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Title: Covid-19 patients and surgery: Guidelines and checklist proposal.

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Abstract

The management of patients with novel 2019 coronavirus (Covid-19) represents a new challenge for medical and surgical teams. Each operating room in the world should be prepared with thinking and the development of a protocol and patient route seems mandatory. Adequate degree of protection must be used. We propose recommendations to help different professionals in the establishment of protocols for the management of patients with Covid-19. We also offer a Checklist which could be used in operating room.

Introduction

In december 2019, pneumonia of unknown causes were described in Wuhan province ^{1,2}. Patients were identified and a new coronavirus was described quickly (2019-nCoV) ¹. Many cases have been described and the spread was quickly carried out in China but also internationally, with the virus reaching Europe ²⁻⁵. The disease seems to spread with human-to-human transmission ⁶ implying professionals contaminated during the care of some patients ^{7,8}. As of February 11, 2020, 3019 Chinese health care workers were infected with Covid-19 and 6 died from it ⁹. In recent decades, we have had examples of epidemic coronavirus. During the SARS and MERS epidemic, infected patients had to undergo emergency surgery ¹⁰⁻¹³. Cases of transmission to health professionals during operating theaters have also been described in previous epidemics and should be prevented ^{10,14}.

The situation is rapidly evolving and we can observe an alarming increase in cases in the world. The European situation is worrying: at the beginning of March 2020, 15 million people were placed in quarantine in Italy and thereafter the whole country, a significant increase in the number of cases is observed in other countries, especially in France now in quarantine (Figure 1). The situation subsequently spread worryingly to North America. Surgical emergencies may be multiple, and some infected patients will need surgical care. Facing this increase of cases, in the same way as China ^{8,15,16}, we will be confronted with patients needing emergency surgery. It is necessary to anticipate and prepare to take care of Covid-19 patients in the operating room.

The objective of this study is to establish recommendations for the management of a patient with covid-19 coronavirus in the operating room. It is essential to be prepared and to have received good information to deal with the management of these cases in order to reduce the risk of contamination.

Before Surgery

The degree of emergency must be assessed and it is preferable to postpone the surgical procedure if it is not urgently needed. It is necessary to use the protective material in the right situation and avoid shortages of protection. We recommend seeking the advice of the hospital's infectious disease department to consider surgery in a patient with the coronavirus Covid-19. In our centers, scheduled patients are hospitalized 48 hours before surgery. If the patient is asymptomatic, we perform a PCR screening test upon arrival. If the patient is symptomatic, we perform 2 screening tests 24 hours apart, combined with a chest CT-scan. The same procedure is applied for patients arriving in emergency adjusted to the required delay of surgery. Antibodies are not routine tests at this time. As soon as they will be available and reliable, they probably should be added to the screening strategy and coupled with the PCR technique to optimize preoperative screening.

Several situations can be encountered:

- If the patient is suspected or confirmed to have coronavirus Covid-19, it is necessary to take the utmost precaution for the management of this patient. A specific protocol should be followed in the operating room (OR). It is obvious that a PCR test must be performed to obtain a necessary diagnosis in these patients ¹⁷.

- If the patient is cured (resolution of clinical symptoms), we currently advise taking the same precautions in the operating room as for a confirmed patient. The precautionary principle should be followed given the absence of follow-up on this disease (risk of

asymptomatic case, risk of second contamination of the patient, risk of carrying the virus longer).

- If a coronavirus diagnosis is made after surgery, it is necessary to identify all the surgical staff who have been in contact with the patient and consider quarantining them after advice from the infectious disease department.

The surgical staff that will take care of this type of patient must have been trained in this risk management and aware of the protocol established in the institution. In this protocol, the patient's journey must have been planned in advance by the OR referents.

It is necessary to delimit a precise route, to avoid as much as possible the patient's contact with other unprotected personnel as well as other patients: dedicated elevator and corridors (Figure 2). In this course, the patient's route should avoid buffer zones such as the recovery room or the induction room. OR must be dedicated for these patients.

