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Research Article

Clinical Characteristics Patients Pneumonia with Diabetes Mellitus at General Hospital Jakarta, Indonesia

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Abstract

Background: Respiratory diseases are currently a worldwide concern, especially in Indonesia due to the increasing mortality such as pneumonia. Pneumonia is an infectious disease of the respiratory tract of the lower part that has inflammation of the pulmonary parenchyma, distal from the terminalis bronchioles. Risk factors for pneumonia include comorbidities. Comorbidities are often found in pneumonia patients, one of which is diabetes mellitus. The purpose of this study was to investigate the prevalence and relationship of clinical characteristics of pneumonia patients with diabetes mellitus. This study was a retrospective observational cohort study on pneumonia patients with diabetes mellitus between June 2020 and June 2021 at a general hospital in Jakarta. Univariate and multivariate analyzes were performed to examine the relationship between the clinical characteristics of patients with diabetes mellitus. **The results**: This study obtained 66 patients. Clinical features of pneumonia patients with diabetes mellitus were characterized by cough and shortness of breath in 52 patients (78.79%) accompanied by fever in 35 patients (53.03%). The results of the chi-square test obtained *P*=0.002, based on the value obtained there was a significant relationship between the clinical characteristics of pneumonia patients with diabetes mellitus. **The conclusion:** There was a relationship between clinical characteristics of pneumonia patients with diabetes mellitus.

Keywords*:* Pneumonia, Diabetes Mellitus, Comorbidities, Clinical Characteristics.

INTRODUCTION

Pneumonia is an acute respiratory infection that occurs in the lung parenchyma, distal to the terminal bronchioles, which includes the respiratory bronchioles, and is accompanied by the consolidation of lung tissue. Lower respiratory tract infections caused the highest mortality occurring largely in patients requiring hospitalization[1].

In western countries, pneumonia overall is the sixth leading cause of death[2]. In the United States, pneumonia causes death at a rate of 16.1 per 100,000 populations[3]. A study in Germany stated that the incidence of hospitalized patients was 2.96 per 1000 population with an incidence rate of 7.65 per 1000 population in patients over 60 years[4]. Various epidemiological studies have also reported an annual incidence of community pneumonia of 5-11 people per 1000 population with the number increasing in elderly patients[5]. Research that has been done by Sato et al related to financing showed that the costs incurred for community pneumonia treatment are high according to increasing age or the presence of comorbidities that accompany patients with pneumonia[6]. Pneumonia infections can occur due to several factors, namely age, gender, an impaired immune function such as HIV (Human Immunodeficiency Virus), comorbidities, malnutrition, prolonged hospital stay, and chronic obstructive pulmonary disease[7].

Comorbidity is a condition of the presence of other diseases that are experienced together with the main disease. The most common comorbidities in pneumonia patients are hypertension, neuromuscular disease, kidney failure, diabetes mellitus, head injury, and Chronic Obstructive Pulmonary Disease (COPD)[8]. Comorbidities such as diabetes mellitus cause disruption of the body's immune system and are a predisposing factor for various infectious diseases including pneumonia[9].

Unfortunately, the information available on the clinical characteristics of pneumonia patients with diabetes mellitus is limited. In particular, we were aware of the lack of data regarding the analysis of the association of clinical characteristics of pneumonia patients with diabetes mellitus. Therefore, we analyzed the clinical findings and outcomes of clinical characteristics in pneumonia patients with diabetes mellitus. The key question discussed in this study is whether there was a relationship between the clinical characteristics of hospitalized pneumonia patients and diabetes mellitus.

METHODS

Patients

All patients in this study were hospitalized at the general hospital in Jakarta, Indonesia, from June 2020 to June 2021. The patients were all admitted to the hospital because they were infected with pneumonia with diabetes mellitus and suffered from various symptoms, age 17 - 70 years, every patient had completed the relevant laboratory examinations and complete medical record data entered the inclusion criteria. Patients were infected with diseases other than

pneumonia, and patients who did not have complete data were excluded.

Data collection and Statistical Analysis

In this study, data were collected through patient medical records suffering from pneumonia with accompanying diabetes mellitus entered the inclusion criteria from June 2020 to June 2021. The data processing was carried out using statistical software SPSS v25.0. The normality of the distributions of variables was assessed by Kolmogorov-Smirnov and the Shapiro-Wilk tests. The Chi-Square test to see the relationship between the clinical characteristics of patients of pneumonia with diabetes mellitus. $P<0.05$ was considered significant.

