

COVID-19: HOW CAN A DEPARTMENT OF GENERAL SURGERY SURVIVE TO A PANDEMIC?

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Text of the paper

The outbreak of coronavirus disease officially started on the 31st of December 2019, when the Wuhan Municipal Health Commission reported 27 cases of pneumonia of unknown etiology.

Chinese scientists found the pathogen that causes this atypical pneumonia and named it "SARS-CoV-2" [1]. The disease caused by this novel coronavirus was called COVID-19 by the WHO on February the 11th 2020 [2].

Now, the outbreak of COVID-19 is a public health emergency of international concern, since more than 150 Countries have been quickly involved in the spread of this disease [3].

The SARS-CoV-2 is highly contagious and seems to have a predilection for middle-aged males, with a median age of 56 [4].

The infection could be characterized by a variety of symptoms: dry cough, fever, myalgia, asthenia, and dyspnea, but also vomit, diarrhea, abdominal pain, and anorexia. Besides, COVID-19 can bring to a severe infection of the inferior respiratory tract, with pneumonia, and acute distress respiratory syndrome (ARDS). Nevertheless, the majority of people experience an asymptomatic or little-symptomatic disease, according to the Chinese Centre for Disease Control and Prevention [5].

The first two Italian cases of COVID-19 were identified at Spallanzani Institute, on the 30th of January 2020: it was a couple of Chinese tourists coming from Wuhan. Then, other cases were identified and put under strict quarantine, but, with a relief of the authorities, all cases came from the Hubei Province.

Then, on February the 20th, the first hospitalization for COVID-19 occurred in Italy. It was a case of a 38-old male from Codogno, Lombardy, with atypical pneumonia, which has had no contact with Chinese people nor traveled to Asia.

The next day, 4 other people were urgently addressed to the infectious disease reference center Luigi Sacco Hospital, which was about to become one of the most important hubs for COVID-19 care. Most hospitals in Northern Italy have been reorganized. Most of them have special areas for COVID-19 patients. In Milan, some hospitals are working as hubs, to collect patients with the same disease.

On the 23rd of February, the Italian Government issued a decree-law, in order to contain the infection. Extraordinary measures were taken during the next days, such as the closure of bars, restaurants, and museums in the regions involved by the virus' spread. Even schools were closed in those areas.

Since February the 21st, everything has changed in Luigi Sacco Hospital.

All ambulances called by 112 (European emergency Number) coming from the territory were prevented to head to Sacco Hospital, to which only transfers of critical patients from other hospitals were accepted. Despite this measure and the Government discouragement, more and more people appeared to the hospital emergency room.

A reorganization of the hospital complex structure was immediately required, in order to contain the infection's spread and to prevent each department from being invaded by the

virus. This enormous task required to use existing teams and resources efficiently, to build a solid and effective structure.

As almost 10% of COVID-19 patients required intensive care, the regular Intensive Care Unit was closed on the 21st of February and a wider dedicated ICU was established near the Infectious Disease Department Building.

Since then, the emergency room has been almost completely dedicated to handling infective patients, and the most of unsuspected patients who required urgent medical or surgical treatment have been hijacked to other hospitals. Thanks to this measure, between the 22nd of February and the 20th of March, only 9 urgent interventions concerning general surgery have been performed at Sacco Hospital.

For Surgical and Operating Room Department, some special considerations need to be done. First, the number of anesthesiologists available for the Operatory Room has steeply decreased, because of their efforts to manage the state of emergency. Second, the ICU would not be available for delicate and complicated surgical patients. Third, the nursing staff was involved: the number of cases has grown to such an extent that aid staff has been recruited and dispatched from other departments to the Infectious Disease Unit.

Consequently, all patients admitted to the surgical department who did not require urgent treatment were discharged; some unsuspected patients have been transferred from the Infectious Disease to the Surgical Department in order to free beds for the COVID emergency; all scheduled surgery has been suspended. Therefore, between the 22nd of February and the 1st of March, the operating room was almost paralyzed, and no elective surgery has been performed.

On the 1st of March, the number of Italian cases of COVID-19 was about 1700, and the trend seemed to be at a rapid increase. As a consequence, the Italian Government implemented

and extended the emergency measures to Lombardy and other 14 Provinces. On the 4th of March, these rules would be extended to the whole National territory. From the 10th of March on, Italian people have been forced to stay home, unless it's urgent, or necessary [6]. On the 11th of March, the WHO declared COVID-19 a pandemic [7].

To deal with this emergency, and to try to maintain "a clean surgical service" for urgent and oncological patients, in contrast to other realities [8], the General Surgery Unit had to reorganize spaces and personnel. Because of the transfer of the nursing staff, the number of beds assigned to surgery has been halved (from 40 to 20). Also, to cope with the number of infected people, the Week Surgery Course was closed and dedicated to the management of highly suspect patients waiting for laboratory tests or mild confirmed cases waiting for admission. But it was not enough.

The more patients arrived, the more doctors and nurses were required. Therefore, on the 9th of March, an urgent department meeting was held, and plenty of surgeons pleaded ready to help.

As a consequence, the next day, a third of general surgeons received detailed instructions on what to do and how to behave in handling COVID-19 patients. Courses on dressing and undressing procedures as well as on respiratory failure treatment mainly focused on the application of continuous positive airway pressure were held. Since then, those surgeons were employed in the emergency department and in the management of highly suspect patients waiting for laboratory tests or mild confirmed cases waiting for admission. As an example of adapting to cope with adversities, they were all excluded from surgical activities and prevented from having contacts with the other surgeons.

