

Gastroenterology department operational reorganisation at the time of covid-19 outbreak: an Italian and Chinese experience

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COVID-19 OUTBREAK AND IMPACT FOR HEALTH SYSTEM

In December 2019, cases of acute respiratory distress syndrome (ARDS) were first reported in Wuhan, China. A new coronavirus, named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by WHO, was identified as the pathogenic agent causing the covid-19.¹ Even if this new virus appears to be less fatal when compared with MERS-CoV and SARS-CoV, it appears to be highly more contagious,² so that there have been more than 200 000 confirmed cases worldwide since the beginning of the outbreak. On 11 March, the WHO declared a global pandemic—Italy and China being the areas at highest risk.³

Covid-19 clinical presentation is similar to that of other types of pneumonia,⁴ namely flu-like manifestations, such as fever and cough, possibly evolving to severe hypoxaemia, ARDS and hypoxic respiratory failure. Interestingly, abnormal findings at chest CT, which may be present also in asymptomatic patients, are becoming an early diagnostic tool.⁵

Luckily, these symptoms are present in about 10% of infected patients with a 2%–8% mortality rate,⁶ the most severe patients being men over 60 years with underlying health conditions, such as diabetes, hypertension, cardiovascular diseases and cancer.

While the management of patients with covid-19 is a relatively simple task, namely to provide supportive care (ie, ventilation), and no specific antivirals are so far validated,⁷ a major concern comes from the number of patients eventually requiring intensive care (IC) assistance. Mathematical models, aimed at instructing political leaders, show an exponential increase both in the number of people being infected and in those requiring IC.⁶ In most predictions, a 3-month period is estimated to be required in order to fully control the outbreak.⁸

In China, community isolation measures have been shown to be pivotal in reducing the spread of the outbreak and in limiting the pressure on health system infrastructures that were requested to exceed their capacity.⁹ Therefore, it is conceivable that containment interventions based on segregation of infected communities, as well as on widespread social distancing, may slow the number of daily new cases, thus reducing the number of overall cases and, in turn, keeping the health system capacity at a manageable level and avoiding that all resources be devoted to covid-19 emergency (figure 1A).

Gastroenterology department operational reorganisation due to covid-19

In all health systems, the covid-19 pandemic is worldwide requiring the progressive allocation of most logistic, technological and human resources to infected patients. This has an obvious impact on the routine activity of most medical and surgical units, limiting numbers, redefining priorities and forcing stricter protective measures within the hospitals. The departments of gastroenterology are particularly involved in this reorganisational process for a variety of reasons: (1) as part of the professional area of internal medicine, gastroenterologists and hepatologists may be directly involved in the medical management of patients with covid-19; (2) endoscopic procedures are obviously at high risk of contagion both for patients and doctors; (3) the high

request for urgent GI consultations is not decreasing during the emergency; and (4) the medical treatment of patients with IBD and GI/liver cancer cannot be discontinued and specific prophylactic measures might temporarily apply to these immunocompromised subjects.

Therefore, a fast operational reorganisation of hospital GI activities is mandatory in order to maintain as good as possible the standards of care for gastroenterological patients during the covid-19 emergency while providing the highest level of protection for patients and healthcare providers (HCPs) such as doctors and nurses (figure 1B).

Based on Italian and Chinese experience, our proposal is actually driven by the need of two-way protection for GI patients and health professionals whose rate of infection is extremely high (at least 10%) in Italy,^{9,10} even in the absence of an extended policy for viral testing by swabs while in China 3.8%, rising up to 63% only in Wuhan.¹

Figure 1B schematically addresses possible operational interventions, as suggested by the Chinese and Italian experiences, in the different settings of inpatients, endoscopy, immunocompromised patients and GI consultations. First of all (in red, right side), the proposal takes for granted that the entire hospital has implemented physical separation, distinct routes from emergency towards, dedicated teams and a dedicated CT scan for patients with ascertained or highly suspected (swab in progress) covid-19.

In addition, it is recommended to reduce the access and personnel density of digestive medical staff in the ward. As the endoscopy room limits the selection of patients, it is also recommended that the endoscopy staff shift. Therefore, the use of protective equipment is indirectly reduced.

