdul Hamid Medical College, Kishoreganj, Bangladesh. E-mail:dr.s.alam37@gmail.com; Cell Number: 01794039398.

can lead to chemical pneumonitis (Mendelson's syndrome), aspiration pneumonia, necrotizing pneumonia, lung abscess, empyema, lobar or segmental atelectasis and pleural effusion[4]. The pattern of pulmonary involvement in stroke patients depends on factors such as patient position, gravity, airflow dynamics and characteristics of the aspirate[5]. Recumbent patients typically have aspiration affecting the posterior segments of the upper lobes and apical segments of the lower lobes, whereas upright or semi-recumbent patients usually develop involvement in the basal segments of the lower lobes[6]. The outcome of aspiration pneumonia is influenced by the type and volume of aspirate, Comorbidities, nutritional status, primary lobe involvement, number of lobes affected, early diagnosis and appropriate management. Mortality and morbidity are closely linked to the number of lobes involved: single-lobe involvement mayresult in morbidity and mortality up to 41.0%, while multi-lobe involvement can increase this risk up to 90.0%[7]. Therefore, careful management of patients with altered consciousness is critical to reduce morbidity and mortality from aspiration pneumonia. Preventive strategies for stroke patients with impaired consciousness include: a) Elevating the head of the patient to a 30° angle to reduce aspiration risk, b)Using nasogastric feeding for at-risk patients, c) Maintaining patients in a lateral position, d) Feeding in a semi-recumbent position and keeping the patient in the same posture for at least 20 minutes post-feeding and e) Performing regular oropharyngeal suction and maintaining proper oral hygiene.

Globally, aspiration pneumonia is recognized as a common disease, though recent statistics are limited. The morbidity and mortality largely depend on the pulmonary involvement pattern. In Bangladesh, no studies have investigated the pattern of pulmonary involvement or outcomes in hospitalized stroke patients with aspiration pneumonia. This study aims to fill that gap, providing baseline information for future research and clinical reference.

Methods

This prospective observational study was conducted in the Department of Medicine at President Abdul Hamid Medical College Hospital, Kishoreganj, from June 2020 to December 2013. A total of 52 adult stroke patients with altered consciousness and aspiration pneumonia admitted to the medicine ward were enrolled. Informed written consent was obtained from the patients' attendants after a thorough explanation of the condition. Patients were evaluated through detailed history-taking and physical examination usinga structured case record form (CRF) completed by the study physician. Altered consciousness was assessed using the Glasgow Coma Scale. All patients underwent hematologic investigations, including total leukocyte count (TLC), platelet count, chest X-ray, blood urea, creatinine, random blood sugar, sputum Gram staining and blood culture. Categorical data were expressed as frequencies and percentages, while continuous variables were presented as means and standard deviations. Data were processed and analyzedboth manually and using SPSS version 16.0 for Windows.

Results

This prospectively conducted study included 52 stroke patients with altered consciousness complicated by aspiration pneumonia. The mean age was 57.42±13.63 years, with a range of 25 to 90 years (Table I). Among the participants, 37(71.15%) were male and 15(28.85%) were female. Following aspiration, 76.92% of patients developed pneumonitis, 13.46% developed lung abscesses and 9.62% developed acute respiratory distress syndrome (ARDS). Radiologically, 33 patients showed opacity in the right lower lobe, 13 in the left lower lobe and 6 in the right midzone. Ten patients had opacities in both lower lobes. The overall mortality rate in this study was 23.0%. Mortality was 8.33% when only a single lobe was involved, whereas involvement of two or more lobes on one or both sides was associated with mortality ranging from 25.0% to 91.0%.

