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Title: Minimally invasive surgery at the time of Covid-19: The OR staff needs protection

Short title: Laparoscopy at the time of Covid-19

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Coronavirus disease 2019 (ie, SARS-CoV-2 or Covid-19) is an infectious disease caused by severe acute respiratory syndrome in humans. In January 2020, the World Health Organization (WHO) formally declared a Public Health Emergency of International Concern (PHEIC) and on 11 March 2020 the WHO declared it a pandemic [1]. COVID-19 is highly infective, having COVID-19 infected more than 100 000 people in 100 countries [2]. The pandemic has changing our life dramatically, peoples are working at home, mass transit is down, cities are doomed. Medicine is changing too, since many physicians and resources are specifically dedicated to the Covid-19

emergency. Although medical treatment is changing, avoiding surgery in most cases (benign disease and non-urgent indication) oncologic surgery is still performed in dedicated hospitals.

Whereas possible surgical procedures should be delayed. Surgery play a role in reducing the immune response and might be increase the risk of developing severe acute respiratory disease in patients harboring asymptomatic Covid-19 infection.

Open surgery and in particular upper abdominal extensive surgical procedures increase the risk of pulmonary complications [3]. Moreover, open approach should be avoided in order to reduce length of hospital stay and possible postoperative morbidity , thus reducing in-hospital spread of Covid-19.

Although minimally invasive surgery improve short term patients outcomes and it is associated with a faster recovery in comparison to traditional approach, we have concerns related to the adoption of minimally invasive surgery in patients potentially infected by Covid-19. Potentially infective viral components has been identified in surgical smoke and could potentially transmit disease [4-6]. To date, no clear have demonstrate that virus might infect the OR staff during electrosurgery. Although the possibility of disease transmission through surgical smoke exists in humans, actual documented cases of pathogen transmission are rare especially RNA virus like Covid-19 [1, 5, 6]. However, owing to the possible risk of contamination from Covid-19, protection of health care providers is mandatory. Even during open surgery we have to keep attention to possible contamination occurring be contact of human fluids (including blood) but also we should paid attention in breathing possible particles coming from pneumoperitoneum. The release of aerosol through the trocar valves, might potentially expose the OR staff to Covid-19. Levels of pneumoperitoneum pressure and the power settings of electrocautery should be as low as possible in order to reduce possible aerosol formation. The OR staff needs substantial protection during all procedures and in particular during minimally invasive surgery. Further studies are needed to confirm this hypothesis. Until now, filters have to be applied in order to reduce possible spread of the virus. Adequate personal protective equipment are necessary to all staff working into the operative theater. Since the importance in reducing Covid-19 spread (especially in health care provider), other minimally

invasive techniques would be preferred to conventional laparoscopic procedures. By this point of view, isobaric minimally invasive technique and robotic-assisted surgery might reduce the risk of contamination of the OR staff. Additionally, these procedures determinate a low impact of pulmonary functions avoiding the need of steep Trendelenburg position and reducing intra-abdominal pressure. Evidence is needed to better understand the risk of OR staff and provide the best treatment for our patients even during Covid-19 pandemic outbreaks

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