Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Letters to the Editor

Regarding "Understanding the 'Scope' of the Problem: Why Laparoscopy Is Considered Safe during the COVID-19 Pandemic"

To the Editor:

We read the editorial titled "Understanding the 'Scope' of the Problem: Why Laparoscopy Is Considered Safe during the COVID-19 Pandemic," recently published in the journal, with great interest [1]. In recent weeks, anesthesiologists are at the frontline of the fight against coronavirus 2019 (COVID-19), particularly at the time of airway management. When we talk about surgery, surgeons and other operating room medical personnel are at risk of infection at the same time. Postponing all elective surgeries during the COVID-19 pandemic has become a standard of care today, but there are still many cases in which it is not possible to delay surgery. It makes sense that as much as we care about the patient, we care about the health of the staff too. Under normal circumstances, laparoscopic approaches may be of great benefit to the patient, but in a crisis caused by a respiratory infection, the situation will definitely be different. The major route of transmission of Severe Acute Respiratory Syndrome Coronavirus 2 is through respiratory droplets, and the most dangerous situation for healthcare workers is performing laryngoscopy and intubation. Therefore, avoiding general anesthesia, which requires airway management (e.g., intubation), is one of the most important ways to protect them [2,3]. Thus, local methods such as neuraxial blocks are superior to general techniques of anesthesia. Because most laparoscopic surgeries require procedures such as Trendelenburg positioning, which is best done under general anesthesia, laparoscopic approaches cannot be insisted on as much as earlier for surgeries.

On the contrary, we are at risk of the virus spreading because of the process itself. It is true that because of the restrictions on the feasibility of research, no case of virus transmission through surgical smoke plumes has been proven yet, but no research has been conducted that refutes such a possibility. The presence of the virus RNA in the stool has been proven in nearly half of the patients even after they have recovered [4]. Furthermore, the possibility of virus shedding in urine is another concern [5]. Thus, no space in the abdominopelvic cavity can be considered virus-free and importing a laparoscopic trocar to any point in this space carries the risk of spreading the virus throughout the operating room by gas insufflation. However, in the interaction between the anesthesiologist and the surgeon, if the benefits of this technique outweigh the potential harm, laparoscopy can be performed by considering appropriate precautions, as mentioned in the article, to reduce the risk of virus transmission as much as possible.

Reza Aminnejad, MD[a]
Alireza Salimi, MD[b]
Ehsan Bastanhagh, MD[c]
[a]*Department of Anesthesiology and Critical Care, Qom University of Medical Sciences, Qom, Iran,*
[b]*Department of Anesthesiology and Critical Care, Shahid Beheshti Medical University, Tehran, Iran, and*
[c]*Tehran University of Medical Sciences, Tehran, Iran*

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Authors' Reply

To the Editor:

Thank you for your thoughtful comments on our manuscript. We agree, and have previously stated, that the risk of transmission of severe acute respiratory syndrome coronavirus 2 is increased during aerosol-generating procedures such as intubation and extubation. We acknowledge that most laparoscopic procedures are performed under general anesthesia. In our manuscript, we recommended protecting operating room personnel with appropriate personal protective equipment to reduce the risk

of transmission during intubation, extubation, and during the operative procedure.

We also recognize that a significant proportion of patients with coronavirus disease 2019 will have viral RNA detectable in different types of clinical specimens (stool, blood, and urine), but to date we have not found a report demonstrating that these viral particles are infectious. In our manuscript, we reviewed ways to decrease any theoretical risk of transmission through laparoscopy.

There are many proven benefits of laparoscopy, both for patients and with regard to the use of hospital resources. We agree that the risks and benefits of the surgical approach and choice of anesthesia should be considered on an individual basis before any surgery. We believe that the benefits of laparoscopy, in most cases, outweigh the risks when appropriate protective measures and equipment are used.

Stephanie N. Morris, MD
Newton, MA

Amanda Nickles Fader, MD
Baltimore, MD

Magdy P. Milad, MD
Chicago, IL

Humberto J. Dionisi, MD
Córdoba, Argentina

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Regarding "Understanding the 'Scope' of the Problem: Why Laparoscopy Is Considered Safe during the COVID-19 Pandemic"

To the Editor:

First of all, thanks to the authors for this nice and clear paper. Whether laparoscopic surgery is safe during the coronavirus 2019 pandemic is a matter of actual debate [1], and it is important for the surgical community to share solid information regarding operating room technology.

We will just briefly comment on the use of high-efficiency particulate arrestance (HEPA) and ultralow particulate arrestance filters because many papers report the wrong assumption that HEPA filters can only filter particles of 0.3 μm or above in diameter. This is an important issue because solid or liquid particulate matter in the air, especially below 2.5 μm in diameter, is able to enter the bloodstream and can affect our health.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) particles range in size from 0.06 μm to 0.125 μm, falling squarely within the particle size range that HEPA filters capture with extraordinary efficiency: 0.01 μm and above [2]. It is incorrect to state that HEPA filters are not able to catch particles below 0.3 μm, such as those of SARS-CoV-2.

This belief is based on a misunderstanding of how HEPA filters work. The particle size of 0.3 μm is used as a standard to measure the effectiveness of HEPA filters, but this does not mean that they are not able to catch smaller particles. A paper from the National Aeronautics and Space Administration [3] explains well that HEPA filters are highly effective in capturing a very high proportion, up to 100%, of nanoparticulate contaminants, ranging in size from 0.1 μm to 0.001 μm (diffusion regime), because they do not fly in a straight line but collide with other fast-moving molecules and move around in random pathways. This is known as Brownian movement. When they strike the filter fibers they remain stuck in them. The intersecting regime has just a small drop in efficiency that affects particles of approximately 0.3 μm, defined as the most penetrating particle size. This value for a typical HEPA filter varies from 0.2 μm to 0.3 μm, depending on the flow rate, and when the flow speed is lowered, a simple HEPA filter will perform as an ultralow particulate arrestance filter.

Francesco Di Marzo, MD[a]
Maurizio Cardi, MD[b]
[a]*Sansepolcro, Arezzo, Italy, and*
[b]*Sapienza University, Rome, Italy*

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Authors' Reply

To the Editor:

Thank you for your interest in our manuscript and for your thoughtful comments [1]. We briefly reviewed the rating of Ultralow Particulate Air and High Efficiency Particulate Air filters in our paper. We based our perspectives on the US Environmental Protection Agency definition that High Efficiency Particulate Air filters "can theoretically remove at least 99.97% of dust, pollen, mold, bacteria, and any airborne particles with a size of 0.3 microns or more in diameter," whereas Ultralow Particulate Air filters "remove 99.9% of particulates 0.12 microns or more in diameter [2]." Thank you for the detailed clarification regarding filter efficacies.