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Experience of COVID-19 in the University General Hospital of Patras: A short report

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Abstract

Background: COVID-19 has rapidly spread around the world, affecting more than 8.5 million people. We aimed to explore the impact of SARS-CoV-2 infections requiring hospitalization in the University General Hospital of Patras which is the COVID-19 referral centre for South Western Greece, during the 1st epidemic wave.

Methods: This was a single-centre retrospective cohort study, reporting the characteristics of SARS-CoV-2 cases, admitted to the University General Hospital of Patras during the 1st epidemic wave, extending from 1st March to 15th June 2020.

Results: A total of 54 patients were included in this study. Median age was 58 years old and 52% were men. The county of origin was most commonly Ileia, followed by Achaia, Argolida and Messinia. 44% of cases were travel-related, while 3.6% of patients were health-care workers and 3.6% were refugees. Fever, fatigue, and dyspnoea were the predominant symptoms on presentation, approximately 6 days after symptom onset. Patients commonly presented with mild lymphopenia (median:1010.36, IQR: 902.93), elevated D-dimers (1.23, 1.23), liver enzymes [SGOT (42, 14.25), SGPT (45, 30.75)] and inflammatory markers (CRP: 3.37, 6.71). Their median length of stay was 11 days, following the administration of antibiotics, mainly in combination with hydroxychloroquine and azithromycin (100%, 87% and 78% respectively). Forty-eight patients (89%) successfully recovered. All patients required supplemental oxygen, of whom 13 (25%) received non-invasive mechanical ventilation and 4 were finally intubated. Mortality among patients requiring mechanical invasive ventilation was 75%.

Conclusions: Lessons learned from current experience should be used to optimize the understanding and management of the next epidemic wave

Key words: *COVID-19; SARS-CoV-2*

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INTRODUCTION

In late December 2019, a series of unknown cause severe pneumonias occurring in Wuhan, Hubei Province, China, led to the identification of a novel coronavirus, named severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), in the throat swab sample of one patient [1]. Shortly after, the World Health Organization (WHO) named the novel epidemic disease caused by SARS-CoV-2, coronavirus disease 2019 (COVID-19) and declared it a global emergency. Currently, COVID-19

has spread worldwide, affecting more than 8.5 million people, out of whom more than 450.000 have died. At the time of this study, 3237 COVID-19 cases have been reported in Greece, of whom 189 passed away. Confirmed cases are distributed along the whole country, and there is evidence of increased local prevalence in 5 regions, including the counties of Argolida, Xanthi, Larissa, Kozani and Kastoria, where increased transmission leak within the community or nursing facilities, refugee camps or other closed populations has been detected [2]. We aimed to explore the pattern and course of SARS-CoV-2 infections requiring hospitalization in South Western Greece, by focusing on COVID-19 admissions to the University General Hospital of Patras referral centre, during the 1st epidemic wave.

METHODS

This was a single-centre retrospective cohort study, reporting characteristics of SARS-CoV-2 cases admitted to the South Western Greece referral centre for COVID-19 i.e University General Hospital of Patras, during the 1st epidemic wave extending from 1st March to 15th June 2020. The study was carried out according to good clinical research practice and was approved by the hospital's Ethics Committee. All patients enrolled in this study were diagnosed according to the World Health Organization criteria [3]. Patients' charts were reviewed, and data were handled according to the general data protection regulation. Epidemiological, clinical, laboratory, imaging and therapeutic characteristics, along with outcomes and prognostic scores were recorded. Severity was evaluated by calculating the APACHE and SOFA severity scores. Categorical variables were described as frequency rates and percentages, and continuous variables were described using mean, median, and interquartile range (IQR) values depending on the distribution of normality.

