

ORIGINAL PAPER

Therapy Area: Other

COVID-19: Patient care after discharge from the Intensive Care Unit

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Abstract

Introduction: The Ibn Rochd CHU is a tertiary care structure that provides care for the most severe cases of COVID-19 requiring hospitalisation in intensive care. The objective of study is to describe the complementary medical and psychological care of patients with COVID-19 in the endocrinology department after a stay in intensive care.

Patients and Methods: This is a descriptive observational study of patients transferred from the intensive care unit to the endocrinology service following a COVID-19 infection during the period from 17 April 2020 to May 26, 2020. Clinical characteristics of the patients and complications related to COVID-19 infection were studied; a nutritional assessment using the MNA nutritional status assessment questionnaire;

psychological assessment using quality-of-life questionnaires (Hamilton depression and anxiety, HAD, SF36, PCLS); a treatment satisfaction questionnaire (TQCMII) and an assessment of patient autonomy by the ADL score.

Result: Our study included 41 patients with an average age of 55 years (19-85 years), a sex ratio M/F of 1.05, 43.9% were diabetic, 34.1% hypertensive, 4.9% asthmatic and 5% obese, and 51.2% were severe and critical cases. The average ICU stay is 8.42 days, requiring intubation in 12.2% of cases. All patients were treated with the Hydroxychloroquine, Azithromycin, vitamin C, zinc and corticosteroid protocol, 14.6% had undernutrition and 65.9% had a risk of undernutrition. The average BMI was 25.34 kg/m² (17-42), 61% had experienced weight loss, which was greater than 8 kg in 26.1% of cases, 12.2% of patients were not autonomous, 12.2% had moderate depression, 2.4% severe depression, 14.6% mild to moderate anxiety, 12.2% severe anxiety and 29.3% suffered acute post-traumatic stress disorder.

Conclusion: Patients with COVID-19 are, in addition to the complications from coronavirus infection, vulnerable to undernutrition, psychological and motor complications. Additional care before discharge is essential for better integration of patients into their families.

1 | INTRODUCTION

The COVID-19 pandemic constitutes a real organisational challenge within healthcare structures. Ibn Rochd CHU is a tertiary care structure that handles the most severe cases that require intensive care, ie, severe cases (who have a pneumonia with hypoxaemia (SpO₂ < 92%)) or critical cases (with acute respiratory distress syndrome, may have shock, encephalopathy, myocardial injury, heart failure, coagulation dysfunction and acute kidney injury).¹⁻⁴

This epidemic imposed a particular organisation at the level of the Casablanca University Hospital for a global and multidisciplinary care, because the COVID-19 patients are at great risk of complications, undernutrition, depression and mental disorders especially when it is a severe or critical case. With this in mind, the administration of the CHU has defined a course of patient care from their arrival in the emergency room, hospitalisation in intensive care, until discharge by the Endocrinology service.^{5,6}

The aim of patient care in the endocrinology department is to complete the rehabilitation of the patient in post-COVID-19 infection after two negative PCR results, from the nutritional, respiratory and psychological point of view in order to guarantee a better exit and integration of these vulnerable patients within their families.

The objective of our study is to describe the complementary medical and psychological care of patients with COVID-19 in the endocrinology department after a stay in intensive care.

2 | PATIENTS AND METHODS

This is an observational descriptive study on adult patients transferred from the intensive care unit to the endocrinology department following

What's known

- The COVID-19 pandemic constitutes a real organisational challenge within healthcare structures.
- Patients with COVID-19 present a high risk of complication, especially in severe forms requiring intensive care.

What's new

- Patients with COVID-19 are vulnerable to undernutrition, along psychological and motor complications.
- Additional care before discharge is essential for better integration of patients within the family.

a COVID-19 infection during the period from April 17, 2020 to May 26, 2020. Non-consenting patients were excluded from the study.

Data collection was carried out using a questionnaire comprising the following sections:

Questions relating to the clinical characteristics of the patient (anthropo-demographic data, medical, surgical and family history, data related to diabetes, cardiovascular risk factors, other comorbidities).

Data related to COVID-19 infection: date and mode of contamination, treatment received, length of hospital stay, intensive care stay with or without intubation, date of negative PCR result, blood work carried out in ICU and complications from the infection.

Data from the clinical examination (weight, height, body mass index, blood pressure, capillary glycaemia, heart and respiratory rate, examination of various organs).