RESULT

Table 1: Characteristics of patients pneumonia with diabetes mellitus

Variable	Normal range	n=66	Percentage
Age			
17 - 25		0	0.00%
26 - 35		2	3.03%
36 - 45		9	13.64%
46 - 55		8	12.12%
56-65		11	16.67%
>65		36	54.54%
Sex			
Men		46	69.70%
Female		20	30.30%
Fever ≥37,5		35	40.91%
Dyspnoea		52	78.79%
Cough		52	78.79%
Oxygen saturation			
Normal	95–100%	56	84.85%
Abnormal	< 90%	10	15.15%
Breath Rate/min			
Bradipnea	≤ 12x/menit	0	0.00%
Normal	14–20x/menit	23	34.85%
Takipnea	≥ 20x/menit	43	65.15%

Based on the results of research conducted at the general hospital Jakarta from medical records of pneumonia patients with diabetes mellitus from June 2020 - June 2021, the number of pneumonia patients with diabetes mellitus obtained from this study was 66 patients. Based on the data in Table 1, patients who dominate pneumonia with diabetes mellitus were at the age over 65 years as many as 36 patients (54.54%). Based on gender, men were 46 patients (69.70%) and women were 20 patients (30.30%). Based on the results of the data above, the highest number of gender in pneumonia patients was men. The clinical characteristics that were often found in hospitalized pneumonia patients were cough and shortness of breath, which are known in 52 patients (78.79%), and accompanied by fever in 35 patients (53.03%).

Table 2: Results of examination of the blood sugar profile of patients

Indicator	N = 66	Presents
FBS (Fasting blood sugar)		
≤200 mg/dl	27	40.91%
≥200 mg/dl	39	59.09%
HbA1c (Haemoglobin A1c)		
<6,5	6	9.09%
≥6,5	60	90.91%

From the data obtained in Table 2, the results of the examination of blood glucose profiles in hospitalized pneumonia patients which is a parameter in diagnosing diabetes mellitus showed the value of Current Blood Sugar (≥ 200 mg/dl) with the highest patient being 39 patients (59.09%), the HbA1c value (≥ 6.5) with the highest number of patients was 60 patients (90.91%). Based on the results of the Kolmogorov-Smirnova normality test, the relationship of diabetes mellitus with clinical characteristics of pneumonia patients showed that the data were not normally distributed because the variable results of the Diabetes Mellitus laboratory examination had a P value <0.05. For this reason, a non-parametric test is carried out, namely the chi-square test. From the results of the statistical analysis of the chi-square test, the P value = 0.002. based on the values obtained, there was a significant relationship between the clinical characteristics of pneumonia patients with diabetes mellitus at a general hospital in Jakarta for the period June 2020 - June 2021.

DISCUSSION

Based on the results of the data above, The most common age group in our study was the age over 65 years. Old age is associated with a large number of changes in decreased immune function. This is a very high risk of disease. Humans experience physiological decline after the age of 40 years. One of several studies conducted by Chapman et al found that people over 65 years of age get sick more than 915,000 times each year in the US. They claim that age is one of the important factors for the development of pneumonia[10]. Diabetes mellitus often appears after humans enter the vulnerable age. As you get older, the risk of suffering from diabetes mellitus will increase. Diabetes mellitus is one of the comorbid diseases that can affect pneumonia[11,12]. The characteristics of patients with pneumonia based on gender were more in men than women. Pneumonia is more common in men, this happens because the diameter of the respiratory tract in men are smaller than in women and there is a differences in the immune system of men and women[13]. Kautzky et al in their study found that there were more men than women and the ratio is higher in favor of men 1.5:1[14]. Clinical characteristics that are often found in pneumonia patients with diabetes mellitus as a result of our research were cough, shortness of breath, accompanied by fever. Long et al in their study found the percentage of pneumonia patients was dominated by shortness of breath (79.8%), cough (72.1%), and fever (66.9%). The dominance of pneumonia is characterized by shortness of breath, because the respiratory rate is >30x/minute and oxygen saturation is <90%[15]. Increased blood glucose levels in patients can occur due to several factors such as increasing age, a history of diabetes mellitus, an unhealthy lifestyle, and the main disease[16]. HbA1c is a substance formed from the reaction between glucose and hemoglobin. The higher the blood sugar level, the more hemoglobin molecules are associated with sugar. The HbA1c examination is carried out to control the

sugar levels of patients with diabetes mellitus so that blood sugar levels can be controlled properly, compared with not having diabetes, having diabetes in combination with a 9% HbA1c level was associated with a 60% increased risk of pneumonia-related hospitalization and having diabetes in combination with a 7% HbA1c level was associated with a 22% increased risk[17,18,19]. When analysing the relationship between diabetes mellitus with clinical characteristics of pneumonia patients, there was a significant relationship between the clinical characteristics of pneumonia patients with diabetes mellitus. This is comparable to a study conducted by Hirata et al found a relationship between the incidence of death in pneumonia patients and the presence of diabetes melitus[19].

CONCLUSION

Based on the research, it can be concluded that the prevalence of pneumonia patients with diabetes mellitus was 66 patients. From the statistical analysis, the chi-square test showed a significant relationship between the clinical characteristics of pneumonia and diabetes mellitus.

CONFLICT OF INTEREST

All authors have nothing to declare.

