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Original Research Article

Diabetes and COVID 19: Experience of the Ibn Sina Hospital Rabat

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Abstract

Since the onset of the COVID-19 pandemic, it has become evident that individuals living with diabetes are at a heightened risk of experiencing severe forms of the disease. As such, a retrospective descriptive study was conducted in 236 diabetic patients who were admitted to the Ibn Sina hospital in Rabat due to COVID-19 infection. The study aimed to provide a comprehensive overview of the clinical, biological, radiological, and evolutionary parameters of diabetic patients infected with COVID-19. This article summarizes the results of the study and compares them with existing literature.

Keywords: Diabetes Mellitus, covid 19, metformin, insulin therapy.

INTRODUCTION

The emergence of SARS-CoV-2, the virus responsible for the onset of COVID-19, was first reported in Wuhan, China, in December 2019. Since then, the virus has spread rapidly across the globe, with the WHO declaring a pandemic in March 2020. As a result, numerous publications have been released on the topic, but few have focused on characterizing the phenotypic features of diabetic patients who have been hospitalized with COVID-19. Therefore, we conducted a review of descriptive data on the infection in diabetic patients admitted to our hospital, and subsequently discussed our therapeutic approach.

PATIENTS AND METHODS

We carried out a retroprospective descriptive study, over a period of 7 months, from November 01, 2020 to May 30, 2021.

The inclusion criteria involved hospitalisation for COVID-19 in a dedicated unit, with a confirmed diagnosis through a positive polymerase chain reaction (PCR) test and/or specific radiological signs on chest scan. Known diabetes, noted in the medical file, and / or the presence of antidiabetic treatment on admission, or newly diagnosed within the first 7 days after hospitalisation, were also included.

Data were collected using a pre-established questionnaire consisting of three parts. The first part focused on socio-demographic and clinical data such as age, sex, duration of diabetes, type of diabetes, other comorbidities, Hba1c on admission, degenerative profile, and antihyperglycemic treatments. The second part included clinical signs, severity indicators, laboratory findings, and radiological aspects of COVID-19 infection. The last part described the treatments received in the hospital as well as the evolution of the disease. HBA1Cs were not performed on all patients, and laboratory tests were performed within 24 hours of admission. Total lung damage was estimated and classified as mild between 0 and 25%, moderate between 25 and 50%, severe between 50 and 75%, and critical above 75%. Data collection and analysis were performed using JAMOVI software, with qualitative variables described in numbers and percentages, and quantitative variables described in means and standard deviations.

RESULTS

During the study period, a total of 236 diabetic patients were included. Among these patients, males

were predominant with a sex ratio of approximately one. The average age of patients was 65.3 years ± 11.3, with 51% of patients being under the age of 65 and only 20% being over the age of 75. The majority of patients had type 2 diabetes, accounting for 91.5% of the cases, while only 2.7% and 0.8% had type 1 diabetes and prediabetes, respectively. Furthermore, 4.9% of patients were newly diagnosed with diabetes.

The mean duration of diabetes is 10.4 ± 7.47, and the degenerative profile is mostly unknown due to the urgent admission of patients. The average level of HbA1C is 7.93% ± 1.94. Various cardiovascular risk factors and comorbidities were identified, such as hypertension (46.2%), dyslipidemia (11%), heart disease (19.9%), COPD (0.8%), asthma (3.8%), and smoking (6.4%).

Regarding antidiabetic treatments, 46.6% of patients take a combination of oral antidiabetic medications (OAD), 24.6% take insulin alone, and 3% are on a combination of both (Table 1).

The initial data showed that 81.6% of the patients had a positive COVID-19 PCR test and 98% had suggestive anomalies on chest scans (Corads 4 and 5). Clinical signs such as fever (37.7%), dyspnea (74.2%), headache (13.6%), and anosmia/ageusia (3.8%) were observed (Table 2).

The median values of hemoglobin, white blood cells, C-reactive protein (CRP), D dimers, and fibrinogen are 12g/dl, 11812 elements/mm3, 118 mg/L, 550 ug / ml and 6.2 g/l, respectively. The majority of patients (38.7%) had severe disease, and 8.5% had critical disease on chest tomodensitometry (CT scan) (Table 3).

Therapeutically, the national protocol was followed and Plaquenil was administered to 66.8% of the patients, Azithromycin to 91.5%, Vitamin therapy to 93.6% and Corticosteroid therapy to 87.9%.

In patients with diabetes, metformin was discontinued and 60.6% of patients received multiple insulin injections (basal bolus), while 25.8% received only basal insulin.

In our study, the patients' condition improved and 86.4% of them were discharged home. 9.3% of the patients were transferred to intensive care and there was an overall mortality rate of 4.2% (Figure 1).

Table 1: Demographic and clinical characteristics of patients at admission:

settings	Mean ± standard deviation (SD) or % and N
Sex ratio	125 Men (53.2%) 110 Women (46.8%)
Age	65.3 ± 11.3
Duration of diabetes	10.4 ± 7.47
Types of diabetes **DT2** **DT1** **D newly diagnosed**	 205 (91,5%) 6 (2,7%) 11 (4,9%)
HbA1c, %	7.93 ± 1.94
Traitement initial : OAD Insulin Bitherapy	 108 (46.6%) 57 (24.6%) 7 (3.0%)
HbA1c: glycated hemoglobin; FDR: risk factors; AHT: arterial hypertension; COPD: chronic obstructive pulmonary disease; OAD: oral antidiabetics	

Table 2: Clinical presentations of covid 19 in our series:

Ageusia (%) Clinical symptoms	9 (3,8%) Overall (N=236)
Anosmia (%)	9 (3,8%)
Ageusia (%)	9 (3,8%)
Cough / dyspnea (%)	175 (74,2%)
Headaches	32(13,6%)
Rhinopharyngitis (%)	33(14%)

