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Incidence of Pulmonary Complication Mainly Pneumonia, Need for Mechanical Ventilation, Respiratory Depression after Acute Stroke

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Abstract

Introduction: Stroke is the second most common cause of death worldwide and a frequent cause of adult disability in developed countries. Stroke burden on families and society is projected to rise from approximately 38 million disability-adjusted life years (DALYs) lost globally in 1990 to 61 million DALYs in 2020 due to population ageing.

Methodology: A total of 100 consecutive stroke patients who got admitted in Medical ICU, medical step down of our hospital and met inclusion criteria and exclusion criteria were studied prospectively over a period of 12 months.

Results: As per our study results, stroke associated pneumonia is found to be the most common pulmonary complication of the stroke next followed by mechanical ventilation. Stroke associated pneumonia is most commonly observed in posterior circulation strokes, Infarcts and in patients who required mechanical ventilation.

Conclusion: Stroke incidence is most commonly seen in the age group of 51-70yrs, male sex, anterior circulation stroke, infarctions are more common in our study.

Keywords: Pneumonia; Mechanical Ventilation; Acute Stroke.

Introduction

Cerebrovascular diseases include some of the most common and devastating disorders: ischemic stroke and hemorrhagic stroke.

Stroke is the second leading cause of death worldwide,causing 6.2 million deaths in 2011. The incidence of cerebrovascular diseases increases with age, and the number of strokes is projected to increase as the elderly population grows, with a doubling in stroke deaths.

Medical complications of acute ischemic stroke are common and often lead to poor clinical outcomes. The frequency of these complications must be recognized so that preventive strategies and appropriate treatment are employed.[1]

Pneumonia is the most common medical complication after stroke. Although several risk factors have been reported, the role of common co morbidities in the development of pneumonia is not

well established. Moreover, there is discrepancy in the literature regarding the impact of pneumonia on stroke outcomes.[2]

Medical and neurological complications after acute ischemic stroke may adversely impact outcome and in some cases may be preventable. Limited data exist regarding the frequency of such complications occurring in the first days after the ictus and the relationship of these complications to outcome.[3]

Specific pulmonary symptoms may be subtle in patients recovering from severe stroke, however fulminant lobar pneumonia mayalso occur. Most often basal bronchopneumonias related to immobilization and reduced basal ventilation are observed.

In patients with dysphagia, aspiration pneumonias, whichare most commonly observed in the upper lobes, are observed. Classic lobar pneumonia is rarely seen; patients with chronic obstructive lung disease oft en present with exacerbations during subacute stroke. Pneumonia is reported to occur in 10% of patients with stroke.[4]

In straightforward cases, a reliable clinical diagnosis can be made based on symptoms including coughing and expectoration, fever, increased respiratory rate, and asymmetric crepitation on lung stethoscopy, oft en accompanied by pain or discomfort at the back of the thorax.

Diagnosis is confirmed by chest x-ray or CT. A tracheal suctioning sample for culture before treatment is recommended togetherwith CRP and WBC supplemented by blood culture as well as arterial gases in more severe cases. Further observation of the patient includes monitoring of respiratory rate and oxygen saturation, e.g. every second hour or continuously.[5]

Pneumonia is treated with antibiotics and supplemented with lung physiotherapy (continuous positive airway pressure) in patientswith no pleural effusion. Rational use of antibiotics follows local resistance patterns and therefore regional/hospital guidelines.

Oxygen supplementation (2–4 L/min) is generally considered to palliate and stabilize the oxygen saturation, however oxygen mustbe used with caution in patients with COPD or other chronic conditions characterized with continued increased arterial blood gascarbon dioxide, as oxygen supplementation may suppress the respiratory impulse. Structured changing in positioning in order toobtain air-shift in all pulmonary regions is mandatory in the immobilized patient. Follow-up of vital values and blood tests are necessaryto monitor the treatment response.[6]

Methodology

Cerebrovascular accident patients which were admitted to medical college and hospital, with in 72hrs of stroke onset and who have met the incusion and exclusion criteria were were included in the study.

All selected patients were studied for post stroke pulmonary complications mainly pneumonia,mechanical ventilation, respiratory depression,its incidence,age, gender distribution and its association with the site of lesion (i.e Anterior vs Posterior), type of lesion (infarct vs bleed), Severity of the stroke if measured by NIHSS scoring system.

As a substudy risk factor –age, gender, dysphagia, smoking, alcoholism and comorbidities – DM, HTN, IHD, RHD were evaluated, comparison and its association with post stroke pulmonary complications were studied.

Detailed history of age,gender, occupation, vitals, risk factors (smoking, alcoholism, dysphagia), comorbidities (DM, HTN) were obtained, clinical examination was done.

Short term outcome in the form of death, with complications, without complications, and discharged against medical advice was studied till discharge that is for a minimum of 2 weeks. Outcome in patients on mechanical ventilator, with pneumonia, dyshagia were also studied.

MRI/CT brain, chest X ray, hemogram, 2 Decho, sputum and ET aspirate cultures were done for the patient.

- Stroke is confirmed by the MRI/CT brian.
- CDC criteria was used for the diagnosis of stroke associated pneumonia.
- Endotracheal tube aspirate cultures were done in intubated patient to study the microbiological profile.while in non-intubated patient sputum could not be sent in all cases.

Results

Of the 100 CVA patients, 23 (23%) were with in the age group of 20-50yrs, 45 (45%) were within age of 51-70yrs, 32 (32%) were in between 71-95yrs of age group.