The patient must wear a surgical mask when transferring to the OR. Personnel must use a dedicated stretcher with disposable protections that will be well disinfected after use. Moreover, caregivers should take their temperature before surgery.

During Surgery

Operating rooms are generally under positive pressure. In these cases an OR must be dedicated and should be switched to negative pressure ^{10-13,15}. We must therefore anticipate this situation and plan to modify the environment in these rooms. In fact, the passage of air from the room to the outside must be limited as much as possible ¹⁸. This procedure should be planned upstream with the hospital engineers, to obtain a negative room pressure (-5 Pa) ¹⁰. We recommend for each surgical team to approach their engineering team in order to study the feasibility and prepare their structure to anticipate such a situation.

A clear display must be set up outside the room to inform other health care worker. The number of people in the Operating room must be reduced to the strict minimum. It is necessary to establish traceability of the health care worker present during the surgery. All the equipment necessary for the surgery procedure must be prepared and present in the operating room. It is necessary to avoid entering and leaving the room as much as possible during surgery. Disposable equipment is preferred.

All health staff in the OR area should use the following protection ¹¹: head cover, shoes cover, surgical gowns, surgical goggles, two pairs of surgical gloves, respiratory masks FFP2. If the material is available, it is possible to use a system powered air-purifying respirator ¹⁰. The staff must be trained to wear the equipment in good conditions, in particular the FFP2 respiratory masks.

The anesthesiologist must wear the same protective equipment when faced with a very high risk of contamination during intubation and extubation procedures. ¹¹. The patient must benefit from an adequate sedation, preferably associated with a curarization in order to avoid agitation and cough episodes. After the intubation, a wet compress can be added to the patient's nose to avoid spreading the virus in the air in the event of a cough ¹⁵. It is also important limiting disconnection of the circuit when positioning the patient.

The surgeon must take the utmost precaution during the surgical procedure in order to reduce the risk of accidents involving exposure to body fluids and tissues. In the event of an

exposure accident, the establishment's standard protocols should be followed to deal with a blood exposure accident. The infectious disease department should immediately be contacted and a test could be considered ¹⁹.

The patient should be awakened in the OR. The patient should wear a surgical mask as soon as he is awake. Once again the recovery room should be avoided and the patient should be brought back to his room directly if possible ¹⁰. 30 minutes ventilation of the room at the end of surgery should be achieved ^{12,20}.

After Surgery

At each transfer, the patient should wear a surgical mask when leaving the operating room. A strict disinfection of the OR should be achieved. The OR should be closed for 2 hours and then switched to the laminar flow again. We recommend the elimination and destruction of body fluids and tissues using bags that allow double closure, and waste and liquids to be destroyed with infectious medical waste. For bacteriological or anatomopathological samples, also use a hermetically sealed bag with a double closure and call the center to recover and inform about the situation.

The health care staff must undress at the end of the procedure, helped by another caregiver because of the risk of contamination during this procedure. Strict decontamination of the OR is required. The infectious disease department of the hospital or hygiene department may be requested to perform tests in the OR to check the presence of viruses. The reusable material used must be carefully cleaned with the usual decontaminating detergent products.

Concerning patients, during postoperative time, he presents a high risk of pneumonia, fevers, infections, with an increase in the level of white blood cells, which can make diagnosis of postoperative infection difficult. In addition to regular temperature monitoring for patients, the surgical staff in contact must also monitor their temperature twice a day ¹⁵. Postoperative temperature monitoring is necessary for patients not at risk being treated for another pathology. Indeed, we can cite the situation in a Wuhan hospital with the post-operative appearance of several cases of Covid-19 coronavirus, either in asymptomatic patients ¹⁶.

We recommend the daily washing of hands for staff, patients and families of patients. Family visits should be limited to the strict minimum. However, in the current situation in our centers, family visits are prohibited. In cases of visits the patient's family should also wear a surgical mask when visiting the patient, and staff should pay attention to contact with families. Indeed, they can also carry Covid-19 so it is necessary to apply the protection procedures for suspicious cases.

