

A Study of Clinical and Etiological Profile of Lower Respiratory Tract Infections in Patients with Diabetes Mellitus

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I. Introduction:

Diabetes mellitus is one of the most common chronic diseases worldwide and is associated with high morbidity and mortality¹. This metabolic disorder causes damage in multiple organs. The normal role of polymorphonuclear leukocytes, leukocyte adherence, chemotaxis, and the processes of phagocytosis may all be compromised². Antioxidant systems involved in bactericidal activity can also be impaired³. Two patterns of susceptibility to pneumonia in patients with diabetes have been noted². Infections caused by certain microorganisms occur with increased frequency. Infections due to other microorganisms are associated with increased mortality and morbidity. The increased incidence of tuberculosis in diabetics is thought due to malfunction of monocytes in diabetic patients with increased susceptibility to tuberculosis and/ or a worse prognosis⁴.

Objectives:

1. To study demographic profile, clinical presentation and risk factors of lower respiratory tract infections in patients with Diabetes Mellitus.
2. To discuss the etiology of lower respiratory tract infections.

II. Materials And Methods:

50 patients with lower respiratory tract infection admitted in ICU and Medical wards of Sri Venkateswara Ramnarain Ruia Government General Hospital, Tirupati are studied prospectively over a period of 6 months from July 2019 to December 2019. All of them are analysed for various symptoms and signs of their lower respiratory tract infection. They are investigated accordingly to know the etiology of their lower respiratory tract infection.

Inclusion criteria:

Patients aged greater than 14 years with history of diabetes mellitus on treatment or newly diagnosed diabetes mellitus who presented with symptoms and signs of lower respiratory tract infection.

Exclusion criteria:

1. Patients with other immunocompromised states (HIV, Autoimmune disorders, Lymphoproliferative disorders).
2. Patients using immunocompromising drugs (corticosteroids, anti- cancer drugs)

III. Results:

TABLE 1: AGE AND SEX DISTRIBUTION

S. No	Age group	Male	Female	Total
1.	15-25	0	0	0
2.	26-35	2	3	5
3.	36-45	10	2	12
4.	46-55	11	5	16
5.	56-65	9	4	13

6.	66-75	3	1	4
TOTAL		35	15	50

Out of 50 patients 70% were males and 30% were females. The peak incidence of illness was in the age group of 46-55 years for both sexes.

TABLE 2: INCIDENCE OF PRESENTING SYMPTOMS OF THE PATIENTS

S. No	SYMPTOMS	No. of Patients	Percentage
1.	FEVER	41	82%
2.	COUGH	43	86%
3.	SPUTUM PRODUCTION	38	76%
4.	HEMOPTYSIS	5	10%
5.	BREATHLESSNESS	43	86%
6.	CHEST PAIN	11	22%
7.	VOMITINGS	8	16%
8.	LOSS OF APPETITE	6	12%
9.	LOSS OF WEIGHT	3	6%
10.	LOOSE STOOLS	5	10%

TABLE 3: RISK FACTOR PROFILE OF THE PATIENTS

S. No	RISK FACTORS	No. of Patients	Percentage
1.	SMOKING	29	58%
2.	ALCOHOLISM	23	46%
3.	HYPERTENSION	11	22%
4.	OLD PULMONARY TUBERCULOSIS	5	10%
5.	CORONARY ARTERY DISEASE	3	6%
6.	CHRONIC KIDNEY DISEASE	1	2%
7.	UPPER RESPIRATORY TRACT INFECTION	1	2%
8.	ASPIRATION	1	2%
9.	BETEL NUT CHEWING	1	2%

Smoking (58%) is the most important risk factor followed by alcoholism (46%) and hypertension (22%) in this study.

TABLE 4: CLINICAL DIAGNOSIS

S. No	CLINICAL DIAGNOSIS	No. of Patients	Percentage
1.	Consolidation	32	64%
2.	Synpneumonic effusion	7	14%
3.	Pleural effusion	5	10%
4.	Hydropneumothorax	4	8%
5.	Pneumothorax	1	2%
6.	Collapse consolidation	1	2%

TABLE 5: SITE OF INVOLVEMENT OF LUNG:

S. No	SITE INVOLVED	No. of Patients	Percentage
1.	Right upper lobe	5	10%
2.	Right middle lobe	16	32%
3.	Right lower lobe	17	34%
4.	Left upper lobe	7	14%
5.	Left lower lobe	12	24%
6.	Both lower lobes	6	12%
7.	Both upper lobes	1	2%
8.	Diffuse involvement	1	2%

Most common site of involvement in lung is right lower lobe in 34% followed by right middle lobe in 32% of patients in the present study.

TABLE 6: CASES WHERE PATHOGEN COULD BE ISOLATED

S.No	Total Patients	Cases with positive grams stain and/or culture (%)	Cases with positive AFB stain (%)
1.	50	28 (56%)	8 (16%)

TABLE 6: ISOLATION PATTERN OF MICROORGANISMS FROM SPUTUM SAMPLES

S. No	ORGANISM	No. of Patients	Percentage
1.	Streptococcus pneumoniae	18	36%

2.	Mycobacterium tuberculosis	8	16%
3.	Staphylococcus aureus	3	6%
4.	Klebsiella pneumoniae	3	6%
5.	Polymicrobial	3	6%
6.	Pseudomonas aeruginosa	2	4%
7.	Escherichia coli	1	2%
8.	Aspergillus	1	2%

In the present study, the most common causative organism isolated was *Streptococcus pneumoniae* (34%) followed by *Mycobacterium tuberculosis* (16%).

III. Discussion:

In the present study, lower respiratory tract infection is more commonly observed in the age group of 46-55 years (16%) followed by 56-65 years (13%), and 36-45 years (12%). Shruithi Bettgowda⁵ et al observed peak incidence in 51-60 years (47.24%) followed by 41-50 years age group (24.4%). Ehrlich and their associates observed peak incidence of disease in the age group of 60-69 years (27.9%) followed by 50-59 years (25.03%).⁶

In the present study, most frequent presenting symptoms are cough and breathlessness (86%) followed by fever (82%) and sputum production (76%). In the study of Di Yacovo et al.,⁷ cough (79.5%) was the most frequent presenting symptom followed by breathlessness (64.5%).

In the present study unilobar infiltration is more common than multilobar infiltration similar to the Miquel Falguera et al.⁸ study. Saibal MAA⁹ et al., showed multilobar infiltrates were more common in Diabetes Mellitus patients with community acquired pneumonia compared in patients without diabetes. In 72% of patients pathogenic organism is isolated in the present study. In Di Yacovo et al.⁷ Miquel Falguera et al.,⁸ and Saibal MAA⁹ et al., pathogenic organism was isolated in 62.1%, 61%, and 48.9 % of patients respectively.

In the present study, *Streptococcus pneumoniae* (36%) is the most common causative organism. Similar observations were made by Di Yacovo et al (39%),⁷ and Miquel Falguera et al (31%).⁸

IV. Conclusion:

In this study of Diabetes Mellitus with lower respiratory tract infections, the common age group of affected individuals is between 46-55 years. Increased incidence of respiratory infections is seen in male patients compared to females, probably due to habits like smoking and alcoholism and co-morbid conditions. Pneumonia is the common pathology observed among respiratory infections and unilobar involvement is more common than multilobar. *Streptococcus pneumoniae* is the most common pathogen isolated.

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