A section on nutritional assessment and management, including the MNA nutritional status assessment questionnaire,⁷ with a complete nutritional blood work. All the patients in the study received a nutritional and educational program adapted to their nutritional status.

A section on psychological assessment including quality-of-life questionnaires (Hamilton depression and anxiety Hospital Anxiety and Depression (HAD) and the short form 36 health survey (SF36) and an acute post-traumatic stress assessment using the Post-traumatic stress disorder Checklist Scale (PCLS) questionnaire).⁸⁻¹²

A section on treatment with evaluation of side effects and Treatment Satisfaction Questionnaire for Medication (TSQM).¹³

A section on assessing patient autonomy using the Activities of Daily Living (ADL) score.¹⁴

A motor and respiratory rehabilitation section including an evaluation by a physiotherapist with motor and respiratory physiotherapy exercises.

All patients benefited from follow-up after discharge by daily telephone interviews to assess clinical signs, compliance with hygiene and containment rules, with day hospital care on D15 and D30 after discharge for control check-up.

Statistical analysis is carried out with the SPSS 20 software. The univariate and bivariate analyses were performed. A value of $P < .05$ is considered statistically significant.

Free and informed consent was taken before inclusion in the study, while respecting the anonymity of patients when collecting data, with the approval of the ethics committee.

3 | RESULTS

3.1 | Demographic and clinical characteristics of patients

The study included 41 patients with an average age of 55 years with the extreme between 19 and 85 years, and a sex ratio of M/F 1.05, 24.4% were over 70 years of age. About comorbidity, 43.9% were diabetic, 34.1% were hypertensive and 4.9% were asthmatic. Of our patients, 58.5% were employed, and 9.8% were health workers.

3.2 | Management of the infection and its complications

Among our patients, 51.2% of cases were severe and critical cases. The average ICU stay is 8.42 days (1-36 days), with 12.2% of cases requiring intubation. The mode of contamination was unknown in 46.3% of cases, 58.7% had a family member contaminated by Covid-19 and 7.3% had a death in the family by the COVID-19. All patients were treated with the Hydroxychloroquine, Azithromycin, vitamin C, zinc and corticosteroid protocol. Negative PCR result was obtained on average after 16.73 days (9-35 days), 21.95% presented complications during hospitalisation, two patients presented

a pulmonary embolism, two suffered acute coronary syndrome requiring the placement of stents in one patient, toxidermia in two patients, hepatocellular insufficiency in one patient, peripartum cardiomyopathy in one patient, deep bradycardia in one patient and Guillain-Barré syndrome in one patient. According to the ADL, 12.2% of patients were non-autonomous. A motor and respiratory rehabilitation section was filled out, including an evaluation by a physiotherapist with motor and respiratory physiotherapy exercises (Table 1).

TABLE 1 Summary of the characteristics related to the infection and treatment

	Average	(Number of patients) percent
Severity classification		
Mild		(3) 7.3%
Moderate		(17) 41.5%
Severe		(16) 39%
Critical		(5) 12.2%
Stay in ICU		
Yes		(31) 75.6%
No		(10) 24.4%
Intubation		
Yes		(5) 12.2%
No		(36) 87.8%
Negative PCR Result		
≤9 d		(16) 39%
Between 9 and 14 d		(8) 19.5%
Between 14 and 30 d		(15) 36.6%
>30 d		(2) 4.9%
C-reactive protein CRP		
Normal		(15) 36.6%
High		(26) 63.4%
White blood cells		
Normal		(23) 56.1%
High		(18) 43.9%
Lymphopenia		
No		(30) 73.2%
Yes		(11) 26.8%
TSQM II treatment satisfaction score		
Effectiveness	66.29% ± 19.99	
Side effects	78.54% ± 24.71	
Convenience	70.68% ± 15.69	
Global satisfaction	70.27 ± 13.49	

Abbreviations: CRP, C-reactive protein; ICU, intensive care unit; PCR, polymerase chain reaction; TQCM, treatment satisfaction questionnaire for medication.

3.3 | Nutritional assessment

For the MNA score, 14.6% had undernutrition, 65.9% had a risk of undernutrition. The average BMI was 25.2 kg/m², 61% experienced weight loss, which was greater than 14 kg in 26.1% of cases, with extremes between 2 kg and 20 kg. Biologically, 19.5% had hypoalbuminaemia, 17.1% had hypoproteinaemia, 19.5% hypocalcaemia, 34.1% anaemia, 12.2% hypomagnesaemia and 51.2% had a deficiency in vitamin D.

