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ORIGINAL ARTICLE

STUDY OF CLINICAL, RADIOLOGICAL AND BACTERIOLOGICAL PROFILE OF COMMUNITY ACQUIRED PNEUMONIA AND ASSESSMENT OF SEVERITY IN DIABETIC AND NON-DIABETIC PATIENT

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ABSTRACT:
Patients with diabetes are immune compromised. It has been suggested that diabetes mellitus is associated with an increased susceptibility to infections, therisk of using more aggressive therapeutic agents and increased mortality and morbidity; however, current evidence supporting these events in the field of pneumonia is scarce. The aim of the present study is to provide information on clinical and microbiological characteristics and the outcome of pneumonia in patients with diabetes mellitus.This prospective comparative study included 50 patients with proper written consent. The clinical profile, radiological features, and bacteriological profile of CAP in diabetic and non-diabetic patients was studied and compared. The severity was assessed by CURB-65 severity scoring system in CAP in diabetic and non-diabetic patients and outcome was measured. Patient below 18years of age, patient with hospital acquired pneumonia, ventilator associated pneumonia, tuberculosis lung malignancies, opportunistic infections were excluded.In this study total 25 diabetic and 25 non-diabetic patients with CAP were enrolled.Out of the 50 patients studied patients with diabetes were significantly associated with multi-lobar involvement (P=0.045*), prolonged duration of hospital stay (P = <0.001**), more severe at presentation in form of increased CURB-65 score (P = 0.004**) and more ICU admissions. By contrast, there was no significant difference in age, sex, concomitant underlying illness, complications, mortality. In the sub group of patients with diabetes, mortality was associated with multi-lobar infiltrate, concomitant illness, high CURB-65 score.Pulmonary complications were relatively more in diabetics then in non-diabetics. Hospitalised diabetics with CAP required referral to intensive care unit more than that of non-diabetics. Hence diabetic patients with CAP need extra attention.

Key words: CAP, CURB-65, diabetes.

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INTRODUCTION:

Pneumonia defines as, "This is an acute inflammation of the pulmonary parenchyma that can be caused by various infective and non infective origin."It has been reported that some co-morbidities can influence the spectrum of causative agents, facilitating unusual and more aggressive microorganisms; alternatively, habitual pathogens could show particular patterns of antimicrobial resistance. Diabetes mellitus is a very prevalent chronic metabolic disorder that is present in about 5 to 10% population. Several aspects of immunity, such as polymorphonuclear leukocyte function i.e. leukocyte adherence, chemo taxis and phagocytes and bactericidal activity of serum are depressed in patients with diabetes. In consequence, some specific infections are very common in these patients, while other occur with severity or are associated with an increased risk of complications. For patient with pneumonia, diabetes mellitus is also one of the most common underlying diseases;however, it remain uncertain as to whether pneumonia shows particular clinical manifestation, increase morbidity or mortality or involves a predisposition for more aggressive agents in patients with diabetes.Community Acquired Pneumonia represents significant therapeutics challenge to physicians, as they have to decide whether the patient is to be treated in a clinic or in a hospital setting/ICU. Therefore, it is vital to assess the severity of the disease. Such assessment forms a starting point in the management algorithm and helps in achieving favorable patient outcomes. In CAP patient it is vital to assess the severity of the disease. For such assessment CURB-65 criteria are easily remembered, but they have not been studied as extensively. In this study the objectives are:

MATERIAL & METHODS:

A total of 50 patients (25 Community acquired pneumonia cases in diabetics and 25 Community