Table I: Age distribution of the study patients

Age in years	Number of patients (n)	Percentage (%)
25-40	06	11.54
41-50	10	19.23

51-60	17	32.69	71-80	04	07.69
61-70	13	25.00			

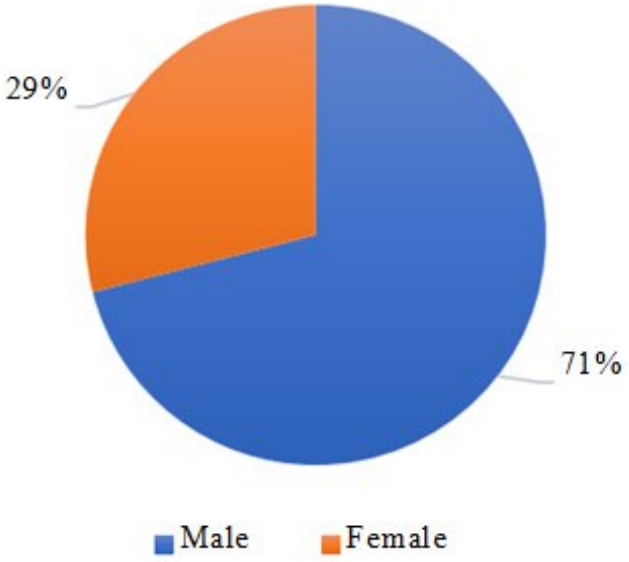

Figure 1: Distribution of patients according to sex

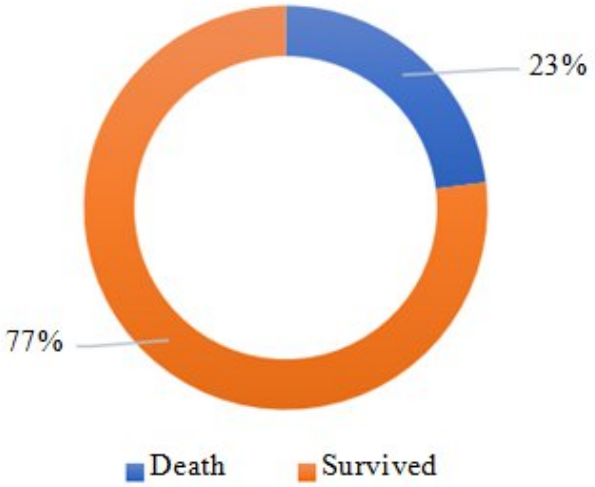

Figure 2: Distribution of outcomes of aspiration pneumonia among the study patients

Table II: Clinical features of aspiration pneumonia among the study patients

Clinical feature	Number of patients (n)	Percentage (%)
Fever	52	100.0
Cough	52	100.0
Respiratory distress	52	100.0

Vomiting	23	44.23
Chest pain	25	50.00

Table III: Frequency of pulmonary manifestations of aspiration pneumonia

Pulmonary manifestations	Number of patients (n)	Percentage (%)
Pneumonia	40	76.92
Lung abscess	07	13.46
ARDS	05	09.62

Table IV: Primary zone involvement radiologically

	Number of patients (%)
Right lung	
Upper zone	00 (00.00)
Middle zone	06 (11.54)
Lower zone	33 (63.46)
Left lung	
Upper zone	00 (00.00)
Lingula	00 (00.00)
Lower zone	13 (25.00)
Both lungs	
Upper zone	00 (00.00)
Middle zone/Lingula	00 (00.00)
Lower zone	10 (19.23)

Table V: Distribution of the study patients according to given antibiotics

Given antibiotics	Number of patients (n)	Percentage (%)
Amoxicillin & Clavulanic Acid	35	67.30
Ceftriaxone	12	23.10
Meropenem	05	09.60
Metronidazole	52	100.0

Table VI: Extent of pulmonary manifestations as related to mortality

Pulmonary manifestations	Mortality	
	Number of patients (n)	Percentage (%)
Pneumonia	05	09.61
Lung abscess	03	05.76
ARDS	04	07.69

Table VII: Extent of pulmonary involvement radio logically and mortality

Pulmonary manifestations	Mortality

	Number of patients (n)	Percentage (%)
Right lower zone	01	08.33
Right, middle and lower zone	03	25.00
Both lower zones	08	66.67