Conclusion

The management of patients with Covid-19 represents a new challenge for medical and surgical teams not accustomed to a large flow of patients. It is important, as of now, that each establishment and structure became aware of the development and prepare for an adequate crisis management.

It is obvious that these recommendations are the result of thinking and research between health care professionals working in the operating room (Figure 3). These recommendations will be confirmed by additional studies with more perspectives on the situation concerning this new virus.

Patient supervision in the operating room must be considered and organized previously to guarantee the safety of the surgical staff and to limit the spread of the disease. Each operating room in the world must prepare with thinking by developing a protocol and patient route. The surgical staff must be aware of the procedure for the care of patients with Covid-19, well trained in the establishment and prepared to deal with it, including during emergency.

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Abbreviations:

SARS: Severe acute respiratory syndrome

MERS: Middle East respiratory syndrome

PCR: Polymerase chain reaction

OR: Operating Room

FFP2: Filtering Facepiece Particles 2

Pa: Pascal

Bibliography

1. Zhu N, Zhang D, Wang W, et al. A Novel Coronavirus from Patients with Pneumonia in China, 2019. *N Engl J Med*. 2020;382(8):727-733. doi:10.1056/NEJMoa2001017
2. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. *Lancet Lond Engl*. 2020;395(10223):470-473. doi:10.1016/S0140-6736(20)30185-9
3. Johnson HC, Gossner CM, Colzani E, et al. Potential scenarios for the progression of a COVID-19 epidemic in the European Union and the European Economic Area, March 2020. *Eurosurveillance*. 2020;25(9):2000202. doi:10.2807/1560-7917.ES.2020.25.9.2000202

4. Spiteri G, Fielding J, Diercke M, et al. First cases of coronavirus disease 2019 (COVID-19) in the WHO European Region, 24 January to 21 February 2020. *Eurosurveillance*. 2020;25(9):2000178. doi:10.2807/1560-7917.ES.2020.25.9.2000178
5. Bernard Stoecklin S, Rolland P, Silue Y, et al. First cases of coronavirus disease 2019 (COVID-19) in France: surveillance, investigations and control measures, January 2020. *Euro Surveill Bull Eur Sur Mal Transm Eur Commun Dis Bull*. 2020;25(6). doi:10.2807/1560-7917.ES.2020.25.6.2000094
6. Riou J, Althaus CL. Pattern of early human-to-human transmission of Wuhan 2019 novel coronavirus (2019-nCoV), December 2019 to January 2020. *Euro Surveill Bull Eur Sur Mal Transm Eur Commun Dis Bull*. 2020;25(4). doi:10.2807/1560-7917.ES.2020.25.4.2000058
7. Guan W-J, Ni Z-Y, Hu Y, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med*. February 2020. doi:10.1056/NEJMoa2002032
8. Zhou P, Huang Z, Xiao Y, Huang X, Fan X-G. Protecting Chinese Healthcare Workers While Combating the 2019 Novel Coronavirus. *Infect Control Hosp Epidemiol*. March 2020;1-4. doi:10.1017/ice.2020.60
9. Liu Xing, Bing Xue, Za Zhi. Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. [The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China]. *Zhonghua Liuxingbingxue Zazhi*. 2020;41(2):145-151. doi:10.3760/cma.j.issn.0254-6450.2020.02.003
10. Park J, Yoo SY, Ko J-H, et al. Infection Prevention Measures for Surgical Procedures during a Middle East Respiratory Syndrome Outbreak in a Tertiary Care Hospital in South Korea. *Sci Rep*. 2020;10(1):325. doi:10.1038/s41598-019-57216-x
11. Tien HC, Chughtai T, Jogeklar A, Cooper AB, Brenneman F. Elective and emergency surgery in patients with severe acute respiratory syndrome (SARS). *Can J Surg J Can Chir*. 2005;48(1):71-74.
12. Chee VWT, Khoo ML-C, Lee SF, Lai YC, Chin NM. Infection control measures for operative procedures in severe acute respiratory syndrome-related patients. *Anesthesiology*. 2004;100(6):1394-1398. doi:10.1097/00000542-200406000-00010
13. Wong SF, Chow KM, Shek CC, et al. Measures to prevent healthcare workers from contracting severe acute respiratory syndrome during high-risk surgical procedures. *Eur J Clin Microbiol Infect Dis Off Publ Eur Soc Clin Microbiol*. 2004;23(2):131-133. doi:10.1007/s10096-003-1068-2
14. Wan IYP, Wan S, Arifi AA, Yim APC. When surgeons become SARS patients. *Ann R Coll Surg Engl*. 2004;86(2):144-145.
15. Tao KX, Zhang BX, Zhang P, et al. [Recommendations for general surgery clinical practice in novel coronavirus pneumonia situation]. *Zhonghua Wai Ke Za Zhi*. 2020;58(0):E001. doi:10.3760/cma.j.issn.0529-5815.2020.0001