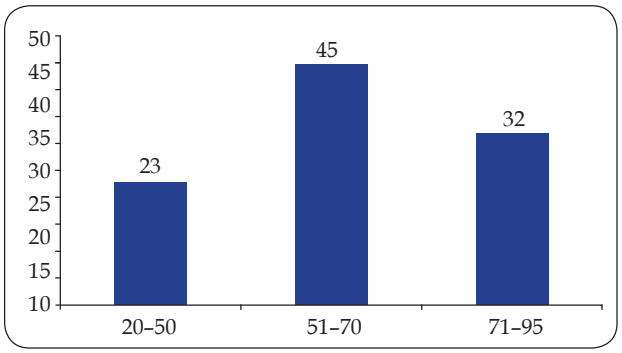

Fig. 1: Age distribution of study participants (N=100).

So incidence of CVA is more in age group of 51-70yrs.

In total of 100 patients, 76 patients were males and 24 were females.

Table 1: Complications details.

Sl. No.	Features	Frequency and %
1	On mechanical ventilation	33
2	Pneumonia	40
3	Respiratory depression	7

This table is showing the post stroke pulmonary complications which were noted in this study. As per the results 40 patients developed stroke associated pneumonia,7 patients has respiratory depression and 67 patients required mechanical ventilation.And patients requiring mechanical ventilation is for varied indications like low GCS,Desaturation,progression of pneumonia.

Table 2: Association of features with pneumonia.

Sl. No.	Features	Pneumonia		p value#
		No n (%)	Yes n (%)	
1	Site of stroke			
	Anterior	55 (67.9)	26 (32.1)	0.001*
	Posterior	5 (26.3)	14 (73.7)	
2	Type of stroke			
	Infarct	35 (55.6)	28 (44.4)	0.23
	Bleeding	25 (67.6)	12 (32.4)	
3	Mechanical ventilation			
	No	55 (82.1)	12 (17.9)	<0.001*
	Yes	5 (15.2)	28 (84.8)	
4	Respiratory depression			
	No	57 (61.3)	36 (38.7)	0.33
	Yes	3 (42.9)	4 (57.1)	

Note: #p value based on Chi-square test, *statistically significant (p<0.05)

Among the patients who developed pneumonia(40),depending on the site association, it was seen that posterior circulation stroke(14patients i.e 73%) are more associated.This finding is statistically significant.

Among infarction and Bleeds, 44% of infarcts are associated with pneumonia and bleeds are 32%.But there no statistical significance for this finding.

84% of patients on mechanical ventilator has developed pneumonia.

57% of patients having respiratory depression have developed pneumonia on due course.

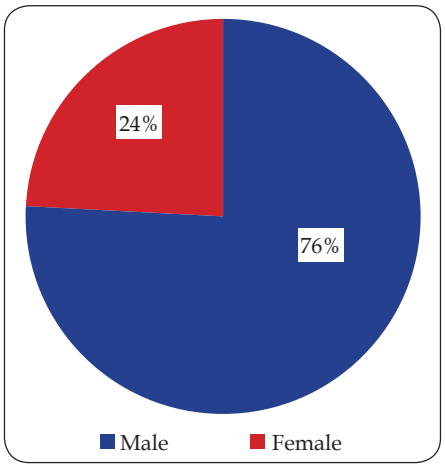

Fig. 2: Gender distribution of study participants (N=100).

Discussion

Stroke is the second leading cause of death worldwide and frequent cause of adult morbidity. It has large physical, psychological and financial impact on patients, health care system and society.[7]

Post stroke medical complications will adversely impact outcome and in some cases may be preventable. Limited data exists regarding the frequency of such complications occurring in the first days after the ictus and relations of these complications to outcome. Among which stroke associated pneumonia has been implicated in the mortality, morbidity and increased medical cost after stroke.[8]

The incidence and prognosis of SAP among ICU patients has not been thoroughly investigated. Hence there is a need for studying the incidence and risk factors and outcome in these patients.

So in this study we have made an attempt to study the post stroke pulmonary complications like pneumonia, requirement of mechanical ventilation, respiratory depression its incidence, its association with factors like age, gender, type and site of the stroke, other risk factor association,NIHSS score correlation and short term outcome.[9,10]

In our study,a total of 100 consecutive patients were taken after fulfilling the inclusion and exclusion criteria who were admitted in our hospital.

We found high prevalence of stroke in the age group of 51-70yrs,followed by in age group>70yrs.

Gender wise prevalence is more in male

population accounting to 76%. Pulmonary complications noted were Pneumonia, Mechanical ventilation, Respiratory depression.

As per our study, 40% patients developed pneumonia, 33% patients requied and on mechanical ventilation and 7% patients of study population developed respiratory depression.

And it was noted that among 100 patients, 63 were infarcts and 37 were intra cerebral bleeds in our study.

While studying the risk factor association ,85% patients has dysphagia and were on ryeles tube.8 patients were smokers,13 were alcoholics,, 11 of them had both, 2 were CKD, 18 were IHD.

Conclusion

As per our study results, stroke associated pneumonia is found to be the most common pulmonary complication of the stroke next followed by mechanical ventilation.

Stroke incidence is most commonly seen in the age group of 51-70yrs, male sex, anterior circulation stroke, infarctions are more common in our study.

Stroke associated pneumonia is most commonly observed in posterior circulation strokes,Infarcts and in patients who required pneumonia

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