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COVID-19 pandemic: Practical advice for Endoscopy Units. Mistakes to be avoided. Experience of the Italian North-Eastern Venetian Region

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ABSTRACT

Italy is the second most affected by coronavirus epidemy country in the world. In this article, members of the Italian Society of Surgical Endoscopy analyze the work of endoscopic units during the COVID-19 pandemic. Authors explain how to stratify patients according to risk groups, how to put on and off personal protective equipment, list decontamination standards for endoscopic equipment and endoscopic room.

Keywords: *endoscopy, coronavirus, COVID-19, personal protective equipment*

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The spread of COVID 19 in Italy began in January 2020 and mainly affected the northeastern regions of Italy [1]. As of April 1, 2020, 77,635 COVID-19 positive patients were registered in Italy, of which 12,428 were fatal. Italy has the second highest incidence of new coronavirus infections in the world.

The Lombardy, Veneto, Emilia-Romagna and Piedmont regions of Italy are mostly affected by the spread of COVID-19 (Lombardy: 25,124 infected/7,199 deaths; Emilia-Romagna: 10,953/1,644; Piedmont: 8,082/854; Veneto: 7,850/477) [1]. At the same time these regions are important economic centres, therefore it has led to serious financial problems throughout the country.

From the outset, the risk of proliferation was largely underestimated and political and medical institutions were not prepared to face the problem.

Overall, after a gradual reduction in the number of beds and medical personnel over the past 10 years, Italy's health care system has not been able to hospitalize all seriously affected patients in intensive care units. New resuscitation units were set up as a matter of urgency, and it was difficult to obtain respirators and personal protective equipment.

From the institutional and political point of view, there was a serious underestimation of the situation, which made it impossible to immediately block the main areas of contamination. One sad example was the spread of infection in the province of Bergamo (the most affected in Italy) following a football match between Atalanta and Valencia. The same happened after the PSG Champions League (Paris) game. In Verona, one of the most affected cities in the Veneto region, a decisive factor in the spread of the infection was the stay of Chinese citizens with positive COVID-19 status, and the tourist attraction of the city.

The main mistake in many cities was the lack of security in hospitals. The spread of the virus among patients was observed in all departments, as there was no proper separation of the flows of infected and uninfected patients,

Potential SARS-CoV-2 infection risk in endoscopy patients [3]

Low risk	No symptoms (e.g., cough, fever, shortness of breath, diarrhoea)
	No contact with positives for SARS-CoV-2
	No visits to SARS-CoV-2 risk zones during the previous 14 days
Intermediate risk	Presence of symptoms with:
	-lack of SARS-CoV-2 contact data
	-no visits to SARS-CoV-2 risk zones during the previous 14 days
	No symptoms, but:
	-contact with SARS-CoV-2 infected persons
	-visits to high-risk areas during the previous 14 days
High risk	Presence of at least one symptom + one of the following conditions:
	-contact with infected SARS-CoV-2
	-visits to high-risk areas in the preceding 14 days

and among medical personnel due to the lack of personal protective equipment.

Another mistake was to allow family visits to patients with COVID-19 status, which led to further infection among the rest of the population.

The regions of north-eastern Italy had rather late organized PCR testing of the medical and administrative staff of hospitals, as well as people suspected of COVID-19. Later, especially in the Veneto region, the testing program reached a large part of the population. The serological testing campaign has only recently been launched to identify the portion of the population that has already undergone COVID-19 and has specific antibodies to the virus.

These people can return to their jobs and help the country in difficult times of financial instability. Moreover, the plasma of the reconvalescents has been shown to be highly effective in treating patients with severe COVID-19 in intensive care units.

Endoscopy services should adapt to the new working conditions and limit the performance of endoscopic manipulations to emergency and urgent cases, as well as endoscopic care for oncological patients.

In March 2020, the WEO (World Endoscopic Organization) issued the following rules, according to which the following patient information must be obtained prior to the endoscopic examination [2]:

a. Fever greater than 37.5 °C

b. Epidemiological history (leaving the country)

c. Occupational exposure

r. COVID-19 patient contact history

d. Presence of relatives/acquaintances with COVID-19 symptoms

Thus, it is possible to carry out correct stratification of patients and quickly identify any suspicious cases.

Patients should be stratified into low-, intermediate- and high-risk groups prior to performing the endoscopic study [3] **(table)**.

If the procedure can be postponed without harm to the patient, it should be rescheduled until the epidemic situation improves. Otherwise, it is essential for the patient to wear a surgical mask until the examination. The scheme proposed by the Canadian Gastroenterologists' Association is useful for deciding whether to perform endoscopic manipulation in a specific patient **(fig. 1)** [3].

The recent provisions provide for the use of FFP2 masks only in certain categories of workers (e.g., endoscopists, pulmonologoists, resuscitators performing intubation). However, since this pandemic is a «new» event, methods of protection against the virus may change.