acquired pneumonia cases in non-diabetics) admitted to ward and ICU meeting the inclusion criteria, irrespective of sex are studied.Patients under 18 years and of age, patients with hospital-acquired pneumonia, aspiration pneumonia, with ventilator associated pneumonia, with pulmonary tuberculosis, having opportunistic infections and with Lung malignancies were excluded. Community acquired pneumonia will be defined and diagnosed by the presence of an acute illness with features of lower respiratory tract infection ,with two or more of the following signs and symptoms: **i]** fever; **ii]** new or increasing cough or sputum production; **iii]** dyspnea; **iv]** chest pain; **v]** new focal signs on chest examination; **vi]** and presence of a consolidation in the chest radiograph that was consistent with acute infections.All patients will be screened for Diabetes mellitus. Diabetes mellitus will be diagnosed by; fasting blood sugar(FBS) ≥ 126 and postprandial blood sugar(PLBS) ≥ 200. Sample for laboratory investigations like Haemoglobin, total count, differential count, erythrocyte sedimentation rate, blood urea nitrogen, creatinine, random blood sugar, fasting blood sugars, postprandial blood sugars, glycated haemoglobin, serum electrolyte and urine for albumin were obtained and sent to laboratory. Urine routine and microscopy was done in all the patients on admission. In all the patients chest x-ray PA view was taken on admission and 7 days after the antibiotic therapy. In few patients chest x-ray lateral view was also taken. HRCT of chest was also done in some of the cases. Sputum was collected in a wide mouth container, for bacteriological examination after rinsing the mouth with saline and all efforts were made to obtain sputum at the time of initial clinical evaluation and before the institution of antibiotic therapy or within 24 hours of admission. In patients who could not expectorate sputum spontaneously, sputum was induced by nebulisation with 3% hypertonic saline and subjected for following tests. Sputum was examined macroscopically with respect to quantity, colour, odour and evidence of haemoptysis. All sputum smears were stained with Gram's stain. Based on the results of gram staining each sample was labelled as appropriate or inappropriate. Those smears which showed more than 25 polymorphs per low power field and less than 10 squamous epithelial cells per low power field (total magnification ×100) was considered as appropriate sample and others as inappropriate and was subjected to Gram's staining using Ruhland's modification.2 early morning sputum sample where collected for 2 consecutive days and send for staining for acid fast bacilli by Ziehl-Neelsen (ZN) stain. The purulent portion of the sputum was inoculated on blood agar, Mac Conkey's agar medium at 37^0C for up to 48 hours. Positive growth was identified by colony characteristics. And antimicrobial susceptibility pattern was determined by disc diffusion (Kirby- Bauer) method if culture was positive. The investigations will be repeated as and when necessary. Objective of this study are to study and compare the clinical profile, radiological features and bacteriological profile of community acquired pneumonia in diabetic and non-diabetic patients, assess the severity by CURB-65 severity scoring system in community acquired pneumonia in diabetic & non-diabetic patients, and to measure the outcome of patients of community acquired pneumonia.Each patients will be evaluated by CURB-65 criteria to assess the severity of illness.

Assigning scores for curb-65 Rule

Clinical Factor	Points
C- Confusion	1
U- Blood urea nitrogen > or = 20 mg/dL	1
R- Respiratory rate > or = 30 breaths/min	1
B- Systolic Blood pressure (SBP) < 90 mm Hg or Diastolic Blood pressure (DBP) < or = 60 mm Hg	1
65- Age > or = 65	1

RESULTS:

Parametric data were expressed in mean±SD. Parametric data were evaluated by independent sample "t" test & categorical data were evaluated by Chi-squre test as needed. Level of significance for all analytical test was set as 0.05 & p=≤0.05 is considered significant.

Clinical-demographic presentation*:* Total 50 patients with CAP were studied over a period of 2 yrears. Among them 25 were diabetic and 25 were non-diabetic. Mean age (±SD) of the diabetic and non diabetic groups were 57.1 (±9.9) years and 58.8(±9.9) years respectively. In both groups male patients (52% in diabetic group and 56% in non-diabetic group) are slightly more compare to female patient, it is not significant. In both groups, majority of the patients presented with fever, cough and expectoration. Around half of patients had breathlessness. Some of the patients had presented with chest pain. Only one patient of each grouppresented with haemoptysis. Oncomparison of concomitant underlying illness between two groups, IHD and COPD was more common underlying illness.