A positive correlation was found between poor nutritional status and the long stay in intensive care (>5 days) ($P = .011$), and lymphopenia ($P = .02$; Table 2).

All the patients in the study received a nutritional and educational program adapted to their nutritional status: prescription of a normal-calorie diet in 63.4% of patients (on average 1900 kcal per day for women and 2300 for men) and high-calorie diet in 36.6%

(between 2500 and 2800 kcal per day), with a high protein intake between 1.3 and 1.8 g/kg/d for all undernourished patients and patients at risk of undernutrition.

3.4 | Psychological assessment

According to the quality-of-life scales, 12.2% had moderate depression and 2.4% had severe depression, 14.6% had mild to moderate anxiety and 12.2% had severe anxiety. And 29.3% showed an acute post-traumatic stress state (Table 3).

A positive correlation was found between anxiety and stay in intensive care ($P = .005$), and death in the family by COVID-19 ($P = .005$), and between depression and delayed negative PCR result >30 days ($P = .006$), death in the family by COVID-19 ($P = .014$),

TABLE 2 Summary of the results of the correlation between clinical parameters and MNA score, Hamilton anxiety, Hamilton depression and post-traumatic stress scores

	Severity classification				Intensive care stay		Intubation		Intensive care Stay <5 d
	Mild	Moderate	Severe	Critical	No	Yes	No	Yes	No
MNA SCORE									
Normal nutritional status	1 (12.5%)	5 (62.5%)	2 (25%)	0 (0%)	4 (50%)	4 (50%)	8 (100%)	0 (0%)	0 (0%)
At risk of undernutrition	2 (7.41%)	11 (40.74%)	11 (40.74%)	3 (11.11%)	6 (22.22%)	21 (77.78%)	23 (85.18%)	4 (14.8%)	14 (66.67%)
Proven undernutrition	0 (0%)	1 (16.67%)	3 (50%)	2 (33.33%)	0 (0%)	6 (100%)	5 (83.33%)	1 (16.67%)	1 (16.67%)
P value	.392				.089		.498		.011
Hamilton anxiety									
Normal	2 (6.66%)	10 (33.33%)	14 (46.66%)	4 (13.33%)	6 (20%)	24 (80%)	27 (90%)	3 (10%)	10 (41.66%)
Mild to moderate anxiety	0 (0%)	4 (66.66%)	2 (33.33%)	0 (0%)	0 (0%)	6 (100%)	5 (83.33%)	1 (16.66%)	4 (66.66%)
Moderate to severe anxiety	1 (20%)	3 (60%)	0 (0%)	1 (20%)	4 (80%)	1 (20%)	4 (80%)	1 (20%)	1 (100%)
P value	.337				.005		.767		.316
Hamilton depression									
Normal	2 (7.14%)	9 (32.14%)	13 (46.42%)	4 (14.28%)	5 (17.85%)	23 (82.14%)	26 (92.85%)	2 (7.14%)	10 (43.47%)
Mild depression	0 (0%)	4 (57.14%)	2 (28.57%)	1 (14.28%)	2 (28.57%)	5 (71.42%)	5 (71.42%)	2 (28.57%)	3 (60%)
Moderate depression	1 (20%)	3 (60%)	1 (20%)	0 (0%)	2 (40%)	3 (60%)	4 (80%)	1 (20%)	1 (50%)
Severe depression	0 (0%)	1 (100%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	1 (100%)	0 (0%)	1 (100%)
P value	.717				.215		.416		.640
Post-traumatic stress disorder									
Yes	1 (8.33%)	5 (41.66%)	4 (33.33%)	2 (16.66%)	3 (25%)	9 (75%)	9 (75%)	3 (25%)	5 (55.55%)
No	2 (6.89%)	12 (41.37%)	12 (41.37%)	3 (10.37%)	7 (24.13%)	22 (75.86%)	27 (93.1%)	2 (6.89%)	10 (45.45%)
P value	.931				.622		.139		.454

Bold value indicates statistical significance of P values.

Abbreviations: COVID-19: coronavirus disease 2019; CRP, C-reactive protein. MNA, mini nutritional assessment; PCR, polymerase chain reaction.

and between post-stress state traumatic and death in the family by COVID-19 ($P = .021$) and inflammation (High White blood cells) ($P = .025$) (Table 2).

