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ORIGINAL ARTICLE

Outcome of Community Acquired Pneumonia in Diabetes Mellitus and the Predictors of in Hospital Mortality in a Tertiary Care Hospital

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ABSTRACT

Introduction: Community acquired pneumonia (CAP) and diabetes mellitus (DM) are common medical conditions which lead to increased morbidity, mortality and high hospitalization rates.

Objective: To determine the outcome and predictors of community acquired pneumonia in patients with diabetes mellitus.

Methodology: This study was hospital based descriptive case series carried out at the department of Medicine Hayatabad Medical Complex, Peshawar for duration of six months from December 2020 to June 2021. 150 patients were included in this study. All the information's including name, age, sex, co-morbidity were recorded in pre-designed questionnaire. Data entry and analysis were done through Statistical package for social sciences (SPSS) verion20.0.

Results: Based on distribution of predictors, total leukocytes count greater than 12000 or less than 4000 was observed in 37(24.7%) patients, FBS equal to or greater than 126mg/d1 and RBS equal to or greater than 200mg/d1 was observed in 20(13.3%) patients, HbAl c greater than 6.5% was observed in 32(21.3%) patients, blood urea greater than 40mg/d1 in 15(10.0%) patients, serum creatinine greater than 1.2mg,/d1 in 20(13.3%) patients while serum sodium less than 130mEq/L was observed in 26(17.3%) patients. Based on outcomes, expired, survived and prolonged stay in hospital was observed in 67(44.7%), 48(32.0%) and 35(23.3%) patients respectively.

Conclusion: Our study concludes that diabetic patients with community acquired pneumonia have unique clinical features. The major predictors of diabetic patients with community acquired pneumonia were total leukocytes count, FBS, RBS, HbAl c, blood urea, serum creatinine and serum sodium. High mortality rate was observed in our study.

Keywords: Community acquired pneumonia; Diabetes mellitus, Mortlity

INTRODUCTION

Community acquired pneumonia (CAP) and diabetes mellitus (DM) are common medical conditions which lead to increased morbidity, mortality and high hospitalization rates in patients undergoing cardiovascular surgery, surgical and medical intensive care unit (ICU) settings, heart disease, stroke and trauma [1]. More than 5 million people acquire CAP in the US every year and 600,000 are hospitalized [2]. Mortality ranges from 10 to 12 percent among adults diagnosed with CAP.3 Advanced age and co-morbidity in all those individuals are associated with increased death [3]. Viruses are one of the leading cause however bacterial pathogens, Haemophilus influenza and Streptococcus pneumonia are the most common causes of pneumonia [4, 5]. Due to hyperglycemia, impaired immunity, compromised lung function and medical complications such as diabetic related kidney injury, stroke, coronary artery disease, there is an increased risk CAP [6, 7]. About 415 million people throughout the world are presently affected from DM and every second patients with DM remain undiagnosed [8]. They are more prone to develop both microvascular and macrovascular complications [9]. Diabetes mellitus is also known as that of an isolated risk factor for developing infections of respiratory tract. Diabetic patients are predisposed to colonization and pneumonia. They are more likely to develop complications including sepsis/ bacteremia, lung abscess and recurrent pneumonia [10].

Multiple studies had been done which show impact of hyperglycemia on the clinical outcome of CAP, newly diagnosis of diabetes in patients admitted with CAP and mortality within 30 to 90 days of hospital discharge [11]. As prevalence of both diabetes and community acquired pneumonia is high, we examine the predictors of in-hospital mortality in patients presenting with CAP in diabetes mellitus. These predictors includes totatieukocytes count, serum glucose (FBS/RBS), glycosylated haemoglobin (HbA 1 c); blood urea, serum creatinine, serum electrolytes and co-morbid conditions. In the present study, in-hospital mortality was the main outcome to be studied. Factors associated with prolonged hospital stay will also be studied. Early detection of these predictors and timely addressing them will aid in reduced hospitalization, morbidity and mortality.