Also for granted is the fact that GI doctors and nurses, as all hospital professionals, wear protective masks and eye-protective goggles, and frequently wash their hands with alcoholic solutions.

However, a single department cannot implement the whole protection plan, and the plan of the digestive department must also be based on the protection strategy of the whole hospital and the whole city.

OUTPATIENTS

Since home isolation of the population is the best way to avoid the diffusion of the virus, all non-urgent outpatients' appointments could be postponed until the outbreak is under control. Moreover, as viral RNA can be cleared by faeces of affected patients,^{11–13}

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public toilets may be places at risk of infection, especially for patients having GI symptoms, such as diarrhoea. Medical institutions should be encouraged to carry out virtual clinics. For non-urgent patients and patients with chronic digestive diseases (especially IBD and autoimmune liver disease), online consultation can solve most problems of patients; for patients who need request online refills of long-term medications, it is recommended to choose express delivery to reduce the opportunity for patients to visit the hospital.

For those who need resupply of long-term medications for maintenance of remission, to choose express delivery to reduce the opportunity for patients to visit the hospital is recommended.

If an appointment cannot be postponed, the epidemiological investigation should be done, measuring body temperature, inquiring about symptoms related to covid-19 infection need to be done, preferably at the entrance of the hospital. In high endemic areas, HCPs should wear surgical face masks, gloves and eye-protective goggles, keeping a distance of at least 1 m to avoid any contact with infected air droplets.

PATIENTS IN TREATMENT, IMMUNOCOMPROMISED (PATIENTS WITH IBD, GI CANCER AND TRANSPLANT PATIENTS)

Patients with IBD, patients with GI cancer undergoing chemotherapy or transplanted patients are in a state of impaired immunity and may be more susceptible to the SARS-CoV-2 virus, especially in patients using immunosuppressants or biologicals. For patients who need to start new treatments, ideally, drugs that can be administered at home by injection or orally should be used to avoid frequent access to the hospital many times. For patients who are receiving scheduled infusion therapies, regular treatment maintenance can continue, but distance among infusion chairs, avoiding overcrowded clinics and skipping companions inside the hospital are necessary measures of prevention to follow. Patients should wear surgical masks to protect themselves and should be invited to maintain strict social isolation when at home.

INPATIENTS

The crucial rule is that admission of GI patients must be limited as much as possible in order to prevent unnecessary exposure of patients to the risk of covid-19 hospital infection but also considering the restricted number of available beds and the reduction of the staff partially diverted to the

management of non-GI conditions. Therefore, the usual case-mix of GI inpatients must be refined by two basic criteria: (A) carefully identify acute conditions usually treated in the hospital as manageable at home under adequate medical supervision (either direct or remote) (eg, antibiotic therapy for cholecystitis, diverticulitis and diarrhoea); and (B) avoid admittances for deferrable endoscopic procedures (see below).

In addition: (A) health professionals serving in the wards must not have any access to hospital areas dedicated to patients with covid-19; (B) patients cannot receive visitors; and (C) rooms and shared restrooms (the virus may be present in the faeces) must be repeatedly sanitised.