Initially, the medical staff in the endoscopic ward had to follow the personal protection rules proposed by the World Health Organization (WHO) [2] and the Advisory Committee on Infectious Diseases and Additional Precautions, Ontario (IPAC) [4]. The above recommendations listed endoscopic procedures for aerosol formation:

— endotracheal intubation;

— cardiopulmonary resuscitation;

— aspiration from the airway;

— bronchoscopy;

— operational interventions and autopsy;

— collection of sputum;

— non-invasive ventilation with positive pressure in acute respiratory distress (CPAP, Bipap3 /5);

— High-flow oxygen therapy.

Personal protective equipment

Until now, only surgical masks have been used in endoscopy, as it was thought that endoscopic examination was not among the procedures with an increased risk of infection.

In the course of endoscopic procedures, medical staff and the patient are in close proximity, so the doctor and paramedical staff are in contact with a mucous or saliva aerosol, especially during the performance of the EGD. The highest transmission risk is within 1 meter.

But according to the studies conducted during the SARS (Severe Acute Respiratory Syndrome) epidemic of 2003, we know that the aerosol can spread up to 1.8 meters from the infected person. Medical personnel were also found to be at risk of exposure to colonoscopy, as the

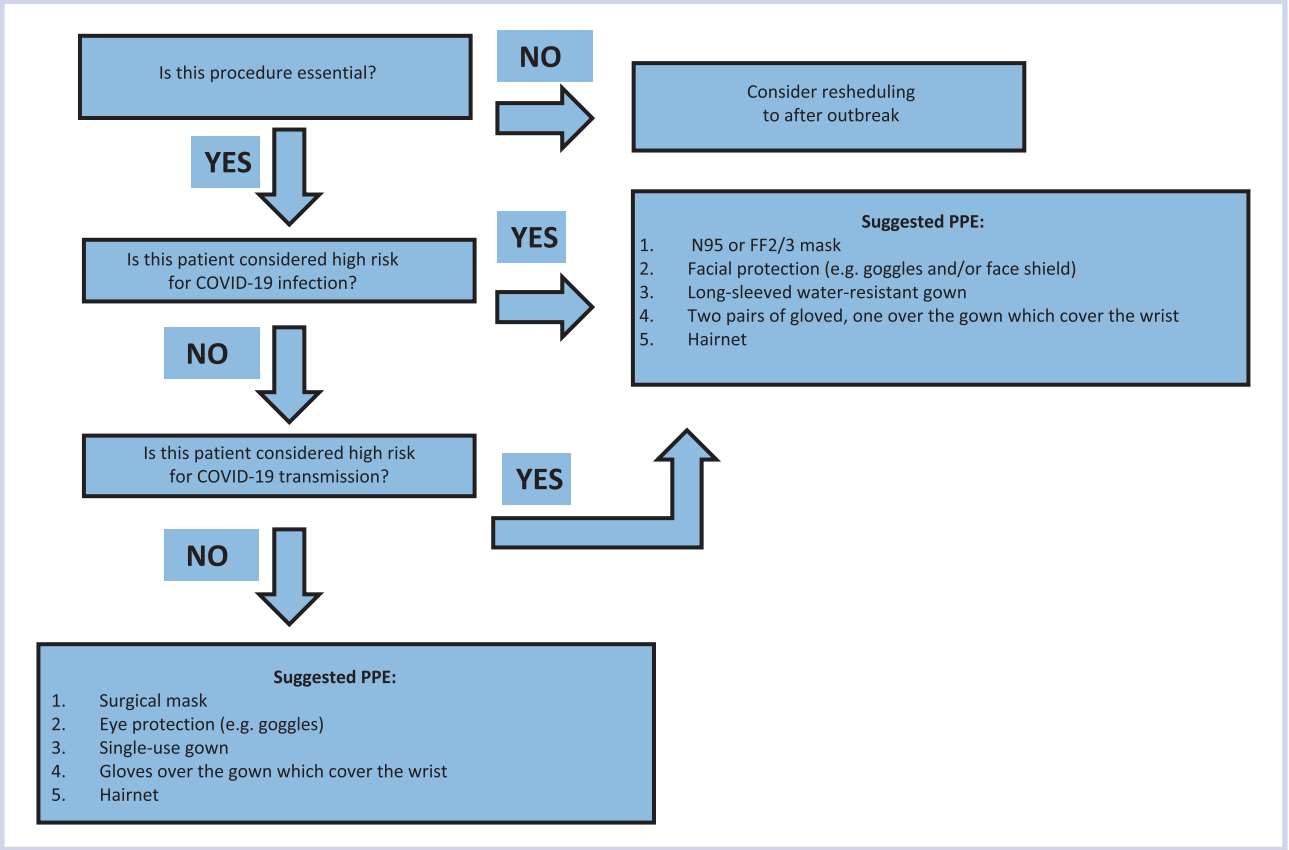

Fig. 1. **Decision tree proposed by the Canadian Association of Gastroenterology for performing endoscopic procedures during the COVID-19 pandemic [3].**

fecal-oral pathway of SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) was recently proven. Two recent studies have shown positive responses to COVID-19 in rectal smears in 29—52% of patients with SARS-CoV-2 [5, 6].