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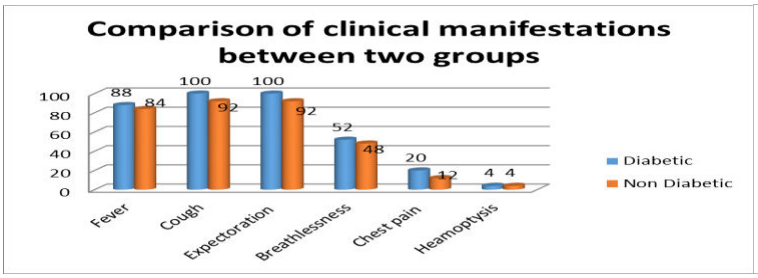
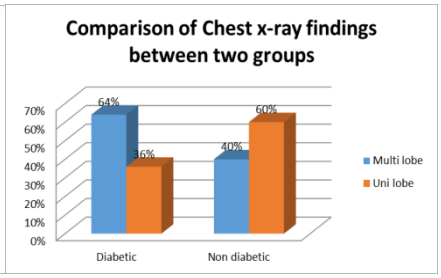
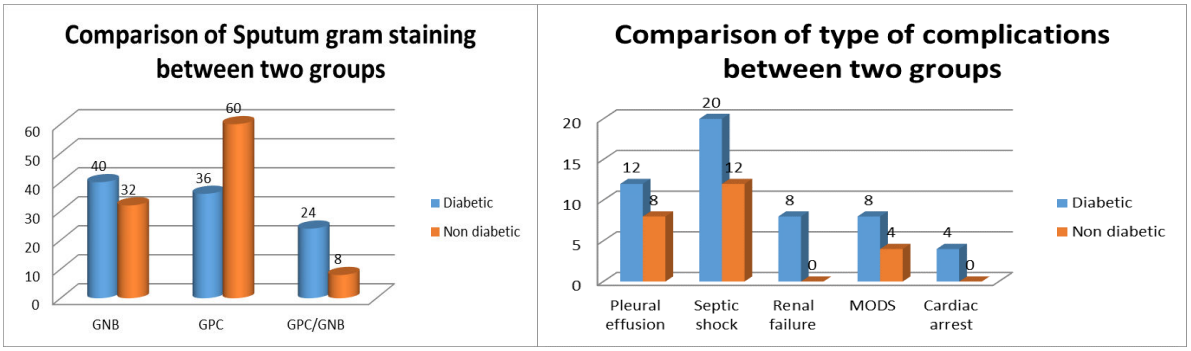
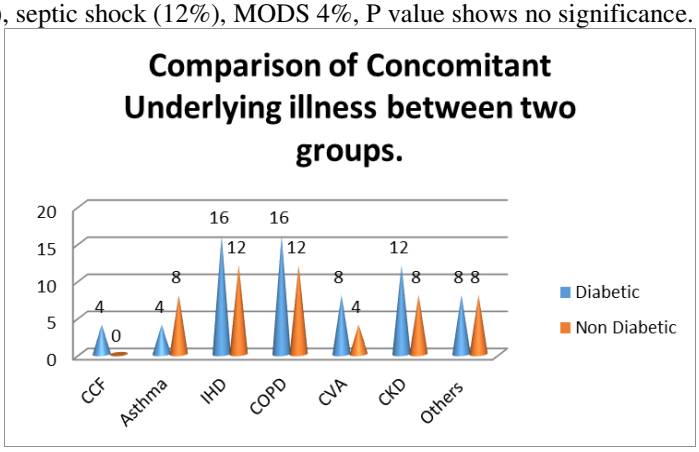