ENDOSCOPY

Endoscopy is a very ‘high risk’ procedure during the covid-19 outbreak, because

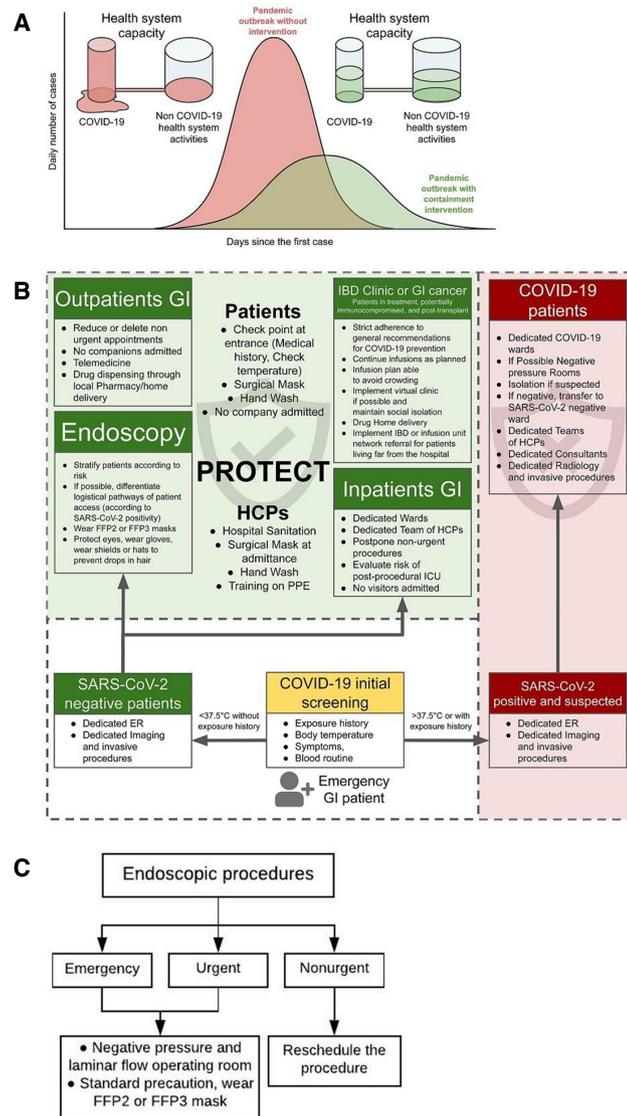


Figure 1 (A) Density plot showing the daily number of cases as a function of days since the first case, in the two predicted scenarios of a pandemic outbreak, without intervention (red distribution), with the fast acceleration of new cases resulting in overflowing of health system capacity due to covid-19 emergency burden and with containment intervention (green distribution), with the slow acceleration of the number of cases, ultimately leading to easier management of the healthcare system capabilities. (B) Schematic representation of the different clinical compartments during the covid-19 emergency and the decision flow chart showing the path a GI patient could follow during the pandemic. GI patients undergo covid-19 initial screening and are divided within a protected environment with its dedicated resources (green area). On the contrary, suspected or diagnosed covid-19 patients are isolated from the rest of any other healthcare activity with dedicated resources and extensive containment measurements (red area). (C) Decision algorithm for patients requiring endoscopic procedures. HCPs, healthcare providers.

of the risk of exposure to respiratory and digestive tract secretions during the procedures, the short physical distance and the faecal–oral transmission.^{11–13–16} Subjects attending an invasive procedure should be considered as potential carriers of covid-19, and therefore protection of endoscopy HCPs is mandatory, including wearing surgical masks or FFP2/3 masks, gloves, eye-protective goggles and shields or hats to prevent drips in hair. Endoscopy should be accessible to severe acute GI disease, such as acute GI haemorrhage, removal of foreign bodies in the digestive tract, endoscopic treatment of suppurative obstructive cholangitis, biliary pancreatitis and so on.³ Urgent endoscopies should be performed according to clinical judgement, whereas postponing non-urgent procedures until the end of the outbreak is advisable, including screening endoscopy (figure 1C).

Physically separated areas between covid-19 and non-covid-19 patients should be available. Endoscopy should be performed in a negative pressure laminar flow operating room for covid-19 patients, and where it is not possible, morning or afternoon shifts in the endoscopic rooms with sanitation is advisable.

CONCLUSIONS

The pandemic by covid-19 requires to adapt the GI department activities to comply with the general rules to prevent virus diffusion. Isolation and country/region lockdown are successful strategies to avoid the fast spreading of the infection and the overload of hospitals and intensive care units. Since this is not an opportunistic infection, the risk of infection and complications appears to be no different from the general population in IBD or other immunosuppressed patients. Therefore, all the WHO recommendations should be followed by everyone. After the outbreak emergency period, containment strategies should be kept until the outbreak is under control worldwide. Education of HCPs and of the general population is key to avoid and/or manage future outbreaks.