MATERIAL AND METHODS

This study was hospital based descriptive case series carried out at the department of Medicine Hayatabad Medical Complex, Peshawar. The study duration was six months from December 2020 to June 2021. The hospital research and ethical committee approve our study. A consent form was signed from the included patients. The criteria for inclusion in our study were patients of both the sex having age ranged from 18-65 years with known history of diabetes or Fasting blood glucose > 126n-1g/di or Random blood glucose level > 200 mg/dl within 12 hours of admission and fulfill the operational definition of pneumonia. The criteria for exclusion in our study were patients with antibiotics initiated for respiratory symptoms within 3 weeks prior to reference hospital admission, patients with ICU care within 12 hours of admission following reference hospital admission, patient who left the hospital against the medical advice, patients suspected for Aspiration pneumonia, patients with history of Pulmonary tuberculosis within one year prior to admission, patients with history of organ transplantation and patients with history of tracheostomy and AIDS. Based on inclusion and exclusion criteria, 150 patients were included in this study. At the time of initial evaluation, the selected patients were observed for a complete clinical history followed by a focused examination. Patients were assessed for the need for ICU referral. All the relevant investigation (CBC/ Blood urea/ Serum creatinine/ Serum electrolytes/ RBS or FBS/ OCR/ HbAlc) were done in the hospital laboratory on routine basis for all in-patients. Patients were divided into survivors and expired. All the data were presented in the form of tables and figures. All information obtained from laboratory reports and demographic data including name, age, sex, co-morbidity were recorded in pre-designed questionnaire. Data entry and analysis were done through Statistical package for social sciences (SPSS) verion20.0. Mean (SD) were calculated for quantitative variables and for categorical variables frequency and percentages were calculated.

RESULTS

The total patients included in our study were 150. 96(64.0%) patients were male while 54(36.0%) patients were female. On the basis of age wise distribution the number of patients in age group 18-30 years were 41(27.3%), 32(21.3%) in age group 31-40 years, 32(21.3%) in age group 41-50 years, 15(10.0%) in age group 51-60 yaers and 30(20.0%) patients were in the age group 61-65 years. (Table 1) On the basis of comorbidities, Hypertension was observed in 95(63.3%) patients, ischemic heart disease was observed in 49 (32.7%) patients and chronic kidney disease was observed in 6(4.0%) patients. (Figure 1)

Based on distribution of predictors, total leukocytes count greater than 12000 or less than 4000 was observed in 37(24.7%) patients, FBS equal to or greater than 126mg/d1 and RBS equal to or greater than 200mg/d1 was observed in 20(13.3%) patients, HbAl c greater than 6.5% was observed in 32(21.3%) patients, blood urea greater than 40mg/d1 in 15(10.0%) patients, serum creatinine greater than 1.2mg,/d1 in 20(13.3%) patients while serum sodium less than 130mEq/L was observed in 26(17.3%) patients. (Table 2) Based on outcomes, expired, survived and prolonged stay in hospital was observed in 67(44.7%), 48(32.0%) and 35(23.3%) patients respectively. (Figure 2)

Table 1: Demographic features of the patients

Parameter	Sub category	Frequency (%)
Age	18-30 Years	41 (27.3%)
	31-40 Years	32 (21.3%)
	41-50 Years	32 (21.3%)
	51-60 Years	15 (10.0%)
	61- 65 Years	30 (20.0%)
Gender	Male	96 (64.0%)
	Female	54 (36.0%)

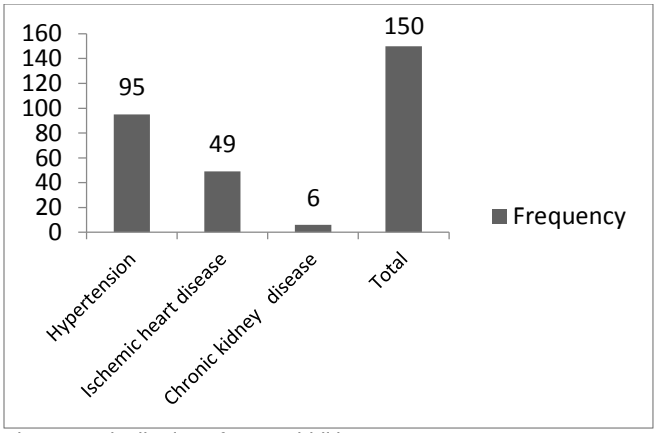

Figure 1: Distribution of co-morbidities

Table 2: Distribution of predictors

Predictors	Frequency (%)
Total leukocytes count greater than 12000 or less than 4000	37 (24.7%)
FBS equal to or greater than 126mg/d1 and RBS equal to or greater than 200mg/d1	20 (13.3%)
HbAl c greater than 6.5%	32 (21.3%)
Blood urea greater than 40mg/d1	15 (10.0%)
Serum creatinine greater than 1.2mg,/d1	20 (13.3%)
Serum sodium less than 130mEq/L	26 (17.3%)