The Italian Society for Gastrointestinal Endoscopy (SIED) in a message 13 of 12 March 2020 [7], and the Italian Society for Surgical Endoscopy (ISSE) in a letter to the Presidents of the Regions dated 1 April 2020 [8] due to the above-mentioned risks of transmission, it was recommended that all endoscopic procedures performed during COVID-19 must use all precautions, not only because of the high risk of infection during the endoscopic study, but also because of the general risk of interpersonal infection. Considering the transmission of COVID-19 not only aerogenic but also fecal-oral, including the incubation period, SIED and ISSE have stated that the use of PPE (FFP2, glasses, gloves, long-sleeved robes) is mandatory in all endoscopic studies **(fig. 2)**.

It is necessary to insist on the widespread implementation of these provisions, since today in the regions of north-eastern Italy, in most endoscopy services, medical personnel are equipped with only simple surgical masks.

On 23 March 2020, the Italian Society for Diseases of the Digestive System (FISMAD) established the following precautionary measures for medical personnel:

1. Hand hygiene (hygienic hand-washing with soap and water, hand-washing with skin antiseptic) should be carried out before direct contact with the patient; after contact with the patient, after contact with the body secrets or excretes, mucous membranes, bandages; prior to performing various care operations; after contact with medical equipment and other objects in the immediate vicinity of the patient; after each contact with contaminated surfaces and equipment.

2. During assistance, it should be undertaken without touching any surfaces in the immediate vicinity of the patient to prevent both contamination of clean hands by environmental surfaces and the transmission of pathogens from contaminated hands to surfaces;

3. When coughing, one should cover a mouth with a disposable handkerchief, which should be discarded as soon as possible (immediately after: hygienic handling of hands) or, if not, cough in the fold of the elbow. It is possible to make an aqueous alcohol solution for hand hygiene;

4. Contaminated surfaces should be disinfected with sodium hypochlorite solution of 10%.

Precautions in the endoscopic room when caring for patients with a negative COVID-19 status

It is recommended to follow standard precautions, recycle all disposable PPE into a Class B container, use

	**Surgical mask** It protects from the spreading of microorganisms from mouth and nose of the wearer but it is not designed to protect the wearer from inhaling airborne bacteria or virus particles. It is a disposable device.
	**FFP1** It is also called "dustproof", it does not protect from the virus but only from non-toxic and non-fibrogenic powders. It is used in the construction or food sector.
	**FFP2 – FFP3** It filters up to 92%. It protects from the virus and must be used by health personnel or in work environments where the air contains harmful substances. FFP3 filters up to 99%.

Fig. 2. **Personal protective equipment.**

FFP2/FFP3 filter masks, wear non-sterile disposable gown with long sleeves and remove it. Before taking off gloves and leaving the endoscopy room, wear goggles, tie long hair and always wear a medical cap. Before leaving the room, always use alcohol gel to disinfect your hands or have your hands cleaned. Staff working with patients should wear new gloves before leaving the endoscopic room and keep the mask on.

According to the ISSE, patients should also wear a surgical mask during the endoscopy by inserting a mouthpiece through a small hole in the mask, thus reducing the risk of large drops **(fig. 3)**.

Additional precautions in the care of patients with COVID-19 (suspected or identified) PPE for use in intensive care units or in wards with negative pressure. The gown shall be replaced after medical treatment. Follow the rules of dressing and remove the PPE as specified in [9].

Role of the negative pressure chambers

Negative pressure wards are isolation techniques used in hospitals and health centres to prevent cross-contamination of rooms. It is used to isolate patients with airborne infections.

Although The American Gastrointestinal Endoscopy Society (ASGE) offers to perform endoscopic procedures in these chambers, which are unavailable in most medical facilities. It would therefore be useful to urgently equip at least one endoscopic room with a negative pressure system to be used for all patients with respiratory symptoms.

If this is not possible, it is recommended to perform endoscopic procedures in patients with a high risk or positive SARS-CoV-2 test in other offices, outside the endoscopy department, in rooms with negative air pressure.

Fig. 3. **Surgical mask usage in a patient during endoscopic examination.**

Decontamination standards for endoscopic equipment

The risk of transmission of any micro-organism is extremely low or non-existent if the instructions for disinfection are strictly followed.

The use of disposable tools is desirable. All reusable endoscopic tools and accessories should be treated according to a standard procedure. The used disinfectants should have the following characteristics: bactericidal, mycobactericidal, fungicidal and virulent. It is useful to carry out extraordinary trainings for personnel according to the rules of handling of endoscopic equipment.

Decontamination standards for endoscopic rooms

There's no data yet on the virucidal efficacy of chemical agents against SARS-CoV-2. So we rely on data available to other coronaviruses. SARS-CoV-2 is stable in stool and urine for at least 1—2 days, so possible sources of contamination may be surfaces. For the disinfection of sur-

faces and equipment we recommend using a solution of bleach and water in a ratio of 1:100. After an endoscopic examination in a patient with positive SARS-CoV-2 or in a negative pressure ward, it is recommended to wait about 30 minutes before allowing the next patient to enter, as the small particles can remain in suspended air.

In the absence of negative pressure chambers, it is recommended that the endoscopic room must be ventilated for at least one hour.

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