Covid-19 pandemic requires a prompt reshaping of GI department activities aimed at adequately addressing non-deferrable gastroenterological needs of the community while minimising patient access to hospital services. Online consultations, home drug deliveries, careful selection of acutely ill patients that are deemed to be manageable at home and strict protective measures during urgent endoscopic procedures are all key factors of such a reorganisation

process. Importantly, immunocompromised GI patients seem not to be at higher risk of covid-19 infection and/or clinical complications.

Obviously, at this stage, our recommendations cannot be supported by data finely assessing the quality of care and the general outcome of GI diseases in our communities during the pandemic period. Consequently, the current key deliverable is simply that the reorganisation of GI departments will not cause any patient mismanagement. In particular, no death potentially referable to delayed medical or surgical intervention on GI patients should occur.

The duration of the proposed reorganisation cannot be predicted and should strictly depend on curves of the covid-19 pandemic at the regional level. However, it seems entirely possible that lessons learned during this emergency will permanently modify operational modalities of GI departments.

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REFERENCES

- Wang D, Hu B, Hu C, *et al.* Clinical characteristics of 138 hospitalized patients with 2019 novel Coronavirus–Infected pneumonia in Wuhan, China. *JAMA* 2020;323:1061.
- Meo SA, Alhowikan AM, Al-Khlaifi T, *et al.* Novel coronavirus 2019-nCoV: prevalence, biological and clinical characteristics comparison with SARS-CoV and MERS-CoV. *Eur Rev Med Pharmacol Sci* 2020;24:2012–9.
- Razai MS, Doerholt K, Ladhani S, *et al.* Coronavirus disease 2019 (covid-19): a guide for UK GPs. *BMJ* 2020;368:m800.
- Huang C, Wang Y, Li X, *et al.* Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet* 2020;395:497–506.
- Shi *Het al.* Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: a descriptive study. *Lancet Infect Dis* 2020.
- Remuzzi A, Remuzzi G. COVID-19 and Italy: what next? *Lancet* 2020. doi:10.1016/S0140-6736(20)30627-9. [Epub ahead of print: 13 Mar 2020].
- Baden LR, Rubin EJ. Covid-19 — the search for effective therapy. *N Engl J Med Overseas Ed* 2020.
- Hellewell *Jet al.* Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts. *Lancet Glob Health* 2020.
- 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. doi:10.1001/jama.2020.4031. [Epub ahead of print: 13 Mar 2020].
- Danese S, Cecconi M, Spinelli A. Management of IBD during the COVID-19 outbreak: resetting clinical priorities. *Nat Rev Gastroenterol Hepatol* 2020;323. doi:10.1038/s41575-020-0294-8. [Epub ahead of print: 25 Mar 2020].
- Gu J, Han B, Wang J. COVID-19: gastrointestinal manifestations and potential fecal-oral transmission. *Gastroenterology* 2020. doi:10.1053/j.gastro.2020.02.054. [Epub ahead of print: 03 Mar 2020].
- Mao R, Liang J, Shen J, *et al.* Implications of COVID-19 for patients with pre-existing digestive diseases. *Lancet Gastroenterol Hepatol* 2020. doi:10.1016/S2468-1253(20)30076-5. [Epub ahead of print: 11 Mar 2020].
- Xu Y, Li X, Zhu B, *et al.* Characteristics of pediatric SARS-CoV-2 infection and potential evidence for persistent fecal viral shedding. *Nat Med* 2020;395.
- Repici A, Maselli R, Colombo M, *et al.* Coronavirus (COVID-19) outbreak: what the Department of endoscopy should know. *Gastrointest Endosc* 2020. doi:10.1016/j.gie.2020.03.019. [Epub ahead of print: 14 Mar 2020].
- Xiao F, Tang M, Zheng X, *et al.* Evidence for gastrointestinal infection of SARS-CoV-2. *Gastroenterology* 2020. doi:10.1053/j.gastro.2020.02.055. [Epub ahead of print: 03 Mar 2020].
- Wang W, Xu Y, Gao R, *et al.* Detection of SARS-CoV-2 in different types of clinical specimens. *JAMA* 2020. doi:10.1001/jama.2020.3786. [Epub ahead of print: 11 Mar 2020].

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