REFERENCES

1. Raghu G, Meyer KC. Cryptogenic organising pneumonia: Current understanding of an enigmatic lung disease. European Respiratory Review. 2021; 30(161). https://doi.org/10.1183/16000617.0094-2021

2. Kochanek KD, Sherry MA;, Murphy L, Xu J. National Vital Statistics Reports, 2015; 63(3):2011. http://www.cdc.gov/nchs/deaths.htm.

3. Brar NK, Niederman MS. Management of community-acquired pneumonia: A review and update. Ther Adv Respir Dis. 2011; 5(1):61-78. https://doi.org/10.1177/1753465810381518

4. Ewig S, Birkner N, Strauss R, et al. New perspectives on community-acquired pneumonia in 388 406 patients. Results from a nationwide mandatory performance measurement programme in healthcare quality. Thorax. 2009; 64(12):1062-1069. https://doi.org/10.1136/thx.2008.109785

5. Eccles S, Pincus C, Higgins B, et al. Diagnosis and management of community and hospital acquired pneumonia in adults: Summary of NICE guidance. The BMJ. 2014; 349. https://doi.org/10.1136/bmj.g6722

6. Sato R, Gomez Rey G, Nelson S, Pinsky B. Community-acquired pneumonia episode costs by age and risk in commercially insured US adults aged ≥50 years. Appl Health Econ Health Policy. 2013; 11(3):251-258. https://doi.org/10.1007/s40258-013-0026-0

7. Holter JC, Ueland T, Jenum PA, et al. Risk factors for long-term mortality after hospitalization for community-acquired pneumonia: a 5-year prospective follow-up study. PLoS One. 2016; 11(2). https://doi.org/10.1371/journal.pone.014874

8. Antoni T, Blasi F, Dartois N, Akova M. Which individuals are at increased risk of pneumococcal disease and why? Impact of COPD, asthma, smoking, diabetes, and/or chronic heart disease on community-acquired pneumonia and invasive pneumococcal disease. Thorax. 2015; 70(10):984-989. https://doi.org/10.1136/thoraxjnl-2015-206780

9. Fulop T, Witkowski JM, Pawelec G, Alan C, Larbi A. On the immunological theory of aging. In: Aging: Facts and Theories. Vol 39. S. Karger AG; 2014; 39:163-176. https://doi.org/10.1159/000358904

10. Chapman SW, Bradsher RW, Campbell GD, Pappas PG, Kauffman CA. Practice Guidelines for the Management of Patients with Blastomycosis. https://academic.oup.com/cid/article/30/4/679/421475 https://doi.org/10.1086/313750

11. Khan MAB, Hashim MJ, King JK, Govender RD, Mustafa H, Kaabi J al. Epidemiology of Type 2 diabetes - Global burden of disease and forecasted trends. J Epidemiol Glob Health. 2020; 10(1):107-111. https://doi.org/10.2991/jegh.k.191028.001

12. Ishiguro T, Takayanagi N, Yamaguchi S, et al. Etiology and factors contributing to the severity and mortality of community-acquired pneumonia. Internal Medicine. 2013; 52(3):317-324. https://doi.org/10.2169/internalmedicine.52.8830

13. Biscevic-Tokic J, Tokic N, Musanovic A. Pneumonia as the most common lower respiratory tract infection. Med Arch. 2013; 67(6):442-445. https://doi.org/10.5455/medarh.2013.67.442-445

14. Kautzky-Willer A, Harreiter J, Pacini G. Sex and gender differences in risk, pathophysiology and complications of type 2 diabetes mellitus. Endocr Rev. 2016; 37(3):278-316. https://doi.org/10.1210/er.2015-1137

15. Long B, Long D, Koyfman A. Emergency Medicine Evaluation of Community-Acquired Pneumonia: History, Examination, Imaging and Laboratory Assessment, and Risk Scores. Journal of Emergency Medicine. 2017; 53(5):642-652. https://doi.org/10.1016/j.jemermed.2017.05.035

16. Mohamed SA. Effect of lifestyle intervention on health behaviors, weight and blood glucose level among patients with diabetes mellitus. J Nurs Educ Pract. 2014; 4(12). https://doi.org/10.5430/jnep.v4n12p75

17. Ojo O, Wang XH, Ojo OO, Ibe J. The effects of substance abuse on blood glucose parameters in patients with diabetes: A systematic review and meta-analysis. Int J Environ Res Public Health. 2018; 15(12). https://doi.org/10.3390/ijerph15122691

18. Kornum JB, Thomsen RW, Riis A, Lervang HH, Schønheyder HC, Sørensen HT. Diabetes, glycemic control, and risk of hospitalization with pneumonia: A population-based case-control study. Diabetes Care. 2008; 31(8):1541-1545. https://doi.org/10.2337/dc08-0138

19. Hirata Y, Tomioka H, Sekiya R, et al. Association of hyperglycemia on admission and during hospitalization with mortality in diabetic patients admitted for pneumonia. Internal Medicine. 2013; 52(21):2431-2438. https://doi.org/10.2169/internalmedicine.52.9594