16. Gou SM, Yin T, Xiong JX, Peng T, Li Y, Wu HS. [Treatment of pancreatic diseases and prevention of infection during outbreak of 2019 coronavirus disease]. *Zhonghua Wai Ke Za Zhi*. 2020;58(0):E006. doi:10.3760/cma.j.cn112139-20200224-00123
17. Corman VM, Landt O, Kaiser M, et al. Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR. *Euro Surveill Bull Eur Sur Mal Transm Eur Commun Dis Bull*. 2020;25(3). doi:10.2807/1560-7917.ES.2020.25.3.2000045
18. Chow TT, Kwan A, Lin Z, Bai W. Conversion of operating theatre from positive to negative pressure environment. *J Hosp Infect*. 2006;64(4):371-378. doi:10.1016/j.jhin.2006.07.020
19. Si Y, Sun XF, Zhong M, Yue JN, Fu WG. [Countermeasures and treatment for aortic acute syndrome with novel coronavirus pneumonia]. *Zhonghua Wai Ke Za Zhi*. 2020;58(0):E002. doi:10.3760/cma.j.issn.0529-5815.2020.0002
20. Peng PWH, Wong DT, Bevan D, Gardam M. Infection control and anesthesia: lessons learned from the Toronto SARS outbreak. *Can J Anaesth J Can Anesth*. 2003;50(10):989-997. doi:10.1007/BF03018361