Discussion

In this small series of stroke patients with altered consciousness complicated by aspiration pneumonia at a district-level hospital, the mean age was 57.42±13.63 years, ranging from 25 to 90 years. The majority of patients (32.69%) were aged 51-60 years. In comparison, El-Solh reported a higher mean age of 80.2±6.5 years in their cohort[8]. Males predominated in our study, comprising 71.15% (n=37) of patients, while females accounted for 28.85% (n=15); similarly, El-Solh reported 43 males and 26 females among 69 patients[8]. All patients in our study had altered consciousness, with Glasgow Coma Scale scores ranging from 7 to 12. Fever, cough and respiratory distress were the most common clinical findings, with a few patients exhibiting chest pain or vomiting. Physical examination frequently revealed tachypnea, hypoxia, crepitations and rhonchi, while hypotension and cyanosis were less common. Bynum and Pierce also reported fever and cough in approximately one-third of their patients[9]. Following aspiration, 40 patients (76.92%) developed pneumonitis, 7(13.46%) developed lung abscesses and 5(9.62%) developed acute respiratory distress syndrome (ARDS). These findings are comparable to Itzhak and Finegold, who reported 70.3% pneumonitis, 16.2% necrotizing pneumonia and 13.5% lung abscess[10]. Radiologically, the right lower zone was most frequently involved (n=33, 63.46%), followed by the left lower zone (n=13, 25.0%) and the right middle zone (n=6, 11.54%). Ten patients (19.23%) had opacities in both lower zones. These results align with previous studies, including Cameron, who observed predominant involvement of the right lower zone and Itzhak and Finegold, who reported right and left lower zone involvement in 34 and 33 patients, respectively[2,10]. Youngberg also noted that aspiration often causes diffuse or unilateral lung opacities[11]. Most patients received intravenous amoxicillin-clavulanate or ceftriaxone, with metronidazole added for anaerobic coverage. Forty patients (77.0%) improved following management. Patients who developed ARDS were transferred to tertiary care centers for mechanical ventilation and meropenem therapy; however, many died, likely due to underlying comorbidities compounded by aspiration. Mortality in previous studies has varied widely: Awe et al. reported 70.0%, Dines et al. 55.0% and El-Solh and Pietrantoni 36.0%, with 64.0% showing improvement[8,12,13]. In this cohort, mortality was closely related to the number of lobes involved. If only one lobe was affected, mortality was 8.33%, whereas involvement of two or more lobes on one or both sides was associated with mortality ranging from 25.0% to 91.0%. Thesefindings highlight that aspiration pneumonia in stroke patients with altered consciousness carries significant morbidity and mortality, particularly with multi-lobar involvement, manifesting with respiratory distress, tachypnea, diffuse rales and hypoxemia.

Conclusion

This prospective observational study examined aspiration pneumonia in hospitalized stroke patients with impaired consciousness. The severity and pattern of pulmonary involvement depend on patient position, gravity, airflow dynamics and the characteristicsof aspirated material. Radiological infiltrates may be diffuse, localized, unilateral, or bilateral and no specific imaging feature can definitively rule out aspiration. However, in an appropriate clinical context, a wide range of radiological abnormalities should raise suspicion for aspiration pneumonia. The outcome is influenced by the type and quantity of aspirates, comorbidities, nutritional status, lobe involvement, timely diagnosis and adequacy of care. Importantly, aspiration pneumonia is largely preventable and manageable with prompt and appropriate interventions. Physicians and healthcare personnel can minimize its incidence by ensuring that comatose patients are not left unattended, nasogastric tubes function correctly and patients are positioned carefully during feeding and care.

References

1. Richard A. David Dines. Thomas C. Tinstman, Aspiration Pneumonia. CHEST. 1974:65.

2. John L. Cameron, William Mitchell, George D. Zuidema, Clinical Outcome following Documented Aspiration. Arch Surg. 1973;106: 49-52.
3. Marik PE. Aspiration pneumonitis and aspiration pneumonia. N Engl J Med. 2001; 344(9):665-71.
4. De Legge Mil. Aspiration pneumonia: incidence, mortality and at-risk populations. Parenter Enteral Nutr. 2002;26 (6 suppl):S19-S25.
5. Michael J. Landay et al. Pulmonary Manifestations of Acute Aspiration Pneumonia of gastric content. Am J Roentgenol. 1978;131: 587-92.
6. Bartlett JG, Gorbach SL. Finegold SM. The bacteriology of aspiration pneumonia. Am J Med. 1974;56:202-7.
7. Ott SR, Allewelt M, Lorenz J. Moxifloxacin vs ampicillin/sulbactam in aspiration pneumonia and primary lung abscess. Infection. 2008;36:23.
8. El-Solh AA. Pietrantoni C, Bhat A, Aquilina AT, Okada MV et al. Microbiology of severe aspiration pneumonia in institutionalized elderly. Am J Respir Cril Care Med. 2003;167(12):1650-4.
9. Bynum LJ, Pierce AK. Pulmonary aspiration of gastric contents. Am Rev Respir Dis. 1976: 114(6):1129.
10. Itzhak Brook. Sydney M. Finegold, Bacteriology of aspiration pneumonia in children. Pediatrics. 1980;65:111.
11. KYoungberg AS. Unilateral diffuse lung opacity. Radiology. 1977;123:277-81.
12. Awe WC, Fletcher WS, Jacob SW. The pathophysiology of aspiration pneumonitis. Surgery. 1966;60:232-9.
13. Dines DE. Titus JL. Sessler AD. Aspiration pneumonitis. Mayo Clinic Proc. 1970;45:347-60.