

Coronavirus Disease 2019 Infection Requires Strengthening of the Chronic Care Model: The Impact on Liver Transplant Practice at a High-Volume Center in Italy

TO THE EDITOR:

The outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection across Italy has produced dramatic changes and is reshaping the practice of liver transplantation (LT) both at our center and nationwide. As of March 28, 2020, a total of 70,065 patients tested positive for coronavirus disease 2019 (COVID-19) infection; of these patients, 10,023 died, 12,384 were successfully treated, and all other patients are currently undergoing treatment.⁽¹⁾ Not only has the burden of COVID-19 patients admitted to regional and national intensive care units resulted in decreased deceased donation rates, but it has dramatically impacted the referral of LT candidates, as well as on pretransplant and posttransplant care.

Abbreviations: CCM, chronic care model; COVID-19, coronavirus disease 2019; GP, general practitioner; HCC, hepatocellular carcinoma; LT, liver transplantation; MELD, Model for End-Stage Liver Disease; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; WHO, World Health Organization.

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At our center, the number of LT procedures dropped by 57% over the last month, namely, the center had 6 patients in March 2020 versus 14 patients in February 2020 with 5 transplants being performed after implementation of official confinement. These transplants occurred for alcohol-related acute-on-chronic liver failure (n = 1); hepatocellular carcinoma (HCC; n = 3), and primary biliary cholangitis (n = 1). Median (range) laboratory Model for End-Stage Liver Disease (MELD) scores did not show a major change (19 versus 18.5), and 30-day graft and patient survival remained unchanged (100%; Table 1). Donor and recipient nasopharyngeal swabs were mandatory prior to surgery after the introduction of official preventative measures for COVID-19. No donor tested positive, while 2 wait-list patients were diagnosed with SARS-CoV-2. Three patients declined a transplant offer (HCC, n = 2; alcohol-related liver cirrhosis, n = 1) for fear of COVID-19 infection.

Notably, reorganization of patient care underwent an unprecedented paradigm shift (Table 1). This shift consisted of the following:

1. Maintenance follow-up care was cancelled for routine patients with no urgent concerns and was transferred to remote assistance (ie, telephone, e-mail).
2. Outpatient care was devoted to early term LT recipients only and to those for whom a return home was impossible based on the implementation of social distancing measures (as per the Decree of the President of the Italian Council of Ministries, March 11, 2020).⁽²⁾
3. Pretransplant referral was limited to priority patients (as per acute and acute-on-chronic liver failure; decompensated patients with or without bleeding of the gastrointestinal tract; and HCC) after telephone triage from medical and nurse staff.

TABLE 1. Activities Implemented Since the Outbreak of COVID-19 Infection at Our LT Center

