Comparisons in hematological characteristics between diabetic and non-diabetic individuals in the Covid-19 cohort

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Abstract
Medical records were retrospectively reviewed onthe clinical, imaging, Patients with confirmed COVID-19 who were hospitalized between March 1, 2020, and April 15, 2020, were studied for clinical and laboratory features. Each patient had a thorough clinical record that included their COVID-19 medical history as well as physical and laboratory exams. Median levels of serum VCM-1 in covid-19 patients with diabetic were higher than in comparison the median levels of covid-19 patients without diabetic, 179.30 (103.24) pg/ml versus 183.75 (124.34) pg/ml, the difference was non-significant (P = 0.302).
Background: COVID-19 , coronavirus, diabetic, serum biochemistry.

Introduction

The COVID-19 pandemic spread from its base in Wuhan, China, to infect approximately 3 million people throughout the world in December 2019, culminating in an excess 200,000 deaths. [1]. SARS.CoV.2 is a coronavirus with an envloped RNA genome which thus outcomes severe acute respiratory syndrome (SARS) [2]. COVID-19-induced negative outcomes and comorbidities are more common in diabetic patients. The COVID-19 pandemic is overlapping with the pre-existing diabetes pandemic, resulting in huge and susceptible populations of COVID-19 and diabetes patients. It also implies that pre-existing problems or pathologies in diabetic individuals may exacerbate the infection's progress. [3] SARS-CoV2 (SevereAcute Respiratory Syndrame Coronavirus-2) is a highly infectiou illness that has spread to over 200 nations throughout the world. SARS-CoV-2 is in respect to all others viruses by the speed with which it spreads, as well as the increased riskof death from acute respiratorydistress syndrome(ARDS) [2]. People with diabetesmellitus (DM), cardiovascular disease, and hypertension aremore prone to become infect with COVID-19 and to die from it. 26.8% of older patients with COVID-19 who are at increased risk of mortality have diabetes. Although the causes of this higher risk are unknown, various variables may play a role in type-2 diabetes patients' greater sensitivity to infections[4]. The defective innateand adaptive immune response, One possible component that may play a role in elevating the risk in people with diabetes and/or obesity is inflammation, which is described as a condition of chronic and low-grade inflammation that can lead to abrupt systemic metabolic alterations. When compared to those who had their blood sugar levels under control,SARS patients who had previously been diagnoses with diabetes or hyperglycemia had greater death and mor-bidity rate[5]. Obese people are also more likely to contract SARS-CoV-2 complications. We will look at current and emerging knowledge about the metabolic impact of coronavirus infections in diabeticand non-diabetic patient in this study. [6]. COVID-19 patients with hyperglycemia had severe clinical issues, more ICU admissions, machine-assisted breathing, and a significant increase in inflammatory markers. Patients with diabetes or hyperglycemia had a two- to four-fold higher risk of death and COVID-19 severity than those without diabetes. The impaired immune response to viral infections is the leading cause of death in COVID-19 individuals with diabetes. Increased blood sugar levels are thought to alter bacterial intracellular breakdown, neutrophil chemotaxis, and phagocytosis, enhancing viral binding affinity and entrance while lowering virus clearance. Furthermore, it has a major impact on proteins by inducing glycosylation and changing complement composition, and glycosylation makes cells more vulnerable to viral inflammation and damage. COVID-19 therapy in diabetic individuals necessitates a multidisciplinary approach to reduce the risk of medical complications and death [5, 7].

Materials and method

Between March 1, 2020, and April 15, 2020, patientswith confirming COVID-19were ademitted to hospital. had their medical records evaluated retrospectively for clinical, radiological, and laboratory features. Each patient had a thorough clinical record that included their COVID-19 medical history as well as physical and laboratory exams. From March 1 to April 15, 2020, all verified COVID-19 diabetic patients who were discharged or died were identified. The people with diabetes in our study had their doctors write

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an unambiguous diagnosis of diabetes in their patient health records. A case-control study was undertaken with two groups of patients: 33 patients with diabetes and covid-19, and 55 patients with covid-19 who were not diabetic. Upon admission, laboratory testing such as standard blood tests, serum biochemistry, and coagulation function were done. A fresh and prolonged (> 48 hours) or increasing infiltrate on the plain radiographs was used to identify breathing machine pneumonia, as were two of the minor criteria mentioned below: a fever of more than 38 degrees Celsius or cold of less than 36 degrees C (VAP).