All patients benefited from clinical management of complications as well as nutritional and psychological care.

And after their discharge, all the patients were contacted by telephone to assess their clinical condition after discharge, the appearance of symptoms, temperature and compliance with confinement rules.

4 | DISCUSSION

On December 2019, a new Coronavirus appeared China. It was responsible for the emergence of a new acute respiratory infection

and was declared a pandemic by the World Health Organisation on March 2020.

The great challenge is the management of severe cases. The risk factors linked to the development of severe forms are mainly advanced age and the presence of comorbidities, especially in patients with a chronic disease such as organ failure, obesity of grade 3, type 2 diabetes or cancer.^{17,18}

In order to avoid the sequelae of a severe form of COVID-19, the Ibn Rochd CHU in Casablanca, which is a tertiary care structure dedicated to the management of the most severe cases, has defined a specific care pathway from the arrival of the patient in the emergency room, hospitalisation in the intensive care unit, until discharge by the Endocrinology department. The stay in the endocrinology department allows medical treatment of

	Negative PCR >30 d		Death in the family by the COVID-19		C-reactive Protein CRP		White blood cells		Lymphopenia	
	No	Yes	No	Yes	Normal	High	Normal	High	No	Yes
4 (100%)	8 (100%)	0 (0%)	8 (100%)	0 (0%)	5 (62.5%)	3 (37.5%)	7 (87.5%)	1 (12.5%)	8 (100%)	0 (0%)
7 (33.33%)	25 (92.6%)	2 (7.4%)	25 (92.6%)	2 (7.4%)	8 (30.77%)	19 (73.07%)	14 (51.85%)	13 (48.15%)	20 (74.07%)	7 (25.93%)
5 (83.33%)	5 (83.33%)	1 (16.67%)	6 (100%)	0 (0%)	2 (33.33%)	4 (66.67%)	2 (33.33%)	4 (66.67%)	2 (33.33%)	4 (66.67%)
	.964		.580		.234		.097		.02	
14 (58.33%)	30 (100%)	0 (0%)	30 (100%)	0 (0%)	21 (70%)	9 (100%)	16 (53.33%)	14 (46.66%)	9 (30%)	21 (70%)
2 (33.33%)	5 (83.33%)	1 (16.66%)	5 (83.33%)	1 (16.66%)	4 (66.66%)	2 (33.33%)	2 (33.33%)	4 (66.66%)	1 (16.66%)	5 (83.33%)
0 (0%)	4 (80%)	1 (20%)	3 (60%)	2 (40%)	1 (20%)	4 (80%)	0 (0%)	5 (100%)	1 (20%)	4 (80%)
	.055		.014		.098		.72		.745	
13 (56.52%)	28 (100%)	0 (0%)	28 (100%)	0 (0%)	20 (71.4%)	8 (28.57%)	16 (57.14%)	12 (42.85%)	9 (32.14%)	19 (67.85%)
2 (40%)	7 (100%)	0 (0%)	6 (85.71%)	1 (14.28%)	2 (28.57%)	5 (71.42%)	2 (28.57%)	5 (71.42%)	0 (0%)	7 (100%)
1 (50%)	3 (60%)	2 (40%)	3 (60%)	2 (40%)	3 (60%)	2 (40%)	0 (0%)	5 (100%)	2 (40%)	3 (60%)
0 (0%)	1 (100%)	0 (0%)	1 (100%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	1 (100%)
	.002		.014		.169		.061		.286	
4 (44.44%)	11 (91.66%)	1 (8.33%)	9 (75%)	3 (20%)	7 (58.33%)	5 (41.66%)	2 (16.66%)	10 (83.33%)	3 (25%)	9 (75%)
12 (54.54%)	28 (96.55%)	1 (3.44%)	29 (100%)	0 (0%)	19 (65.51%)	10 (34.48%)	16 (55.17%)	13 (44.82%)	8 (27.58%)	21 (72.41%)
	.505		.021		.464		.025		.595	

complications related to the disease, nutritional and psychological care, as well as respiratory and motor rehabilitation in order to prepare for the reintegration of patients into their families after a stay in intensive care.

Our series focused mainly on severe and critical cases, since the Ibn Rochd CHU is a tertiary care structure that takes care of patients requiring care in intensive care.