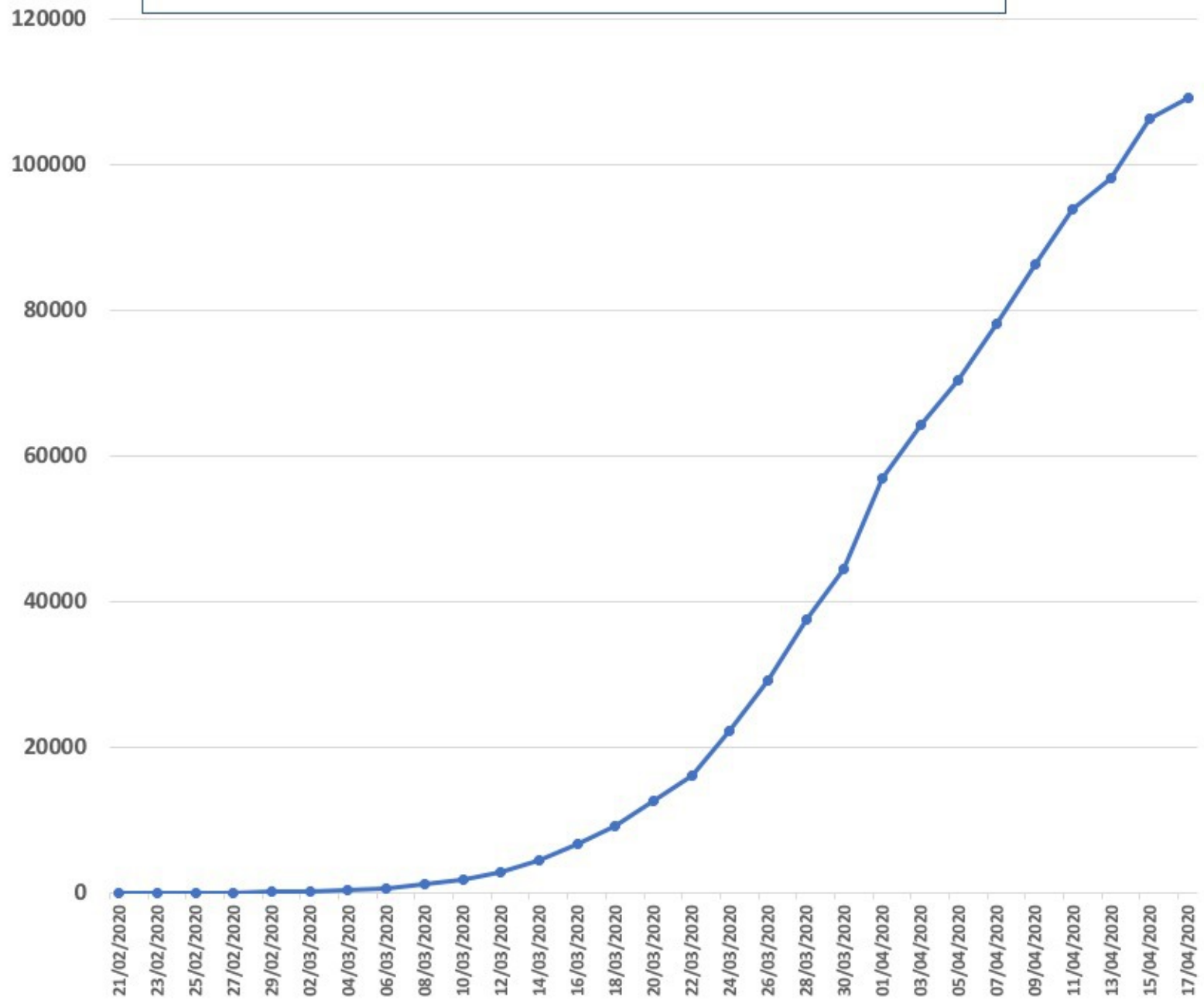
Figures legend

Figure 1: Evolution of coronavirus cases Covid-19 in France (Source: Public Health France)