Results

Although there were no significant variations in baseline values between the two groups, the covid-19 diabetic patients had considerably greater white blood cell and neutrophil counts than the nondiabetic patients, but they also had more severe lymphocytopenia and inflammation (P 0.05). The majority of biochemical indicators did not change significantly between the two groups (P > 0.05). Hyperlactatemia, hyponatremia, and hypocalcemia were all shown to be considerably more common in covid-19 diabetic individuals.

Table (1): Frequency distribution of covid-19 patients with diabetic and covid-19 patients without diabetic according to some variables.

	Case with diabetic – Case without diabetic comparison		
	covid-19 patients with diabeticN=33	covid-19 patients without diabeticn=55	P
White blood cells			
Mean± SD	15.73 ± 3.25	15.7± 3.95	0.962 † NS
Range	10.80 – 23.60	10.44 – 26.20	
SE	0.55	0.528	
Lymphcyte			
Mean± SD	5.64 ± 3.31	6.19 ± 3.66	0.469 † NS
Range	1.10- 13.20	1.10 - 17.20	
SE	0.0.56	0.49	
Hemoglobin			
Mean± SD	12.49 ± 1.63	12.14 ± 1.85	0.373 † NS
Range	7.70 - 16.00	8.10 - 17.70	
SE	0.276	0.247	
AST			
Mean± SD	35.69 ± 12.46	37.785 ± 12.64	0.441 † NS
Range	15.00 - 55.00	13.00 - 59.00	
SE	2.106	1.68	
ALT			
Mean± SD	35.68 ± 13.99	36.46 ± 13.577	0.794 † NS
Range	12.00 - 54.00	10.00 - 58.00	
SE	2.36	1.81	
Ferritin			
Mean± SD	498.92 ± 135.24	483.81 ± 95.208	0.534 † NS
Range	213.40 - 829.80	140.40- 751.00	
SE	22.86	12.72	
D-dimer			
Mean± SD	1183.32 ± 695.766	677.40 ± 413.26	0.039 † S
Range	160.00 - 7622.00	140.40- 3483.00	
SE	286.63	68.58	

n: number of cases; SD: standard deviation; †: independent samples t-test; HS: Highly significant at P ≤ 0.001; NS: not significant at P ≤ 0.05.

The comparison of serum VCM-1 level between covid-19 patients with diabetic and covid-19 patients without diabetic has been carried out and the results were demonstrated in table (1). Median levels of serum VCM-1 in covid-19 patients with diabetic were higher than in comparison the median levels of covid-19 patients without diabetic, 179.30 (103.24) pg/ml versus 183.75 (124.34) pg/ml, the difference was non-significant (P = 0.302).

Table (2): Frequency distribution of covid-19 patients with diabetic and covid-19 patients without diabetic according to level of Serum VCM-1.

	Case with diabetic – Case without diabetic comparison		
VCM-1 (pg/ml)	covid-19 patients with diabetic N=33	covid-19 patients without diabetic n=55	P
Range	112.36 – 562.40	34.66 – 456.00	0. 289 † NS
Median (IQR)	179.30 (103.24)	183.75 (124.34)	

n: number of cases; IQR: inter-quartile range; †: Mann Whitney U test; HS: Highly significant at *P* ≤ 0.001

Discussion

The features ofCOVID-19 patientswith diabetes and patient without diabetes were compare in this study, and risk factors related with in-hospital mortality were discovered. Patientswith diabetes had more underalying comorbidities, were more likely to develop complications, had larger proportion of ICUhospitalizations, and had more fatalities comparedto patients without diabetes who were hospitalized with COVID-19. Fever, cough, and dyspnea were the mostprevalent symptoms of SARS-CoV-2 infection in diabetic individuals. Diabetes, according to a prior study, quadrupled the risk of hospitalization following the H1N1 pandemic and greatly increased the chance of ICU admission and fatality [8]. Patients with diabetes were more likely to have hypertension and cardiovascular disease. Although diabetes was not shown to be an independent cause of mortality in COVID-19 patient in our multivarable analysis, diabetes and other comorbiditie, such as cardiovascular disease and hypertension,were often linked, and their effects could not be separated. Pressure and hyperglycemia frequently cohabit and may collaborate to increase the risk of severe clinical outcomes[9]. During the infection, COVID-19 individuals with T2D had distinct clinical and hematological characteristics. Diabetes mellitus, obesity, and other variables have all been related to an increased risk of death from Coronavirus disease-19 (COVID-19).[5]

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