

# Gynecological Endoscopic Society of Malaysia Statement and Recommendations on Gynecological Laparoscopic Surgery during COVID-19 Pandemic

Wan Ahmad Hazim Wan Ghazali<sup>1\*</sup>, Pavani Nallalathan<sup>1</sup>, Raimi Zamriah Hasan<sup>1</sup>, Aizura Syafinaz Adlan<sup>2</sup>, Ng Kwee Boon<sup>3</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, Putrajaya Hospital, Pusat Pentadbiran Kerajaan Persekutuan, Putrajaya, <sup>2</sup>Department of Obstetrics and Gynecology, University Malaya Medical Centre, <sup>3</sup>Department of Obstetrics and Gynecology, Tung Shin Hospital, Kuala Lumpur, Malaysia

## Abstract

**Objectives:** While the issue of aerosolization of virus from the blood occurs during usage of energy sources scare practitioners, there have been no reported instances of healthcare workers (HCWs) being infected. COVID-19 virus is primarily transmitted via respiratory droplets and contact routes. Therefore, the ultimate decision for surgery, should be based on which is the safest, quickest route and concurrently ensuring that HCWs are protected during these surgeries. During the time of crisis, HCWs need to concentrate and channel resources to the care of those affected by the coronavirus hence judicious allocation of resources is mandatory. We present the guidelines and recommendations on gynecological laparoscopic surgery during this COVID-19 outbreak in Malaysia.

**Materials and Methods:** Thorough search of articles and recommendations were done to look into the characteristics of the virus in terms of transmission and risks during surgery. Smoke plume characteristics, composition and risk of viral transmission were also studied. Search includes The WHO Library, Cochrane Library and electronic databases (PubMed, Google scholar and Science Direct).

**Conclusion:** We concluded that there is no scientific basis of shunning laparoscopic approach in surgical intervention. Ultimately, the guiding principles would be of reducing the anesthetic and surgical duration, the availability of full protective gear for HCWs during the surgery and the status of the patient. It is mandatory for viral swab tests to be done within the shortest window period possible, for all cases planned for surgery.

**Keywords:** Aerosolization, laparoscopy, safety, transmission

## INTRODUCTION

Laparoscopy offers minimal direct tissue handling or exposure to the blood, which would be safer for surgeons in the presence of viremia.<sup>[1]</sup> In contrast, laparotomy exposes the surgeon to a higher risk of blood and plasma contamination.<sup>[1,2]</sup> Laparotomy also may expose the surgeon to more surgical smoke than laparoscopy, which would be more confined intrabdominally.<sup>[3]</sup> Laparoscopy can enhance surgical smoke management by its usage of port filters; preventing leakages, and the liberal use of the intraabdominal suction system. Refining its surgical techniques using sharp and blunt

dissection instead of electrocautery, smoke and aerosolization can be reduced. Laparotomy is also more morbid, resulting in the delay of recovery, prolonged hospitalization, and increased utilization of valuable health-care resources. Minimally invasive surgery, on the other hand, will reduce the hospital stay, which allows less doctor-patient burden, overcrowding and lowers the risk of nosocomial infections. Discharging postoperative patients earlier would comply with the health-care guidelines in pandemic situations.

**Address for correspondence:** Dr. Wan Ahmad Hazim Wan Ghazali, Department of Obstetrics and Gynecology, Putrajaya Hospital, Pusat Pentadbiran Kerajaan Persekutuan, Presint 7, 62250 Putrajaya, Malaysia. E-mail: researchhpj@gmail.com

### Article History:

Submitted: 6 August 2020

Revised: 12 August 2020

Accepted: 26 August 2020

Published: 15 October 2020

### Access this article online

#### Quick Response Code:



Website:  
www.e-gmit.com

DOI:  
10.4103/GMIT.GMIT\_109\_20

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** WKHLRPMedknow\_reprints@wolterskluwer.com

**How to cite this article:** Ghazali WA, Nallalathan P, Hasan RZ, Adlan AS, Boon NK. Gynecological endoscopic society of malaysia statement and recommendations on gynecological laparoscopic surgery during COVID-19 pandemic. *Gynecol Minim Invasive Ther* 2020;9:185-9.