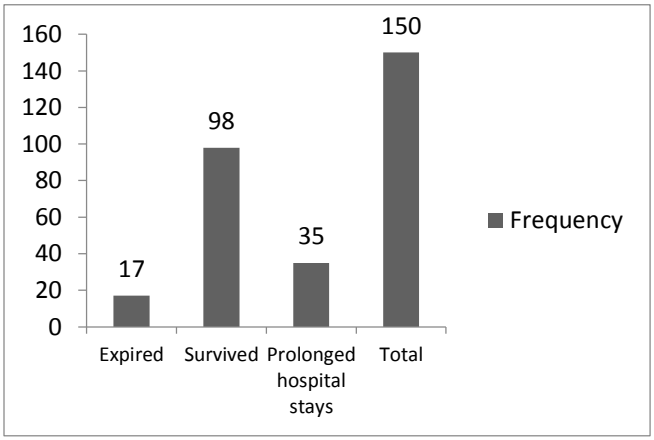

Figure 2: Distribution of outcome

DISCUSSION

Diabetes mellitus is also known as that of an isolated risk factor for developing infections of respiratory tract. Diabetic patients are predisposed to colonization and pneumonia. They are more likely to develop complications including

sepsis/ bacteremia, lung abscess and recurrent pneumonia [10].

Multiple studies had been done which show impact of hyperglycemia on the clinical outcome of CAP, newly diagnosis of diabetes in patients admitted with CAP and mortality within 30 to 90 days of hospital discharge [11]. As prevalence of both diabetes and community acquired pneumonia is high, we examine the predictors of in-hospital mortality in patients presenting with CAP in diabetes mellitus. During the pneumonia episode, our study reported that individuals with DM did not display several of the usual clinical characteristics. The clinical manifestation of CAP has not been recorded in prior studies concerned with diabetes and pneumonia. Patients with diabetes mellitus (DM) are less likely to develop the characteristic clinical triad of cough, sputum, and pleuritic chest discomfort associated with bacterial pneumonia than those without diabetes. Coughing and expectoration are less common in people who have diabetes. This could be because of the problems in pulmonary host defense that come with diabetes, which makes the lungs less able to fight off infections [7, 12, 13]. Due to the lower incidence of pleural effusion, pleuritic chest discomfort is less prevalent. Pleuritic discomfort, even in the absence of a pleural effusion on a chest radiograph, is the most common clinical consequence of inflammatory fluid in the pleural space [10]. In this respect, the fact that individuals with DM were less likely than other patients to experience pleuritic pain might indicate that these patients had a weak inflammatory response.

In our study, on the basis of comorbidities, Hypertension was observed in 95(63.3%) patients, ischemic heart disease was observed in 49 (32.7%) patients and chronic kidney disease was observed in 6(4.0%) patients. Cardiovascular events have been identified in a large proportion of individuals with CAP in earlier studies [14-18]. However, there is little evidence available on which individuals are at greater risk of cardiac problems, although Perry et al did find a link between diabetes and the assessment of heart failure in the situation of pneumonia [14]. End-organ damage caused by diabetes mellitus should be taken into consideration by clinicians when treating individuals with pneumonia who are more likely to have complications. It is thus necessary to determine the best ways for reducing morbidity and mortality related with cardiac disease during pneumonia treatment. In our study, based on distribution of predictors, total leukocytes count greater than 12000 or less than 4000 was observed in 37(24.7%) patients, FBS equal to or greater than 126mg/d1 and RBS equal to or greater than 200mg/d1 was observed in 20(13.3%) patients, HbAl c greater than 6.5% was observed in 32(21.3%) patients, blood urea greater than 40mg/d1 in 15(10.0%) patients, serum creatinine greater than 1.2mg,/d1 in 20(13.3%) patients while serum sodium less than 130mEq/L was observed in 26(17.3%) patients. A previous study also reported comparable predictors [19].

In our study, based on outcomes, expired, survived and prolonged stay in hospital was observed in 67(44.7%), 48(32.0%) and 35(23.3%) patients respectively. Previous studies reported comparable results [11, 20]. The mortality risk factors in our patients with diabetes mellitus and pneumonia are comparable to those described in earlier studies including individuals with CAP [21, 22].

CONCLUSION

Our study concludes that diabetic patients with community acquired pneumonia have unique clinical features. The major predictors of diabetic patients with community acquired pneumonia were total leukocytes count, FBS, RBS, HbAl c, blood urea, serum creatinine and serum sodium. High mortality rate was observed in our study.

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