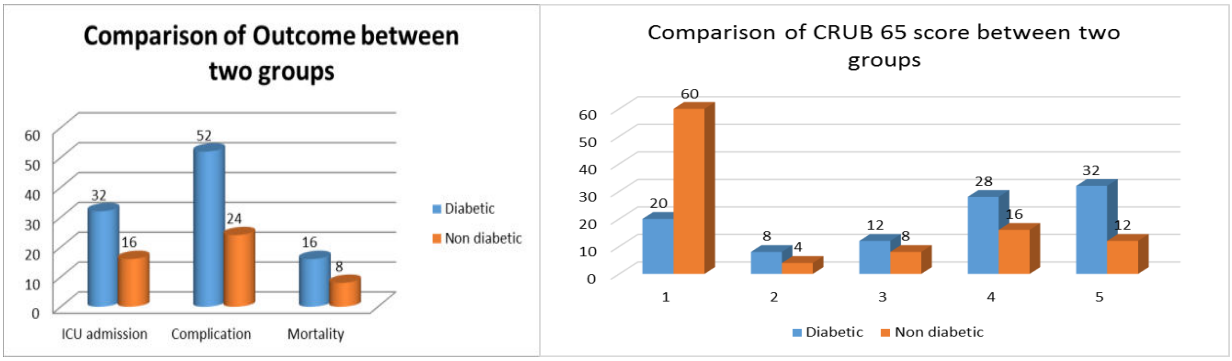
There was no statically significant difference of habits (smoking and alcohol intake) between two groups. The average hemoglobin% in non-diabetics was 12.81±1.80 and in diabetics 10.90±1.55. There was statistically highly significant difference (P=0.001**) between two groups, as many patients in diabetic group were anemic. The total count and ESR are significantly high in Diabetic compared to non Diabetic. The BUN and creatinine are also more in diabetic but which were statistically not significant. Renal failure in diabetic group was either a consequence of sepsis or diabetic nephropathy. Among diabetic 64% had multi-lobe involved and 36% had unilateral lobe involved. And among non diabetic 40% had multi-lobe involved and 60% had unilateral lobe involved.

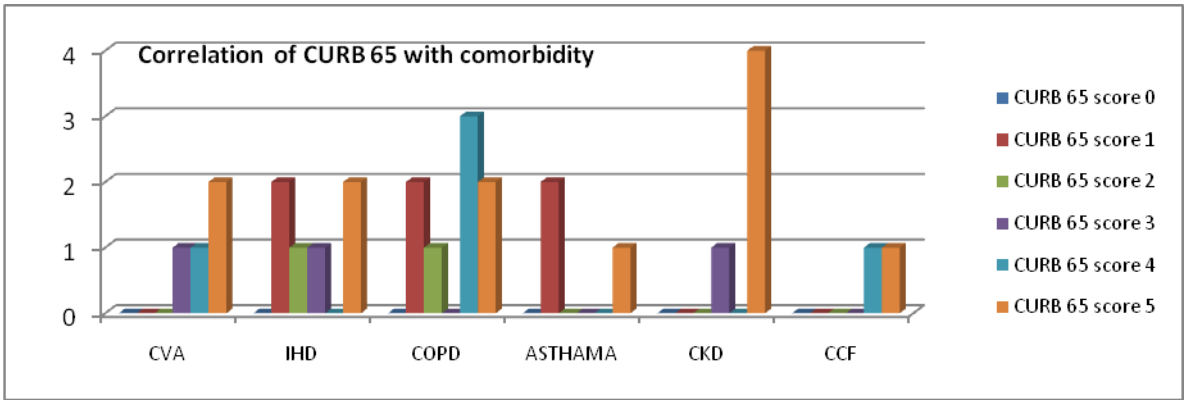


On Gram staining, Gram positive cocci were more in non diabetic in comparison with diabetic (60% vs. 36%) . Gram negative bacteria were more in non diabetic in comparison with diabetic (40% vs. 32%). And ratio was more in diabetic than non diabetic, P value shows no significance. The common organisms on sputum culture in non diabetics were Strep pneumonia (40%), *Stap. auerus* (20.0%), *Klebsiella* (12%). In diabetics, *Strep. pneumonia* (28%), *Klebsiella*(16%), Polymicrobial (24%). There was no any significance present for any organism in both the groups. ICU admission and complications were more in diabetics. More number of mortalities were in diabetic (16%) in comparison with non diabetic (6%). The duration of hospital stay was significantly more (P=0.001**) in diabetic (13.28±3) in comparison with non diabetic (10.36±2.51).The complications in diabetic group were pleural effusion (12%), septic shock (20%), renal failure (8%), MODS (8%), and cardiac arrest (4%). In comparison with non diabetic were pleural effusion (8 %), septic shock (12%), MODS 4%, P value shows no significance.