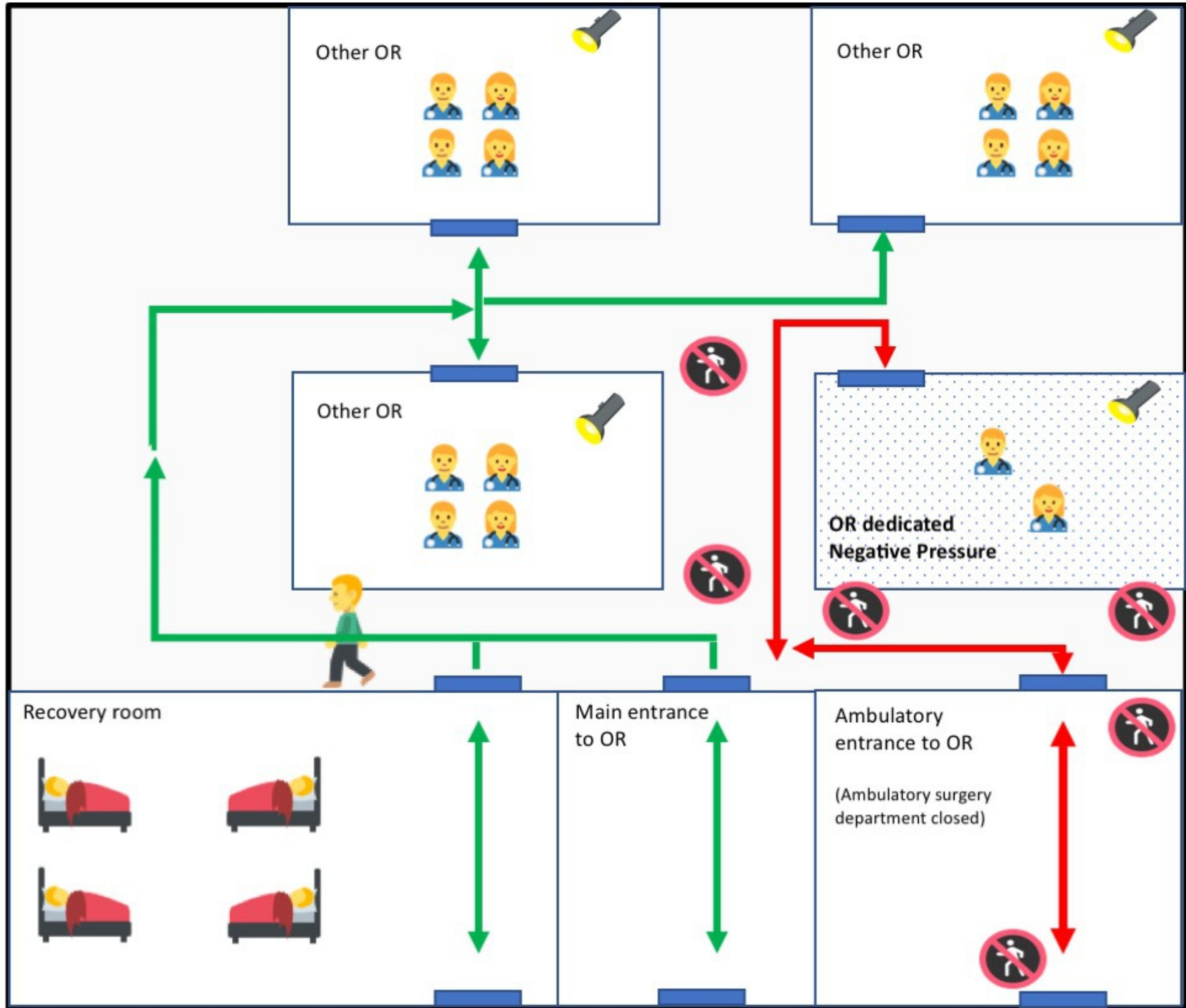
Figure 2: Example of a pre-established patient route in case of suspected or confirmed Covid-19 patient. Green arrows: Usual route of patients. Red arrows: Covid-19 patients route. If possible, corridors, elevators and OR should be dedicated; Patient should avoid Buffers zones such as recovery room.

Figure 3: Management of Suspicion of Covid-19 in Operating Room (OR): Safety Checklist of mandatory points to limit the surgical staff exposure and the spread of the disease.

Evolution of Coronavirus cases Covid-19 in France



Source: Public Health France



Management of Suspicion of Covid-19 in Operating Room (OR): Checklist

Before OR

- **Confirmed Covid-19 case (PCR)?**
 YES NO
- **Necessary surgery?**
 YES NO
- **Infectious disease department is informed?**
 YES NO
- **Itinerary of the patient is planned?**
 YES NO
- **Surgical team, anesthesiologist, nurses are informed and ready to take care of the patient?**
 YES NO
- **Patient wears a surgical mask?**
 YES NO

In OR

- **OR is under negative pressure?**
 YES NO NOT APPLICABLE
- **Health care workers in the OR are identified and listed?**
 YES NO
- **All surgical equipment is in OR?**
 YES NO
- **Health care workers follow the personal protection equipment protocol?**
 YES NO
- **Patient wears a surgical mask after extubation?**
 YES NO

After OR

- **Any incident during the procedure?**
 YES NO
- **Elimination and destruction of infectious medical waste?**
 YES NO
- **OR is decontaminated strictly?**
 YES NO
- **Itinerary of the patient is planned?**
 YES NO
- **Surgical department, nurses are informed and ready to take care of the patient?**
 YES NO
- **Patient wears a surgical mask?**
 YES NO

**The surgical staff have to take their temperature twice a day and wash their hands regularly*