

Effects of a reorganization of cirrhosis care during the lockdown for SARS-CoV-2 outbreak



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To the Editor:

The COVID-19 pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, has led to a major public health challenge.¹ The high virulence and transmissibility of SARS-CoV-2 requires strong health-care policy actions to reduce its spread. Since February 21st, the SARS-CoV-2 outbreak smashed Northern and Central Italy and on March 9th the Italian government introduced a lockdown which lasted until May 3rd. Meanwhile non-urgent clinical care activity was deferred, potentially negatively impacting on patients with chronic diseases, including patients with cirrhosis.² Whether the lockdown determined clinical consequences in patients with cirrhosis is unknown. Herein we evaluated the characteristics, clinical course, in-hospital and 90-day mortality as well as the 30-day readmission rate in patients hospitalized for an acute decompensation of cirrhosis from March 2020 to April 2020 in 2 centers in Northern/Center Italy. Their characteristics and outcomes were compared with those of patients admitted in March-April 2019.

Patients were retrospectively identified and demographic, clinical and laboratory data were collected reviewing electronic and paper charts. Data on readmissions and mortality at 90 days were collected as well.

During the lockdown non-urgent visits were deferred and telemedicine/phone contacts were implemented. Day hospital activity for planned procedures (e.g. large volume paracentesis) and outpatient visits for patients at high risk of readmissions (readmitted in the prior 30 days, with acute-on-chronic liver failure during hospitalization or Child-Pugh class C) were maintained.^{3,4} Overall, we observed a 65% reduction in outpatients visits.

We identified 100 patients admitted for acute decompensation of cirrhosis, 55 were admitted in 2019 and 45 in 2020. Demographic characteristics and reasons for hospitalization were similar between the 2 groups (Table 1). Bilirubin was significantly higher in patients admitted during the lockdown (116 vs. 65 $\mu\text{mol/L}$; $p = 0.032$). There was a trend toward a higher model for end-stage liver disease-sodium (MELD-Na) score in patients admitted during the lockdown (22 vs. 19; $p = 0.071$). In spite of a similar rate of bacterial infections at admission, the level of C-reactive protein tended to be higher in patients admitted during the lockdown (45 vs. 29 mg/L ; $p = 0.057$). Finally, patients

admitted during the lockdown more frequently had acute kidney injury (AKI) at admission (42 vs. 22%; $p = 0.028$). In-hospital mortality and probability of 90-day survival were not significantly different between the 2 groups (7% vs. 7%; $p = 1.00$; and 23% vs. 25%; $p = 0.951$; Fig. 1). The proportion of patients transplanted within 90 days was not significantly different between patients admitted during the lockdown and those admitted in 2019 (7% vs. 13%; $p = 0.505$). After discharge, 21 out of 40 patients discharged alive during the lockdown were referred to the outpatient clinic for early post discharge management (53% vs. 81% in 2019; $p = 0.004$),³ 4 were lost to follow-up while the remaining were followed up by telemedicine/phone contact. The proportion of patients readmitted within 30 days was not significantly different in lockdown and control groups (23 vs. 21%; $p = 0.920$).

This study showed 2 main findings. The first is that during the lockdown patients admitted to the hospital for an acute decompensation of cirrhosis had a more advanced liver disease, a higher proportion of AKI and higher inflammatory biomarkers. One may hypothesize that during the lockdown patients with cirrhosis delayed their access to medical care because of concerns over contracting COVID-19 in hospital. This is relevant for patients with cirrhosis that are at risk of severe COVID-19^{5,6} and is in keeping with the delayed access to care observed for patients with stroke and myocardial infarction during the peak of the COVID-19 outbreak in Spain and England.^{7,8} Anyway, this is a speculation that has to be proven in well-designed studies. Despite a more severe disease at admission, we did not find an increase in mortality rate in patients admitted during the lockdown, however the sample size was underpowered to identify such a difference. In preparing to face the new COVID-19 outbreaks worldwide, patients with cirrhosis should be advised to seek care without delay when signs of decompensation/infection occur.

In keeping with data of other Italian Hepatology units, outpatient activity was significantly reduced in our center during the lockdown.⁹ One potential drawback of this reduction could be the increase of early readmissions for patients discharged. The second main finding of this study is that the reorganization of outpatient management (prioritizing urgent visits and those for patients at risk of readmissions) could have mitigated the risk of early readmissions. This was obtained with no undermining of patient and staff safety. All physicians and nurses at our institutions wore personal protective equipment during visits and a negative nasopharyngeal swab was required within a week for patients before their planned day admission. None of the medical staff contracted SARS-CoV-2 infection during the study period.

