Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Clinical Microbiology and Infection 26 (2020) 1576–1578

Contents lists available at ScienceDirect

Clinical Microbiology and Infection

journal homepage: www.clinicalmicrobiologyandinfection.com

Letter to the Editor

COVID-19 Network: the response of an Italian Reference Institute to research challenges about a new pandemia

A. Bandera [1, 12, *], S. Aliberti [2, 12], R. Gualtierotti [3, 12], M. Baldini [4], F. Blasi [2, 12], M. Cesari [5, 13], G. Costantino [6, 13], A.L. Fracanzani [7, 12], A. Gori [1, 12], N. Montano [8, 13], V. Monzani [9], A. Nobili [14], F. Peyvandi [3, 12], A. Pesenti [6, 12], D. Prati [10], L. Valenti [10, 12], G. Fusetti [11], L. Scudeller [11], S. Bosari [11], for the COVID-19 Network[†], Scientific Direction, Department of Transfusion Medicine and Biobank, Infectious Diseases Unit, Internal Medicine, Hemophilia and Thrombosis Center and Fondazione Luigi Villa, Internal Medicine, Immunology and Allergies, Respiratory Unit and Cystic Fibrosis Adult Center, Cardiology Unit, Emergency Medicine, Acute Internal Medicine, Internal Medicine, Internal Medicine and Metabolic Diseases, Geriatric Unit, Istituto di Ricerche Farmacologiche Mario Negri IRCCS

[1] *Infectious Disease Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*
[2] *Department of Pathophysiology and Transplantation, University of Milan, Milan, Italy*
[3] *Respiratory Unit and Cystic Fibrosis Adult Center, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*
[4] *Internal Medicine and Hemostasis and Thrombosis Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milano, Italy*
[5] *Internal Medicine, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*
[6] *Geriatric Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*
[7] *Department of Clinical Sciences and Community Health, University of Milan, Milan, Italy*
[8] *Department of Anesthesia, Critical Care and Emergency, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*
[9] *Internal Medicine and Metabolic Diseases, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*
[10] *Internal Medicine, Immunology and Allergology, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*
[11] *Acute Medical Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*
[12] *Istituto di Ricerche Farmacologiche Mario Negri IRCCS, Milan, Italy*
[13] *Department of Transfusion Medicine and Hematology and Biobank POLI-MI, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*
[14] *Scientific Direction, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*

ARTICLE INFO

Article history:
Received 10 May 2020
Received in revised form
23 June 2020
Accepted 25 June 2020
Available online 30 June 2020

Editor: L. Leibovici

On 12 February 2020, the first case was reported of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission within Italy's borders with no apparent link to imported cases [1]. The number of confirmed infections has therefore multiplied, and Italy currently has the second highest number of recorded cases in a European country, with Lombardy the most affected region [2]. The regional health service has been reorganized, and coronavirus disease 2019 (COVID-19) units have rapidly been developed in most regional hospitals [3]. The COVID-19 outbreak represents a significant challenge for organizing translational research activity using a coordinated and multidisciplinary approach.

Founded in the 14th century, the Ospedale Maggiore Policlinico in Milan, Italy, is one of the leading Italian hospital in clinical and research activities, with 900 beds and 36 000 hospitalization per year. Notably, it hosts units for clinical follow-up and translational research in pulmonary, haematologic and infectious diseases, as well as a national reference centre for extracorporeal membrane oxygenation. From 21 February 2020, to cope with the COVID-19 emergency, the hospital's organization was quickly modified,

* Corresponding author. A. Bandera, Department of Pathophysiology and Transplantation, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, University of Milan, Infectious Diseases Unit, Via Francesco Sforza 35, 20122, Milan, Italy.
E-mail address: alessandra.bandera@unimi.it (A. Bandera).
[†] Members of the COVID-19 Network are listed in the Acknowledgements.

https://doi.org/10.1016/j.cmi.2020.06.028

with the installation of four different pavilions entirely dedicated to the management of COVID-19 patients to accommodate 350 patients, of which 50 are in intensive care units.

In the ongoing COVID-19 pandemic, the central research governance of the Ospedale Maggiore Policlinico has faced several challenges arising from: (a) the emergence of many study proposals from different research groups on the same patients; (b) the need to coordinate ethical questions in the absence of standardized procedures and approved treatments; (c) the need to collect biospecimens of interest for basic science and translational research projects; and (d) the need to divert staff from their normal research routines to COVID-19–focused projects, consistent with public health goals.

Thus, our first action was to rapidly establish a COVID-19 research steering committee with the aim of guiding institutional research activities.

Subsequently, an institutional coronavirus registry known as the COVID-19 Network was established to answer present and future research questions regarding the epidemiology and clinical presentation/evolution of this disease [4] and to set up a biobank of biological samples for translational studies (EC approval 241_2020, 17 March 2020). Funding for the biobanking activity was provided by scientific direction to the POLI-MI biobank, the hospital central facility for collection, conservation and assignment of biological material.

The aims of the registry are to: (a) describe the epidemiologic and clinical characteristics of patients admitted to the COVID-19 units; (b) describe diagnostic and therapeutic interventions; (c) evaluate the short- and long-term clinical outcomes and prognostic factors; and (d) allow subgroup analyses of specific patients' groups. Moreover, biological samples (plasma, peripheral blood mononuclear cells and stool) are collected at the time of diagnosis and at several time points, and stored for future investigations.

The registry includes all consecutive adults (aged 18 years or older) with a positive RT-PCR result for SARS-CoV-2 at the time of admission to the Policlinico hospital, with more than 800 patients expected to be enrolled.

