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Is it too premature to recommend against laparoscopic emergency surgery in COVID-19 patients?

Editor

As the COVID-19 pandemic continues to spread globally at an alarming rate, it is inevitable that increasing numbers of COVID-19 patients will require emergency surgery. The Intercollegiate General Surgery Guidance on COVID-19¹ suggests that laparoscopy should be avoided due to risk of aerosol formation and viral transmission. The Society of Gastrointestinal and Endoscopic Surgeons (SAGES) initially highlighted the risk of aerosolization during laparoscopic surgery², although their updated guidance acknowledged a lack of evidence.

Although there is currently no evidence of disease transmission from aerosols generated during laparoscopic surgery in COVID-19 patients, the use of energy devices has propensity for aerosol generation; with associated concern of disease transmission to the operator. In laparoscopy, pneumoperitoneum may increase the risk of aerosolization of viral particles³. After using electrical/ultrasonic equipment for 10 min, smoke particle concentration is higher during laparoscopic compared with open surgery⁴. Proposed reasons for this include the concentration of aerosols within the abdominal cavity due to reduced air circulation in a pneumoperitoneum; the aerosols may then be released during opening of trocar valves or creation of abdominal incisions³.

Previous studies have not shown transmission of human papillomavirus to the


surgeon during CO₂ laser treatment⁵. In another study in which human immunodeficiency virus-1 inoculated blood was bubbled through viral culture media⁶, there was no culture growth with hot aerosols generated from electrocautery usage, suggesting that the virus may be deactivated at high temperatures. The distance from the aerosol-generating energy device to the face of the operator is an important consideration affecting aerosol exposure. Li *et al.*⁴ found that the concentration of particles drops substantially at increasing distances.

Laparoscopic surgery has transformed emergency surgery for common conditions such as acute appendicitis and cholecystitis. Laparoscopic surgery results in lower postoperative pain intensity, wound infections, length of hospital stay, and time to return to normal activity compared with open surgery. Shorter hospital stays afforded by laparoscopic surgery free up hospital beds. Laparoscopic surgery affords better visualization, and the current generation of surgeons are more familiar with laparoscopic procedures, especially for appendectomy/cholecystectomy.

COVID-19 patients admitted for acute surgical issues should be managed conservatively where possible. If conservative management fails, or surgery is deemed more appropriate at the outset, emergency surgery should be arranged. Surgeons should proceed with laparoscopic surgery if indicated, however, additional precautions must be taken: the number of healthcare workers present in the operating room should be minimized, and full personal protective equipment (PPE) with N95 mask or powered air-purifying respirator and disposable trocars should be used. Closed suction systems should be connected to filters with ultralow particulate air filtration capability.

Although there are currently no studies confirming the aerosolization of SARS-CoV-2 during operations, surgical teams should undertake

measures to protect against possible aerosolized virus during surgery. There is insufficient evidence to conclude that the risks of viral transmission in laparoscopic surgery are higher than in open surgery, and the benefits of laparoscopic surgery outweigh those of open surgery.

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- 1 Intercollegiate General Surgery Guidance on COVID-19; 2020. <https://www.rcsed.ac.uk/news-public-affairs/news/2020/march/intercollegiate-general-surgery-guidance-on-covid-19> [accessed 25 March 2020].
- 2 Aurora Pyror. SAGES Recommendations Regarding Surgical Response To Covid-19 Crisis; 2020. <https://www.sages.org/recommendations-surgical-response-covid-19/#update> [accessed 19 March 2020].
- 3 Spinelli A and Pellino G. COVID-19 pandemic: perspectives on an unfolding crisis. *Br J Surg* 2020; <https://doi.org/10.1002/bjs.11627> [Epub ahead of print].
- 4 Li CI, Pai JY, Chen CH. Characterization of smoke generated during the use of surgical knife in laparotomy surgeries. *J Air Waste Manag Assoc* 2020; <https://doi.org/10.1080/10962247.2020.1717675> [Epub ahead of print].
- 5 Manson LT and Damrose E. Does exposure to laser plume place the surgeon at high risk for acquiring clinical human papillomavirus infection? *Laryngoscope* 2013; **123**: 1319–1320.
- 6 Johnson GK, Robinson WS. Human immunodeficiency virus-1 (HIV-1) in the vapors of surgical power instruments. *J Med Virol* 1991; **33**: 47–50.