Table 3: Biological and radiological data

	Overall (N = 236)
Biological and morphological parameters (thoracic CT scan)	Median +/- standard deviation
Hgb (g/dl)	12,7
WBC (elements/mm3)	9570 (5823- 15 000)
CRP (mg/l)	130 (129 -500)
D. Dimers (ug/ml)	550 (0,4 – 2120)
Fibrinogen (g/l)	6,20 (2,00 – 10,0)
Degrees of CT impairment: Mild: less than 25% impairment Moderate: 25-50% Severe: 50 to 75% Critical: above 75%	 41(20,6%) 64 (32,2%) 77 (38,7%) 17 (8,5%)
Hb: hemoglobin; WBC: white blood cells; CRP: C-reactive protein, CT: computed tomography	

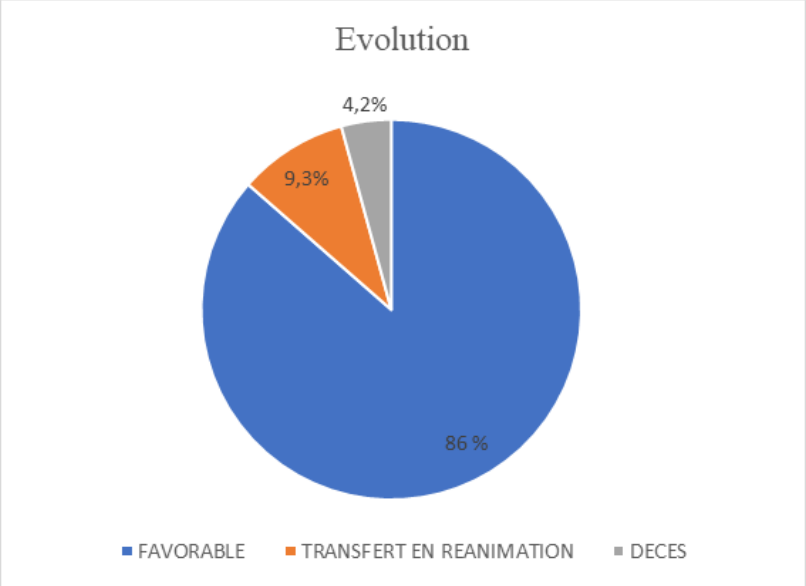

Figure 1: Evolution of patients in our series

DISCUSSION

The coronavirus disease 2019 (COVID-19) pandemic has brought to light diabetes as a significant risk factor for severe disease [1-3]. In a meta-analysis of 6,452 patients, diabetes was found to be associated with mortality, severity of disease, development of acute respiratory distress syndrome and disease progression in patients with COVID-19 [4]. However, there remains a dearth of literature dedicated to the description of phenotypic parameters in this vulnerable population.

In particular, our patients were on average than those included in the CORONADO study, with an average age of 65 compared to 70 [5, 6]. This discrepancy may be attributed to the difference in the prevalence of diabetes among elderly individuals in Morocco and France, where it is 20% among those over 60 and 25% among those over 75, respectively [5, 6].

The CORONADO study [7], a retrospective and prospective multicenter observational study, aimed to describe the clinical and biological characteristics of diabetic patients hospitalized for COVID-19 in French hospitals. In this study, the "typical" patient was male (64%) with a median duration of diabetes of 11 years. Our study yielded similar results, with 53.2% of our patients being male and an average duration of diabetes of 10 years. However, we found a slightly higher median HbA1c in our cohort, at 7.9%, compared to 7.7% in the CORONADO and COVIDIAB studies. Notably, HbA1c was not available in more than half of our patients.

The majority of patients in our series were DT2 as well as in the other series. The prevalence of DT1 in our series is 2.7%. This lower prevalence of type 1 diabetes among hospitalized patients is consistent with the CORONADO study, which reported a prevalence of 2.1% of type 1 diabetic patients among hospitalized diabetic patients for COVID-19 [7].

Infection with SARS-CoV-2 also appears to be capable of leading to the outbreak of new diabetes similar to forms of type 1 diabetes (DT1) [8, 9] and in our own series, 4.9% of cases of new diabetes have

been diagnosed among diabetics hospitalized with Covid 19.

The severity of lung involvement in our series is higher than that observed in COVIDIAB, 47% vs 32% respectively. Death occurs in 4.2% of patients in our series vs 20.6% in CORONADO. The evolution was favorable in 86.4% of our patients vs 50.2% in CORONADO. The significant mortality in CORONADO can be explained by the advanced age of the patients included (38.2% are over 75 years old) as well as the epidemic peak at the time of the study.

At the start of the epidemic, due to the lack of international recommendations and due to the contraindications associated with the molecule, it was decided to stop metformin in our diabetic patients hospitalized for Covid 19 with transient insulin therapy.

At the end of 2020, a few retrospective analyses of observational studies in patients with DT2 hospitalized with severe COVID-19 suggested that metformin use may be associated with reduced mortality [10-12]. A recent study published on 23 October 2021 concluded with the same result [13] but given the risk of lactic acidosis and in the absence of randomized controlled trials, the continuation of Metformin in the event of hospitalization for Covid 19 proves dangerous.

CONCLUSION

Diabetes mellitus is a common risk factor for severe Covid-19, and the phenotypic characteristics of diabetic patients with Covid-19 in our series are consistent with those reported in the literature. Almost half of our patients (47.2%) had severe lung damage, reflecting the severity of the disease in this population. Metformin, a widely used antidiabetic drug, has been suggested to have a protective role in severe Covid-19, although this remains controversial and requires further investigation. We encourage the Moroccan scientific community to consider this issue in their research and practice.

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