The response of our hospital to COVID-19 outbreak was fast and well structured in order to guide institutional research activity on COVID-19 on an integrated and multidisciplinary basis. To this end, beyond the medical staff, 15 data managers, one biostatistician and one ethicist were involved in this activity. So far, 103 studies in several patient groups are in different stages of development; among these, 58 are observational, 19 non-pharmacologic interventional and 6 pharmacologic interventional studies. The ethics committee meets daily to assess the scientific and ethical value of the studies. Moreover, we have opened the registry to several regional and national centres to allow collection of data for centres with limited research resources and to create a network of different hospital units. To date, more than 984 patients overall have been enrolled (641 observed at the coordinating centre, Ospedale Maggiore Policlinico), and more than 1000 biological samples have been stored. Moreover, researchers from this study group have produced 112 research articles on COVID-19 (currently in press or already published).

The COVID-19 Network will also provide a platform for future national and international multicentre studies and investigator-initiated satellite projects. We plan not only epidemiologic studies but also precision medicine studies with a multidisciplinary approach, including immunology, virology and omics approaches. To our knowledge, only three other multicentre registries are currently ongoing at a national level, focused on neonates, children and intensive care units.

On the one hand, in evaluating our experience as a reference hospital facing the COVID-19 epidemic, we think that the tools that have facilitated research activities have been: (1) strong leadership in different disciplines, which proved fundamental in the management of COVID-19 patients; (b) IT resources, such as RedCap, i2b2 and teleconferencing systems; (3) coordination between different research units; (4) involvement of data managers and technical personnel dedicated to data collection, sample collection, processing and storage; (5) collaboration with other research institutes and clinical centres; and (6) strong motivation and altruism of clinical, research and support staff.

On the other hand, administrative issues linked to document generation and approval often acted as barriers. Furthermore, the limited data available in the clinical electronic records required a lot of human labor (data managers) to input highly granular data. Finally, conducting interventional pharmacologic studies proved difficult because of the limited preclinical and clinical data on many proposed drugs and because of the national-level centralization of drug trials.

To fully exploit the potential of our registry, data sharing will be crucial. Like similar initiatives at the national and international levels, our data will be available for projects proposed by basic and clinical research groups worldwide.

Transparency declaration

Funded by Ricerca Corrente, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Infectious Disease Unit, Milan, Italy (institutional funding to DP); COVID-19 Network Registry Biobanking, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico 5permille (LV). All authors report no conflicts of interest relevant to this letter.

Acknowledgements

We thank the healthcare workers at contributing hospitals for their professional and indefatigable commitment to COVID-19 patient care in these difficult times. We are also grateful to all the data managers, study coordinators, physicians and lab technicians involved in data and sample collection. We thank the personnel of the clinical trial center, grant office, IT services and human resources of Policlinico di Milano for their constant support.

Members of the COVID-19 NetworkWorking Group, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, are as follows: Scientific Direction: S. Bosari, L. Scudeller, G. Fusetti, L. Rusconi, S.Dell'Orto. Department of Transfusion Medicine and Biobank: D. Prati,L. Valenti, G. Lamorte, M. Manunta, G. Baselli, L. Santoro,. Infectious Diseases Unit: A. Gori, A. Bandera, A. Muscatello, D. Mangioni, L.Alagna, G. Bozzi, A. Lombardi, R. Ungaro, T. Itri, V. Ferroni, V. Pastore,R. Massafra, I. Rondolini. Internal Medicine, Hemophilia and Thrombosis Center and Fondazione Luigi Villa: F. Peyvandi, R. Gualtierotti, B. Ferrari, R. Rossio, E. Corona, N. Rampi, C. Massimo. Internal Medicine, Immunology and Allergies: N. Montano, B. Vigone, C. Bellocchi, E. Fiorelli, V. Melli, E. Tobaldini. Respiratory Unit and Cystic Fibrosis Adult Center: F. Blasi, S. Aliberti, M. Spotti, E. Simonetta, L. Terranova, F. Amati, C. Miele, S. Misuraca, A. D'Adda, S. Della Fiore, M. Di Pasquale, M. M. M. Contarini, M. Ori, L. Morlacchi, V. Rossetti, A. Gramegna, M. Pappalettera, M. Cavallini, A. Vigni. Cardiology Unit: M. Vicenzi, I. Rota. Emergency Medicine: G. Costantino, M. Solbiati, L. Furlan, M. Mancarella, G. Colombo, G. Colombo, A. Fanin. Acute Internal Medicine: V. Monzani, A. Rovellini, L. Barbetta, F. Billi, C. Folli. Internal Medicine: M. Baldini, I. Motta, N. Scaramellini. Internal Medicine and Metabolic Diseases: A. L. Fracanzani, R. Lombardi, F. Iuculano. Geriatric Unit: M. Cesari, M. Proietti, L. Calcaterra. Istituto di Ricerche Farmacologiche Mario Negri IRCCS: A. Nobili, M. Tettamanti, I. Monti.

References

[1] Spiteri G, Fielding J, Diercke M, Campese C, Enouf V, Gaymard A, et al. Review of 'First cases of coronavirus disease 2019 (COVID-19) in the WHO European region, 24 January to 21 February 2020.' One-minute summary. PHO reviewer's comments; 2020.
[2] Johns Hopkins University of Medicine; Coronavirus Resource Center. Coronavirus COVID-19 Global Cases by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins. 2020. Available at: https://coronavirus.jhu.edu/map.html.
[3] Grasselli G, Pesenti A, Cecconi M. Critical care utilization for the COVID-19 outbreak in Lombardy, Italy: early experience and forecast during an emergency response. JAMA 2020.
[4] Lipsitch M, Swerdlow DL, Finelli L. Defining the epidemiology of COVID-19—studies needed. N Engl J Med 2020;382:1194–6.