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Diabetology and Vascular Disease Research

What Effect Does Glycemic Control Have On Patients With Severe COVID-19 Who Are Diabetic?

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Abstract

Background: Diabetes is one of the most frequently reported comorbidities in COVID-19 disease patients and is associated with a higher risk of death and disease progression.

Aim: Evaluating how glycemic management affects the development of Covid-19 illness.

Materials and methods: From November 2020 to November 2021, 369 diabetic patients who were admitted to the Duc De Tovar hospital in Tangier for COVID-19 participated in this mixed cohort study. with a follow-up on days 7, 14, 21, 28, and 30 after being released from the hospital.

Results: The majority of those we objectified were men (61.5%), with an average age of 60 (+/-11.25; (18-85)).
Diabetes patients were admitted to 243 acute care units (65.9%) and 126 reanimation units (34.1%).
Glycemic targets were not met in 179 patients (48.5%), while glycemic control was satisfactory in 190 patients (51.5%).

Conclusion: Our study's findings indicate that glycemic control can mitigate the effects of other factors that exacerbate the advancement of Covid-19.

Introduction

The novel Coronavirus was discovered in China (Wuhan) in December 2019. It caused unexplained acute pneumonia, and the World Health Organization declared it to be a pandemic in March 2020 [1].

The main issue during the COVID-19 pandemic was how difficult it was to provide ongoing care and the risks associated with chronic conditions. According to the national survey of 2019, diabetes, one of the most often reported comorbidities in patients with COVID-19, has a prevalence of 10.6% in Morocco. This incidence rises with age, from 4% to 23.2% between the age groups of 18-29 years and 60-69 years, respectively [2].In patients with COVID-19, diabetes and hyperglycemia have been identified as risk factors for disease progression, ICU hospitalizations, and mortality [3].

The objective of this study is to assess how glycemic management affects the development of COVID-19 disease.

Method and Procedures

Type of research:

A follow-up at admission, at D7, D14, D21, and D28 of 369 diabetic patients hospitalised for COVID-19 at the Duc De Tovar hospital in Tangier, within two units (intensive care unit, and reanimation unit), and a follow-up of the progression until the thirtieth day after hospital discharge are included in this mixed retrospective and prospective cohort study.

Study participants

All forms of diabetes that are known about or are found out while in the hospital are included.
Patients who decline to take part in the trial are excluded.

Data gathering

Data are gathered using a CRF (Case Report Form), which was created using the World Health Organization's (WHO) modified International Severe Acute Respiratory and Emerging Infection (USARIC) case report form, in order to standardise the obtained data and enable comparison with other populations.

These CRF's four modules are as follows:

1. Module 1 must be completed on the first day of hospitalisation and includes sociodemographic information, anamnesis, medications taken prior to admission, comorbidities related to diabetes-related medical history, admission unit, and clinical and paraclinical parameters on admission (results of the RT-PCR, rapid antigen test, biological tests, chest CT, and electrocardiogram).
2. Module 2 for follow-up, which includes a clinical, biochemical, supportive care, and therapeutic assessment and is due at days 7, 14, 21, and 28,acute metabolic problems, such as diabetic ketoacidosis, hyperosmolar coma, and severe hypoglycemia, as

well as other complications, such as acute respiratory distress syndrome, pulmonary embolism, acute renal failure, and others, as well as the patient's condition at the end of the week.

3. The third module deals with the patient's result, such as death or discharge with or without supportive care.

4. The evolution of patients at D15 and D30 following hospital release is covered in Module 4.

The meaning of variables

According to WHO recommendations, the diagnosis of COVID-19 disease was made by identifying SARS-COV-2 viral RNA using the PCR technique, by fast antigenic tests, or by radiological information from chest CT scans.