In this respect, dedicated pathways were arranged to separate "clean" areas, included courses, stairs, elevators, changing rooms, and showers from those defined "contaminated".

Having said that, the Operating Room remained a “clean” area with dedicated staff, and no COVID-19 outpatient or inpatient of Sacco Hospital needed an urgent surgical operation until now. Anyway, if necessary, an OR located at the end of the operative complex, with a separate entrance, is available for all suspected or confirmed cases. The same operating room and anesthesia machines would only be used for COVID-19 cases for the duration of the epidemic. A separate pathway and elevator are prepared in case of COVID-19 surgical urgency, and a surgical dedicated staff is on call, if needed.

Furthermore, for oncological patients who need general or abdominal surgery, the Unit of General Surgery of Sacco Hospital joined an agreement written and issued by a group of experts established by Lombardy Region Authorities. These criteria define the requirements for oncological patients and list them on an urgent basis. Therefore, patients are divided into three groups, which should undergo surgical procedure within two weeks, two months, or delayed after two months respectively. The aim is to allow oncological patients to have access to elective surgery, as well as to give adequate treatment to patients who need post-operative ICU, working in another secure and clean hub. Previously, other Authorities and Hospitals have already made such plans for some critical patients [9].

As regards the general surgery ward, all patients are screened before admission with home screening and evaluation by phone call, to identify fever or respiratory symptoms, and, at admission, with blood tests and lung X-rays. To avoid nosocomial transmission of the virus, the members of the medical and nursing staff always use personal protective equipment (PPE). Besides, the visitor policy was updated: all patients may have only one visitor at a time and each visitor should wear a surgical mask during the entire stay. Concerning clinic, office visits were suspended, and all hospital appointments were delayed, except for the emergency ones, to make resources available for most severe cases.

As a result of these measures, between the 2nd and the 20th of March, 20 elective surgical operations in oncological patients have been safely performed, and no patient in the general surgery ward resulted SARS-CoV-2 positive nor had respiratory symptoms, nor positive X-ray. Besides, other 19 oncological patients have been listed to undergo surgical operations within the next two weeks.

In conclusion, although Sacco Hospital is an infectious disease center, no infected patients have been identified in the General Surgery Unit and no patient developed COVID-19 after surgery. Until now, surgeons could be professionally and ethically proud of their work, because they are demonstrating good coping skills in this situation, despite the few resources available.

Anyway, we could say we have learned this lesson: two months ago, the epidemic broke out in Wuhan seemed to be very far and we felt safe, in our continent. We should have considered that, in a globalized world, any epidemic could easily spread with a simple flight. If we could go back in time, we should have implemented these recommendations in advance.

Moreover, it would have been useful to immediately identify reference hubs sorted by pathology, in order to maintain "clean" areas and hospitals.

Another thing we think should not be underestimated is the possible psychological distress that doctors can experience during coronavirus emergency. Healthcare professionals involved could undergo a Critical Incident Stress Syndrome, with emotional reactions which could even compromise private and social life. For this reason, Sacco Hospital have arranged a psychosocial support for healthcare personnel. This has turned to be a very important measure we suggest implementing, to get totally ready.

The recommendations described in this article are based on current clinical practice and previous experiences reported during the current outbreak [10].

Key point box

What we do need to survive	
1. Self-protection -->	Personal protective equipment
2. Designing -->	Separate wards, different pathways
3. Strategy -->	Planning surgical activity on a urgent basis
4. Resilience -->	Adapting to cope
5. Institution -->	Psychosocial support

Conflicts of interest

The authors declare no conflict of interest.

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References

1. Sohrabi C, Alsafi Z, O'Neill N, et al. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *Int J Surg.* 2020;76:71-76.
2. Naming the coronavirus disease (COVID-19) and the virus that causes it [WHO web site]. Available at [https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-\(covid-2019\)-and-the-virus-that-causes-it](https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it). Accessed March 16, 2020.

3. Coronavirus Update (Live): 179,558 Cases and 7,067 Deaths from COVID-19 Virus Outbreak - Worldometer. Available at <https://www.worldometers.info/coronavirus/>. Accessed March 16, 2020.
4. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *The Lancet*. 2020;0(0).
5. Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. *JAMA*. February 2020.
6. decreto_del_presidente_del_consiglio_dei_ministri_8_marzo_2020_en_rev_1.pdf. [Esteri.it web site]. Available at https://www.esteri.it/mae/resource/doc/2020/03/decreto_del_presidente_del_consiglio_dei_ministri_8_marzo_2020_en_rev_1.pdf. Accessed March 16, 2020.
7. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. [WHO web site]. Available at <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>. Accessed March 16, 2020.
8. Iacobucci G. Covid-19: GP surgeries close for two weeks after staff test positive. *BMJ*. 2020;368.
9. Lung Cancer Study Group, Chinese Thoracic Society, Chinese Medical Association, Chinese Respiratory Oncology Collaboration. [Expert recommendations on the management of patients with advanced non-small cell lung cancer during epidemic of COVID-19 (Trial version)]. *Zhonghua Jie He He Hu Xi Za Zhi*. 2020;43(0):E031.

10. Tao J, Song Z, Yang L, Huang C, Feng A, Man X. Emergency management for preventing and controlling nosocomial infection of 2019 novel coronavirus: implications for the dermatology department. *British Journal of Dermatology*. n/a(n/a).