In our study, 43.9% of our patients were diabetic, 34.1% hypertensive and 4.9% asthmatic. 51.2% of patients were severe and critical cases. The average ICU stay is 8.42 days (1-36 days), 12.2% of cases requiring intubation.

All patients were treated with the Hydroxychloroquine, Azithromycin, vitamin C, zinc and corticosteroid protocol. A negative PCR result was obtained on average after 16.71 days (9-35 days).

TABLE 3 Summary of the results of the psychological assessment of the patients

	Average	(N) %
Depression (HAM D)		
Normal	7.32 ± 6.37	(28) 63.8%
Mild depression		(7) 17.1%
Moderate depression		(3) 12.2%
Severe depression		(1) 2.4%
Anxiety (HAM A)		
Normal	12.46 ± 12.32	(30) 73.2%
Mild to moderate anxiety		(6) 14.6%
Moderate to severe anxiety		(5) 12.2%
Anxiety/depression (HAD score)		
Normal	7.78 ± 6.91	(25) 61%
Borderline abnormal		(6) 14.6%
Abnormal		(10) 24.4%
Quality of life (SF36)		
Physical functioning	72.32 ± 22.64	
Role limitations due to physical health	66.29 ± 32.41	
Role limitation due to emotional problems	60.32 ± 36.51	
Energy-fatigue	56.85 ± 17.59	
Emotional well-being	62.51 ± 22.43	
Pain	58.56 ± 28.14	
General health	66.01 ± 19.03	
Social functioning	67.12 ± 25.10	
Health change	45.27 ± 22.81	
Post-traumatic stress disorder (PCLS)		
Yes	25.28 ± 9.93	(12) 29.3%
No		(29) 70.7%

Abbreviations: HAD: hospital anxiety and depression; HAM-A, Hamilton anxiety; HAM-D, Hamilton depression; N, number; PCLS, post-traumatic stress disorder checklist scale; SF36, The short form (36) health survey.

The therapeutic protocol adopted by the Moroccan Ministry of Health recommended the treatment of all patients with the Hydroxychloroquine, Azithromycin, vitamin C, zinc and corticosteroid combination in the absence of a contraindication, this combination has given satisfactory results in several studies.^{19,20}

Patients cured of the infection, having lost weight and weakened after weeks in intensive care, frequently have more or less severe impairments, on the respiratory, cardiovascular, neurological, neurocognitive or musculoskeletal level. These deficiencies require prolonged management and expose patients to several complications.²¹⁻²³

Like any acute infection, COVID-19 presents a high risk of undernutrition, especially in severe forms requiring intensive care. In addition, these diseases often mask underlying protein malnutrition. The probability that the infected patient is already malnourished on admission to hospital is, therefore, high. Undernutrition is generally a factor of poor prognosis and should, therefore, be actively looked out for.

In our study, 14.6% had undernutrition and 65.9% had a risk of undernutrition. The average BMI was 25.34 kg/m², 61% experienced a weight loss, which was more than 8 kg in 26.1% of the cases, with extremes of 2-20 kg.

Undernutrition during a COVID-19 infection can be explained by the increase in energy expenditure during a severe respiratory, inflammatory syndrome and hypercatabolism, and also by the very reduced food intake. This is why we must closely monitor food intake.²¹

In our study, all patients benefited from personalised dietary management with the establishment of a high-protein diet and supplementation with vitamin D and trace elements.²¹

And because of the clinical and therapeutic particularity of this disease involving containment and isolation measures, patients with COVID-19 are at great risk of depression, anxiety and post-traumatic stress disorder. Patients who spent time in ICU report a greater deterioration in their quality of life.²⁴⁻³⁰ In our study, 12.2% of patients had moderate depression and 2.4% severe depression, 14.6% mild to moderate anxiety and 12.2% severe anxiety, 29.3% with acute post-traumatic stress.

5 | CONCLUSION

COVID-19 patients are vulnerable to undernutrition, and psychological and motor complications, in addition to complications from the Coronavirus infection. Additional care before discharge is essential for better integration of patients within the family. It is the role played by the endocrinology service of the Ibn Rochd University Hospital which ensured their care before their discharge.

DISCLOSURES

Authors declared they have no conflicts of interest.

AUTHORS' CONTRIBUTIONS

All the authors participated in the care of the patients, the realisation of the study, writing of the final manuscript. All authors read and approved the final manuscript.

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