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LETTER TO THE EDITOR

COVID-19 emergency: from a general hospital to a covid hospital in one week, an Italian experience

Emergenza COVID-19: da ospedale generale ad ospedale Covid-19 in 7 giorni, un'esperienza italiana

Abstract

Aim of this letter is to describe the reconversion process of our general hospital, in just one week, into a COVID-19 Hospital. The working strategy allowed to quickly find the spaces, identify the working group, reshape the hospital organizational structure, redesign the flows and patient/health workers pathways. The hospital provided for a progressive activation of COVID-19 beds following the philosophy of the intensity of care. The main results were on management, flows, PPE and hygiene areas. Although some problems came out in the beginning, this fast hospital reconversion model may be replicated in the future to face similar epidemic or pandemic outbreaks.

Dear Editor:

In early 2020, to fight the rise of COVID-19 pandemic, the Government of Latium, a Region of Central Italy, decided to activate the Emergency Plan to increase by 50% the beds of the Intensive Care Units (ICUs) and of the multidisciplinary hospital wards (specializing in infectious, pneumological and cardiological diseases). Obviously, existing facilities were to be identified and adapted to the need (1-2). To reach these objectives, it was necessary to implement a plan that could allow a redesigning of the healthcare network, in order to maintain the global healthcare to the population, while facing the growing pressure on resources by the COVID-19 public health emergency.

The actions planned are summarized as follows:

- to expand the hospital reception areas, where suspected patients could wait in safety for the diagnosis;
- to postpone non urgent procedures, temporarily closing low priority activities and hospitalizations;
- to leave the mild symptomatic infected people at home or to send them to other facilities (COVID-19 Hotels), using telematic monitoring as much as possible;
- to adjust the bed capacity to the epidemiological trend, also adding temporary health facilities (3);
- to separate the flows of hospitalizations in different intensity of care levels, in order to preserve more resources for those in high intensity of care wards;
- to increase the expiratory ventilation assistance capacity;
- to gradually enhance the regional Intensive Care Network (4).

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After the regional authorities included our hospital in the group destined to become a COVID-19 hospital (5), we converted it partially, according to the instructions received. The Latium Region made the request on March 20, and the COVID-19 Hospital had to be operational by March 28.

Our hospital was originally a traditional general public hospital, built in the 1940s, spanning over 4 buildings, with a high level emergency area, highly specialized wards and about 400 beds. We moved immediately to prepare the project and managed to perform the most appropriate steps for the transformation of the hospital, to make it an active contributor to the fight against SARS-Cov-2.

The purpose of this Letter is to describe the hospital's conversion procedure, in just one week, from general hospital to COVID-19 Hospital.

The project

The Hospital Managerial Team took action quickly to accurately schedule the activities. As for the procedure, the same approach previously used by another hospital in northern Italy, the Humanitas Research Hospital of Rozzano (Milan), was applied (Figure 1).

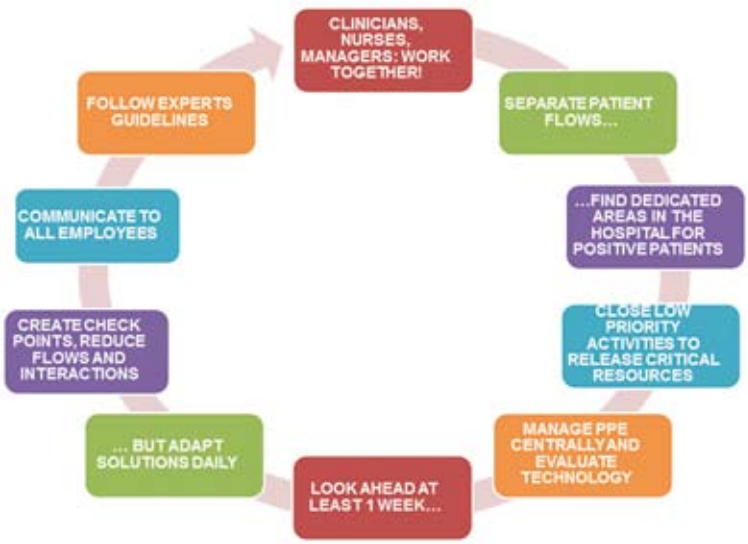

Figure 1 - Management suggestions for facing COVID-19

Strategy

The Hospital Medical Directorate dealt with the support of hospital physicians and qualified technicians to evaluate the project feasibility in a short time. The Hospital strategy has led to many interventions on the project before its implementation.

Management

The project immediately envisaged the establishment of a *Core Team*, where each member had defined responsibilities and aims. The Core Team included the members of the Medical Directorate, the Heads of ICU, Pulmonology, Cardiology, Internal Medicine, Pathology, the Nursing Coordinator and the Head of the Technical Office.

An *Internal Contact List* has been prepared (available in a short time) that included members of Administration, Nurses and Physicians of COVID-19 Hospital (Cardiology, Pneumology, Intensive care unit, radiology, Pathology), Security, Pharmacy and PPE center, Public Relations, Biosafety Office, Infection Control, Emergency Room (ER), Building Management, Cleaning and Waste management, Emergency

Transport, Patient Logistics and flows, Information and Communication Technology, Hospital Morgue. Beginning on March 20, a meeting of the Core Team and other key figures of the project was convened every 2 days to discuss about the present critical issues and those that emerged during the execution plan. The Information and Communication Technology Unit set up a shared space on the COVID-19 Hospital platform as an official internal communication service for all employees to share news, national and regional decisions and changes regarding the hospital.