The Ministry of Health's admission standards for the intensive care unit and the reanimation unit were used as a guide:

- A COVID-positive patient who needs close monitoring and oxygen saturation (SpO2) 92% is required for admission to the intensive care unit (decompensated comorbidity...).
- Need for invasive or non-invasive ventilation (SpO2 90% with evidence of severe respiratory failure, SpO2 92% on 8 l/min of O2 or on a high concentration mask for more than one hour; or presence of any of the following) is a need for admission to the reanimation unit. Hyperglycemia was defined as a blood glucose level of 1.80 g/L; A blood glucose level higher than or equal to 2.50 g/L defines severe hyperglycemia.Hypoglycemia was defined as a blood glucose level below 0.70 g/l.

All diabetic patients hospitalized for covid-19,received insulin therapy, with discontinuation of ADO.

Different insulin regimens were initiated:

- Basal insulin regimen with one to three boluses of rapid insulin;
- Basal insulin regimen with corrective boluses of rapid insulin depending on capillary glucose;
- Basal insulin regimen only.The routine protocol for blood glucose monitoring during hospitalization was set at seven measurements per day (fasting, before meals, two hours after meals and at bedtime). For patients who did not eat properly, or who were intubated, capillary blood glucose monitoring every four hours was implemented.

Blood sugar levels of 1.80 g/L or above were used to characterise hyperglycemia, while 2.50 g/L or more was used to define severe hyperglycemia.
A blood glucose level of less than 0.70 g/l was deemed to constitute hypoglycemia.
All diabetic patients who were admitted to the hospital for COVID-19 received insulin medication, and ADO was stopped.
Three different insulin regimens were started: a basal regimen with one to three boluses of fast insulin; a basal regimen with correcting boluses of rapid insulin based on capillary glucose; and a basal regimen with just basal insulin.

Seven blood glucose tests per day (during fasting, before meals, two hours after meals, and at bedtime) were established as the standard practise for blood glucose monitoring during hospitalisation. Capillary blood glucose monitoring every four hours for patients who did not consume enough food or who were intubated was implemented between 1.40 g/l to 1.80 g/l of blood sugar. These glycemic goals are modified for some patients in emergency situations.

circumstances where a capillary glycemia between 1.80 g/l and 2 g/l is acceptable include elderly subjects, people with severe renal insufficiency, and cardiopaths.
We split the diabetic hospitalised patients into two groups because the capillary blood glucose readings are used to define the assessment of glycemic management during hospitalisation.

- A group of patients with blood glucose levels between 1.40 g/l and 1.80 g/l in whom glycemic control was achieved.
- A group of individuals with blood glucose levels exceeding 1.80 g/L who have not achieved glycemic control
In-hospital death is the main evaluation factor in our study.

Statistic evaluation:

Version 21 of IBM SPSS Statistics was used for the data analysis. Standard deviations and averages were used to represent quantitative factors, while proportions and numbers were used to express qualitative variables. The graphs were produced using an examination of the descriptive data using the Excel Graph Generator and IBM SPSS Statistics programme, version 21.

Single-variable analysis Cross-tabulation was used to compare percentages, and either the Chi-square test or Fisher's exact test was used. The one-factor ANOVA technique was used to compare averages. The chosen level of significance was 0.05.
Multivariate analysis: For the multivariate analysis, binary logistic regression models were built.

They were derived using the factor(s) that the univariate analysis determined to be significant, with a significance threshold of 0.2 being used.

Ethics and legal considerations

On February 11, 2021, the University Hospital Ethics Committee of Fez requested the approval of the ethics committee for this study in order to respect ethical characteristics (anonymity; informed consent of the patient; voluntary participation).

Conclusion:

Our research enabled us to demonstrate that, following multivariate

analysis, the association between glycemic control during hospitalisation and the unfavourable course of Covid-19 illness was no longer significant. Thus, the influence of the other factors exacerbating the course of Covid-19, particularly the respiratory distress syndrome, the transfer to reanimation, and the invasive ventilation, is modified by the glycemic management.

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