RESULTS

A total of 54 cases were included in this study. Patients' characteristics and hospitalization -related characteristics and outcome are shown in Tables 1 and 2 respectively. Median age was 58 years old and 52% were men. Nearly half had an unremarkable medical history. Fever, fatigue, and dyspnoea were the predominant symptoms on presentation, approximately 6 days after symptom onset. Twenty-four cases were travel related, 2 cases were among healthcare professionals and 2 involved refugees. Most patients originated from Ileia, but positive cases were detected in all other counties. In the majority of cases, patients presented with mildly elevated inflammatory markers and liver enzymes, lymphopenia, and bilateral infiltrates in plain chest X ray (Table 1). All patients received antibiotics, in most cases in combination with hydroxychloroquine with or without azithromycin (Table 2). Remdesivir and/or immunomodulation was used in selected severe cases. Severity on presentation varied, according to the APACHE and SOFA scores. Median length of stay was 11 days (Table 2). Forty-eight patients (89%) successfully recovered, mostly following non-invasive non-mechanical ventilation support, while no evidence of relapse or reinfection was noted. Six patients died, among which, 5 were men, 2 were very elderly, 2 suffered from haematological malignancies and 2 had unremarkable medical history. All exhibited signs of multi-organ failure. Thirteen patients required non-invasive mechanical ventilation, in the form of high flow nasal canula or continuous positive airway pressure, out of whom 4 were intubated. Mortality among patients requiring mechanical invasive ventilation was 75%. The limited number of patients did not allow for further correlation analysis between various parameters and outcomes to be performed.

DISCUSSION

This was a retrospective study to explore the impact of SARS-CoV-2 infections requiring hospitalization in South Western Greece, as this is reflected in the number and characteristics of COVID-19 admissions to the University General Hospital of Patras, which is the Southwestern Greece referral centre, during the first pandemic wave.

As previously described, closed spaces and ventilation systems, in combination with close contact favour SARS-CoV-2 transmission [4, 5]. The initial group of patients presenting to our hospital originated from Ileia, representing an imported cluster of COVID-19 cases, which travelled by bus during a pilgrimage to Israel. Patients presenting to our department showed classical symptoms, as previously described in other cohorts and recorded in Table 1 [6-8]. Older age and co-morbidities seemed to predict for worse outcomes, in agreement with the existing literature, even though, patients of younger age with unremarkable prior medical history were also affected [4, 7, 8]. Interestingly, both healthcare workers admitted to our unit, required mechanical ventilation, exhibiting bilateral pneumonia and ARDS, in agreement with previous findings, suggesting increased viral load among healthcare personnel, due to prolonged

Table 1. *Patient Characteristics.*

	Total number of Patients (n=54)
County of origin (n, %)	
Achaia	18 (33.3)
Ileia	22 (40.7)
Arkadia	2 (3.7)
Argolida	4 (7.4)
Messinia	5 (9.2)
Korinthia	0 (0)
Lakonia	1 (1.9)
Aitoloakarnania	1 (1.9)
Ionian Islands	1 (1.9)
Age (median, IQR)	(58.31, 23.25)
Gender (male, %)	28 (51.8)
Travel related history (n, %)	24 (44)
Medical staff (n, %)	2 (3.6)
Refugees (n, %)	2 (3.6)
Co-morbidities (n, %)	26 (48.1)
Diabetes Mellitus	2 (3.7)
Immunocompromise (other than malignancy)	2 (3.7)
Malignancy	4 (7.4)
Arterial Hypertension	6 (11.1)
Coronary Heart Disease	2 (3.7)
Chronic Obstructive Pulmonary Disease	2 (3.7)
Hyperlipidemia	4 (7.4)
Chronic Renal Disease	1 (1.8)
Chronic Liver Disease	2 (3.6)
Other	6 (11.1)

	Total number of Patients (n=54)
Days from symptom onset to admission (median, IQR)	(6, 5)
Symptoms (n, %)	
Asymptomatic	3 (5.5)
Fever	38 (70.3)
Cough	15 (27.7)
Dyspnoea	4 (7.4)
Fatigue	51 (94.4)
Diarrhoea	20 (37)
SOFA on admission (median, IQR)	(1, 2.25)
APACHE on admission (median, IQR)	(5, 5)
Laboratory Values (median, IQR)	
White Blood Cells (K/ul)	(5.650, 2.585)
Absolut Lymph count (/ul)	(1010.36, 902.93)
Platelets (K/ul)	(208.000, 108.000)
D-dimers (ng/ml)	(1.23, 1.23)
Ferritin (ng/ml)	(15, 0)
Troponin I (ng/ml)	(5.9, 8.4)
LDH (U/l)	(334, 203.75)
SGOT (U/l)	(42, 14.25)
SGPT (U/l)	(45, 30.75)
Creatinine (mg/dl)	(0.8, 0.3)
C-Reactive protein (mg/l)	(3.37, 6.71)
Imaging findings (n, %)	
None	5 (9.3)
Unilateral infiltration	4 (7.4)
Bilateral infiltration	45 (83.3)

exposure [9, 10]. A number of laboratory indices to predict COVID-19 severity have also been proposed including ferritin, D-dimers, LDH, absolute lymph and platelet count, supAR levels, etc [11-13]. However, a careful critical appraisal of current evidence is needed, since current knowledge retrospectively derived from large cohorts with so far limited targeted therapeutic interventions. In this respect, there is a need for the implementation of more accurate prediction models, that combine several laboratory markers [14].