The plan of the COVID-19Hospital provided for a progressive activation of COVID-19 beds following the logic of the intensity of care, considering the different categories of clinical features of patients and the technical characteristics of each hospital room. Initially it was planned to open 20 inpatient beds with medium care intensity. After a further 5 days, an additional 10 single beds were expected to be activated in a high intensity of care unit. For the creation of a new ICU dedicated to COVID-19 patients, the supply of oxygen and medical gases has been expanded with the technical support of the Hospital Technical Office. In agreement with the emergency network of the Lazio Region, if necessary, the Hospital would have made available an additional ward of 20 beds of medium intensity care and another of low intensity care that would act as an intermediate care facility for patients who, following hospital discharge, needed final stabilization of their clinical situation before returning home.

Following the experiences of the Humanitas Hospital, once the beds were activated, our COVID-19 Hospital communicated electronically to the Regional Coordinating Center its beds availability, in order to inform the emergency electronical network about the additional number of beds available daily; in that way the Lazio Region could manage all the different kinds of COVID-19 beds altogether available in its Hospitals (6).

The allocation of resources to the COVID-19 wards contemplated a previous appropriate preparation and training of the workforce. Smart working was considered only when feasible. The Hospital also activated a dedicated phone line to offer psychological support to healthcare professionals. The psychologist was available on the phone h 12 per day.

Flows and pathways

The patients' flow was redesigned. The COVID-19 patients were given a priority and assigned dedicated pathway (indicated by colored signs) to get to their ward. In order to dedicate hospital areas to positive patients, a single hospital building was chosen, next to the ER, to isolate patients as much as possible and maintain separate patient flows. The main routes have been designed as suggested by the literature (7-11): from the dedicated Emergency Rooms to the COVID-19 wards, from the COVID-19 wards to the Radiology service, from the COVID-19 wards to the operating rooms, from the COVID-19 wards to the Interventional Cardiology Service. It was set up a pre-triage tent outside the ER for respiratory patients, potentially SARS-CoV-2 positive. Local protocols for triage of patients with respiratory symptoms were established, to test them rapidly, and, depending on the diagnosis, allocate them to the right place. The ER was divided in two areas, one to treat COVID-19 suspects (waiting for nasopharyngeal swab results) and one for the other non-suspect patients, in order to minimize crossed pathways and the risk of in-hospital transmission (but also non-suspect patients were submitted to the swab test). There was a place to treat patients through mechanical ventilation, if necessary, pending the final result of diagnostic tests.

Critically ill patients with suspected or confirmed COVID-19 diagnosis should ideally be admitted to an airborne infection isolation room (AIIR) that is at negative pressure relative to surrounding areas (12). In our Hospital the AIIRs are unavailable, so patients have been placed in adequately ventilated single rooms with the doors closed, as recommended by the World Health Organization (WHO), with accessible sinks and alcohol hand gel dispensers (13-14). An ambulance and a taxi car were located just outside the Emergency Room, dedicated exclusively to pick up COVID-19 patients. When the patients were brought to the Hospital by other cars or ambulances, these were submitted to a standard procedure of disinfection.

Personal Protection Equipments

After calculating the initial Personal Protection Equipments (PPEs) requirement for HCWs, an Operations Center was set up near the pharmacy for the adequate and specific supply and distribution of PPEs for the new COVID-19 Hospital: gloves, medical/surgical face masks (FFP2, FFP3 or equivalent), goggles, face shield and gowns, as well as items for specific procedures (15). The PPE Center ensured uninterrupted supplies for the ICU and the isolation units of infusion pumps, cleaning and disinfection material, alcohol solution for hand hygiene, bins for infectious waste.

The PPE Operations Center and the COVID-19 Hospital staff were in daily contact to solve any problems such as any additional PPE required or other supplies. The Hospital Risk Manager organized training courses for HCWs at risk of contagion about the correct use (including donning and doffing) of the PPEs as per the protocol of the Italian National Institute of Health. The courses consisted of a theoretical part and a practical part, including the use of Information Technology supports.

Hygiene

The sanitation service was available h 24 and followed the moves of the COVID-19 patients. WHO's recommendations were adopted (16). Surfaces in all environments in which COVID-19 patients receive care (ICU, treatment units, community care centres) had to be cleaned at least once a day and after discharge. Commonly used hospital disinfectants have been recommended: 70% ethyl alcohol to disinfect small areas between uses, such as reusable dedicated equipment (for example, thermometers); sodium hypochlorite at 0.5% for disinfecting surfaces. Laundry machine was set up with warm water at 60–90°C with normal laundry detergent (16).

Considerations and Conclusions

Sars-Cov2 is a new virus that has led to an unprecedented public health crisis in Italy. There are not strong evidences about a fast hospital reshaping model during a pandemic.

According to the recommendations of the Regional Health Authority (5), our Institution was able to reorganize an entire building in one week as COVID-19 Hospital. Different emergency plans, specific treatment pathways, internal operating protocols and guidelines, new skills have been developed to manage this new disease, ensuring high quality of care to COVID-19 patients and, at the same time, guaranteeing high quality of care to non-COVID-19 hospitalized patients in the non-involved wards of the hospital. And, finally, all the risks of contagion for other patients and the staff have been minimized.

This fast hospital reshaping model may be used again in the future for pandemic or epidemic outbreaks, to protect patients and healthcare operators, through the integration of hospital management with the regional emergency network, all supported by the high professionality of the HCWs and of the tehnical staff of the hospital.

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