Area	Impact	Implemented Activities	Results
Deceased donation	Decreased	<ul style="list-style-type: none"> Telephone assistance for wait-list patients Interaction with local GPs and hepatologists for optimization of pretransplant care 	<ul style="list-style-type: none"> 41 wait-list patients followed up through remote assistance 35 local GPs and 6 hepatologists contacted for on-site care
Pretransplant referral	Shifted from a first-come, first-served basis to priority cases	<ul style="list-style-type: none"> Preliminary telephone triage from medical and nurse staff Shipping of medical records and imaging prior to visit at center 	<ul style="list-style-type: none"> 26 patients were triaged prior to outpatient visit 3 patients were excluded due to extrahepatic HCC (n = 2) and active alcohol use (n = 1) 15 patients were admitted to outpatient visits 8 patients on hold due to a lack of medical urgency (MELD <10) No wait-list mortality 3 patients (HCC, n = 2; alcohol use, n = 1) declined transplantation for fear of COVID-19 2 LT candidates tested positive for SARS-CoV-2 and were followed up via remote assistance/local GPs
Transplantation	Decreased (March 2020 versus February 2020)	<ul style="list-style-type: none"> Donor nasopharyngeal swab testing mandatory Recipient nasopharyngeal swab testing mandatory (<72 hours) Closer patient surveillance 	<ul style="list-style-type: none"> 57% overall reduction (6 transplants versus 14) 5 transplants performed after official confinement (alcohol-related acute-on-chronic liver failure, n = 1; HCC, n = 3; primary biliary cirrhosis, n = 1) Median laboratory MELD 19 (range, 17-34) versus 18.5 (range, 15-31) 100% 30-day graft and patient survival in both periods Recipient nasopharyngeal swab mandatory prior (<72 hours) to surgery after introduction of official confinement measures
Posttransplant care	Maintenance follow-up visits deferred unless urgent	<ul style="list-style-type: none"> Telephone/e-mail assistance Telephone triage for suspected COVID-19 infection based on regional, national, and WHO guidelines* 	<ul style="list-style-type: none"> 517 E-mail contacts from transplant patients/GPs (versus 325 over previous months, ie, 59.1% increase) 712 patient laboratory tests faxed (versus 491 over previous month, ie, 45.0% increase) 16 radiologic imaging shipped from transplant patients 2 LT recipients tested positive for SARS-CoV-2 and were followed up via remote assistance/local GPs
Health care workers	Implementation of safety policies and measures	<ul style="list-style-type: none"> Interindividual distancing Use of routine safety devices (masks) Remote work whenever possible 	<ul style="list-style-type: none"> No SARS-CoV-2 infection 5 workers (1 surgeon and 4 nurses) underwent genetic testing (nasopharyngeal swab) due to symptoms or at-risk contacts but all were negative

NOTE: Changes implemented during March 11-28, 2020, are given.

* WHO⁽³⁾ (2020).

- Wait-list patient follow-up was carried out on the phone and through interactions with local general practitioners (GPs) and referring hepatologists.
- Health care worker safety policies were implemented as indicated by health authorities and regional and central governments.⁽²⁾

Crucial to such a plan was the implementation of on-the-job training and remote educational initiatives on SARS-CoV-2 infection for the medical and nurse staff, daily updates on medical and surgical urgencies, and prompt referral of suspected COVID-19 infections to medical authorities, as per national and World Health Organization (WHO) guidelines.⁽³⁾

As a result, in March 2020 a total of 41 wait-list patients were followed up through remote assistance with collaboration from 35 local GPs and 6

hepatologists (Table 1). As many as 26 patients were triaged prior to outpatient visit, and 3 were excluded from follow-up, which was for extrahepatic HCC in 2 patients and active alcohol use in 1 patient. For the other patients, 15 liver disease patients were admitted to outpatient clinic, and 8 patients are still on hold due to a lack of medical urgency (MELD <10; Table 1).

Our outpatient follow-up activity underwent major changes, with 517 e-mail contacts from transplant patients or their referring GPs (versus 325 over the previous months, ie, a 59.1% increase); 712 laboratory tests were faxed (versus 491 previously, ie, a 45.0% increase); 16 radiologic tests were shipped from transplant patients; and 2 LT recipients were diagnosed with SARS-CoV-2 infection and followed up via remote assistance with collaboration from local GPs.

After implementation of social confinement policies, no case of COVID-19 was detected among our staff members. A total of 5 health care workers (1 surgeon, 4 nurses) underwent genetic testing (nasopharyngeal swab) for symptoms or at-risk contacts, but none tested positive (Table 1).

Despite the challenges inflicted on our National Health System, we firmly believe that COVID-19 infection is a unique opportunity to strengthen social cohesion and interprofessional cooperation; bolster relationships between care providers and patients; and reinforce the chronic care model (CCM).⁽⁴⁾ Although originally designed for improvement of care to chronic disease rather than for acute conditions, the CCM is based on productive interaction between informed, activated patients and prepared, proactive practice teams by the use of resources from health care organizations, communities, and policy makers.⁽⁴⁾ All of these components are necessary to contain the spread of SARS-CoV-2, to overcome infections, and to return as quickly as possible to regular transplant practice.

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