In the absence of a specific antiviral therapy, a variety of regimens were used on top of regular antibiotics, in the context of current treatment recommendations for COVID-19 pneumonia [2, 15, 16]. These regimens included hydroxychloroquine in combination with azithromycin, lopinavir/r, remdesivir, anakinra, tocilizumab and corticosteroids, according to existing experience at the time. Hydroxychloroquine and azithromycin were prescribed to all patients, except for those with a known allergy or G6PD deficiency,

Table 2. *Hospitalization-related characteristics and outcome.*

	Total number of Patients (n=54)
Length of stay (median, IQR)	(11, 6)
Complications (n, %)	
Shock	2 (3.7)
Acute Cardiac Injury	2 (3.7)
Acute kidney failure	2 (3.7)
Acute Respiratory Distress Syndrome	13 (24.1)
Outcome (n, %)	
Resolution & Discharge	48 (88.9)
Death	6 (11.1)
Relapse	0 (0)
Re-infection	0 (0)
Pharmacological Management (n, %)	
Antibiotics	54 (100)
Remdesivir	2 (3.7)
Tocilizumab	2 (3.7)
Hydroxychloroquine	47 (87)
Anakinra	2 (3.7)
Azithromycin	42 (78)
Lopinavir/ritonavir	22 (40.7)
Glucocorticoid	6 (11)
Respiratory Support (n, %)	
Non-invasive, non-mechanical ventilation	53 (98)
Non-invasive mechanical ventilation	13 (24)
Invasive mechanical ventilation	4 (7.4)

showing good tolerance and efficacy, in line with previous findings [17, 18] . Even though, later studies reported controversial results [19], the effect of hydroxychloroquine remains under investigation; however, considering its good profile and in the absence of a definite treatment regimen, it will probably continue to be used. According to the experience of these authors, lopinavir/r administration resulted in severe gastrointestinal adverse events, and was soon abandoned, despite its inclusion in the Chinese guidelines [20] and the report of favourable results from other cohorts [6-8]. Recently, a randomized open label trial revealed no beneficial effect of lopinavir–ritonavir treatment compared to standard care [21]. In addition, we administered remdesivir in the context of a compassionate use program in two patients with severe pneumonia requiring mechanical ventilation, with a 50% favourable clinical outcome. It has been previously shown that, remdesivir may shorten the time of clinical improvement in these patients [22] and early administration in the course of the disease may play a significant role [23, 24]. As disease progresses and the hyper-inflammation syndrome develops, ad-junctive therapy with immunomodulation, including anti IL-6, IL-1 receptor antagonists and corticosteroids is to be considered [25]. We used both anakinra and tocilizumab in 4 patients exhibiting signs of cyto-kine storm and/or macrophage activation syndrome with variable results, in accordance with previous observations [26, 27]. However, we did observe better outcomes when implementing a combined antiviral and anti-inflammatory approach [28]. Despite previ-ous recommendations to avoid corticosteroid use due to a delay in viral clearance, we administered methyl-prednisolone at a low dose in sicker patients. Even though, due to the small number of patients we cannot draw safe conclusions, early data have come to show that corticosteroid use is associated with bet-ter outcomes [29, 30]. We are at the moment looking forward to future results from many more trials and experimental regimens [31, 32].

CONCLUSIONS

During the first wave of the COVID-19 pandemic, 54 patients were hospitalized in the University General Hospital of Patras and our observations did not significantly differ from the experience reported in other institutions. While waiting for the second pandemic wave, results from multi-centre randomized trials and larger patient cohorts are much anticipated, in the prospect of better understanding and managing COVID-19.

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FF, were involved in patients' management, KA, EA, GE. reviewed medical charts and collected data, MM, CG oversaw pa-tients' management, KA conceived study, analysed data and wrote the manuscript, CG critically corrected the manuscript.

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