In conclusion, a reorganization of outpatient management, prioritizing visits for high-risk patients and maintaining

Keywords: COVID-19; Liver transplantation; Readmissions; Coronavirus; Healthcare; Outpatients; Liver.

Received 10 December 2020; accepted 16 December 2020; ; available online 19 January 2021

<https://doi.org/10.1016/j.jhepr.2021.100229>



Table 1. Clinical characteristics of patients admitted in the 2 cohorts.

Variable	2019 (n = 55)	2020 (n = 45)	p value
Age (years), m ± SD	64±11	61±14	0.228
Gender (Male), n (%)	35 (64)	35 (78)	0.125
Etiology of cirrhosis, n (%)			
Alcohol	24 (44)	26 (58)	0.159
HCV	13 (24)	8 (18)	0.474
HBV	8 (15)	8 (18)	0.661
NASH	7 (13)	6 (13)	0.929
Other	10 (18)	5 (11)	0.325
Main cause of admission, n (%)			
Ascites	11 (20)	6 (13)	0.674
Gastrointestinal bleeding	11 (20)	13 (29)	
Hepatic encephalopathy	14 (26)	8 (18)	
Infections	7 (13)	7 (16)	
Others	12 (22)	11 (24)	
Ascites at admission, n (%)	32 (58)	32 (71)	0.180
HE at admission, n (%)	18 (33)	13 (29)	0.680
Bacterial infections at admission, n (%)	14 (26)	10 (22)	0.887
AKI at admission, n (%)	12 (22)	19 (42)	0.028
Leukocytes (x10 ⁹ /L), median (IQR)	6.7±3.6	6.9±4.0	0.783
C-reactive protein, median (IQR)	29±30	45 ± 51	0.057
Bilirubin (mmol/l) , median (IQR)	65 ± 67	116 ± 158	0.032
Albumin (g/l) , median (IQR)	29 ± 5	30 ± 5	0.551
INR, median (IQR)	1.6 ± 0.8	1.6 ± 0.5	0.693
Creatinine (μmol/l), median (IQR)	100 ± 57	119 ± 66	0.128
Serum sodium (mmol/L), mean ± SD	136 ± 6	135 ± 8	0.129
MELD-Na, mean ± SD	19 ± 7	22 ± 10	0.071

Continuous variables were compared with Student's *t* test or Mann-Whitney *U* test. Categorical variables were compared with Chi-square or Fisher's exact test. AKI, acute kidney injury; HE, hepatic encephalopathy; INR, international normalized ratio; MELD-Na, model of end stage liver disease sodium; NASH, non-alcoholic steatohepatitis.

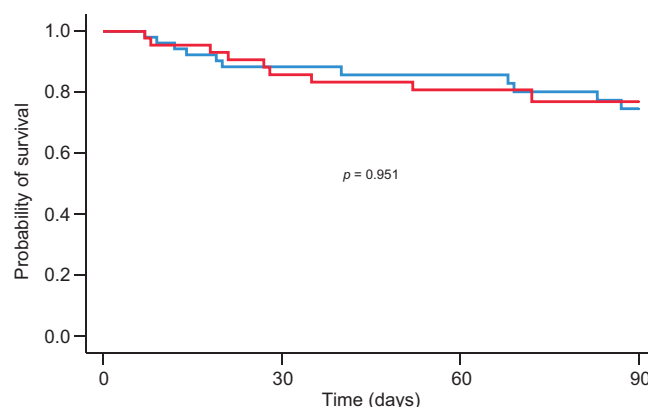


Fig. 1. 90-day probability of survival in patients admitted during the lockdown for COVID-19 outbreak (red line) and controls (blue line). Survival curves were compared with log rank test.

day hospital activity, mitigated the risk of 30-day readmissions and 90-day mortality for patients admitted for decompensated cirrhosis during lockdown. Such a policy was effective for a short-term lockdown period. Whether that policy is safe for

longer periods of lockdown is yet to be explored; similarly, unintended long-term consequences for less sick patients should be better explored in the future.

Financial support

The authors received no financial support to produce this manuscript.

Conflict of interest

The authors declare no conflicts of interest that pertain to this work.

Please refer to the accompanying ICMJE disclosure forms for further details.

Authors' contributions

SP: Study concept and design, collection of data, analysis and interpretation of data, drafting of the manuscript. MM: Study concept and design, collection of data, study supervision, interpretation of data, drafting of the manuscript, critical revision for important intellectual content. PA: Study concept and design, study supervision, interpretation of data, drafting of the manuscript, critical revision for important intellectual content.

Supplementary data

Supplementary data to this article can be found at <https://doi.org/10.1016/j.jhepr.2021.100229>.

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