Patients in diabetic group were significantly more among score 4 and 5 in comparison with non diabetic who were predominantly among score 1. Patient with CURB 65 score of 5 had mortality in both the groups. Mortality is more in DM group (6% Vs. 8%) than the non-DM group.





DISCUSSION:

Among the Diabetic majority 56% were <60 years and among non diabetic group majority 60% were <60years. Miquel et al has reported that patients with diabetes were significantly older with average age of 62 yrs. Akbar DH has also reported a higher age incidence. Study by Saibal et alshowed that mean age among cases was 56.3±12.2years and among controls 35.7±10.5. Between two groups, IHD and COPD was more common underlying illness. Miquel et al reported that 56% of patients with diabetes had concomitant underlying disease along with diabetes. Among diabetic 64% had multi-lobe involved and 36% had unilateral lobe involved and among non diabetic 40% had multi-lobe involved and 60% had unilateral lobe involved.Saibal et al showed that on comparison of Chest X-ray (CXR) revealed thatunilateral lobe infiltration was more common in non-diabetic patients.In present study the common organisms on sputum culture in non diabetics were *Strep pneumonia (40%), Stap auerus (20.0%), Klebsiella (12%)*. In diabetics, *Strep pneumonia (28%), Klebsiella* (16%), Polymicrobial (24%). Miquel et al has reported that there was no significant difference in microbiological results in patients with diabetes and non diabetes.[41] Spomenka et al reported that *Staph. auerus* and Gram negative organisms such as *Klebsiell, E. coli*, Enterobacter, Pseudomonas and Acinectobacter are common organisms in diabetes. Palmar DL reported that Gram positive cocci such as Strep. pneumonia are responsible for majority of infections in diabetic patients, followed by agents such as *H. influenza*.Saibal et alshowed that *Klebsiella pneumonia* was the most commonly isolated organism from sputum sample. It is followed by *Streptococcus pneumoniae*, *Staphylococcus aureus*, *E. coli* and *Pseudomonas aeruginosa.* ICU admission and complications were more in diabetics. More number of mortalities were in diabetic (16%) in comparison with non diabetic (6%). The duration of hospital stay was significantly more (P=0.001**) in diabetic (13.28±3) in comparison with non diabetic (10.36±2.51). Miquel et al reported that duration of stay was more in diabetics in comparison with non-diabetics. Miquel et al reported that mortality was more common in diabetic patients which was statistically significant. Akbar DH reported that there was no significant difference in mortality between both the groups. Saibal et al showed the mean duration of hospital stay of two groups of patients. It was observed that mean duration of hospital stay was higher in diabetic group than in non-diabetic group, which was statistically significant (P<0.05). Outcome was observed that in terms of improvement, 15(31.9%) and 30(69.8%) patients improved in diabetic group and non-diabetic group respectively. The complications in diabetic group were pleural effusion (12%), septic shock (20%), renal failure (8%), MODS (8%), and cardiac arrest (4%). In comparison with non diabetic were pleural effusion (8 %), septic shock (12%), MODS 4%. P value shows no significance . Koziel H et al reported that the most common complications of pneumonia in diabetics were pleural effusion, empyema and bacteremia.Miquel et al reported that pleural effusion was significantly more in diabetic patients and there was difference between other risk factors.Study by Saibal et al showed that on clinical examination pleural effusion was found in most of the diabetic patients (83.0%).

CONCLUSION:

In patients with pneumonia, Diabetes Mellitus is associated with poor prognosis, polymicrobial etiology, multi-lobe involvement, increased requirement of intensive care (ICU admissions), increased severity in the form of higher CURB 65 score, increased duration of hospital stay and mortality. This study suggests that this adverse outcome is more attributable to the underlying circumstances of patients and uncommon microbiological findings. Certainly, age, prior co morbidities, as well as multi-lobe infiltrates have already been related to poor prognosis; however, in this study, diabetes also remained a significant prognostic factor of mortality in patients with pneumonia.

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