Even though hemostasis through diathermy in laparoscopy is an aerosol-generating procedure (AGP), the amount of viral load from tissue has not been documented. Viral load in the blood of infected patients show variable figures. Larger series of collected specimens demonstrated the presence of viruses in the blood of between 0% and 1% of infected patients,<sup>[4]</sup> while small series quoted up to 15% to 40% in symptomatic cases.<sup>[5]</sup> It is assumed that aerosolization of virus from the blood occurs while using energy devices during surgery.<sup>[6]</sup> However, to date, there have been no reported instances of health-care workers (HCWs) being infected with aerosolized blood in SARS-CoV-2.<sup>[7]</sup> Therefore, it is very unlikely that any infection to the HCW would occur from laparoscopic surgery, especially when adequate universal precautions are applied.

Surgical smoke during surgery is also a source of chemicals, particulates, bacterias, and viruses. A study quoted cases of gynecologists who contracted tonsillar squamous cell carcinoma and base of tongue malignancies after 20 and 30 years of laser ablation and loop electrosurgical excisional procedure of HPV 16-infected cervical dysplasia and vulva lesions.<sup>[8]</sup> Some gynecologists and nurses developed laryngeal papillomatosis after treating patients with anogenital condylomas infected with HPV (6 and 11) with electrosurgery or laser.<sup>[8]</sup> Hepatitis B, C, and HIV viruses have also been demonstrated to be in the surgical smoke plume. Some studies have identified the virus on swabs of surgeons' glasses and gloves resulting from surgical smoke plume contamination. However, this has not been recognized as a mode of transmission.<sup>[3]</sup>

For COVID-19, the surgical and anesthetic teams are more exposed to the virus arising from the patient's nasopharyngeal region or fecal contamination.<sup>[9-11]</sup> The potential viral transmission would be through unprotected patient's breathing, coughing, sneezing, intubation, and extubation procedures. Viral shedding was seen >60%–90% involving the respiratory tract. SARS-COV-2 was detected in bronchoalveolar lavage fluid (93%), sputum (72%), nasal swabs (63%), pharyngeal swabs (32%), and a small percentage 29% from feces.<sup>[4]</sup>

Current knowledge reveals that the COVID-19 virus is primarily transmitted via respiratory droplets and contact routes and limited data on oral fecal transmission.<sup>[5,9,11]</sup> Therefore, the ultimate decision for surgical treatment is not about laparotomy or laparoscopy, but should be based on which is the safest, quickest route to perform surgery while at the same time ensuring that HCWs are adequately protected during these surgical treatment processes.<sup>[12]</sup>

## METHODS

We went through searching for articles and recommendations from other on coronavirus at The WHO Library, Cochrane Library, and electronic databases (PubMed, Google Scholar, and Science Direct). We look into the characteristics of viral transmission and also other viruses' behavior in relation to transmission. As this virus is new, data pertaining to it has to be compared with behaviors of other virus which has been thoroughly understood.

We also looked into the WHO scientific and public documents. We also studied the behavior of smoke and its composition and relations to be an infective carrier for certain viruses. We hereby then recommend and discuss in relation to laparoscopy.

## DISCUSSIONS

We put the discussion in point form manner as this is a statement and recommendations which will be easier to understand and to be used as a guideline.

During the time of crisis, HCWs need to concentrate and channel resources to the care of those affected by the coronavirus. The judicious allocation of resources is mandatory among this pandemic condition. Certain gynecological surgeries may still need to be performed during this period.<sup>[13]</sup> We must be prudent to prevent the potential spread of the disease to patients or HCWs. Usage of personal protective equipment (PPE) is imperative and should be saved and stretched over for the more clinically significant cases since there is a known worldwide shortage of protection gear.

We hereby offer recommendations as follows:

- Objectives of surgery:
  1. To ensure successful, uncomplicated surgical treatment in the quickest and safest manner
  2. To adopt practical measures and prevent transmission of COVID-19 virus.

- Action

Plan for the shortest, most efficient, and complete surgery and anesthesia.

- Facts sheet on the mode of transmission
  1. Transmission of COVID-19 virus due to CO<sub>2</sub> insufflation has not been documented.<sup>[10]</sup> The risk of CO<sub>2</sub> insufflation causing viral dissemination may not be possible as the viral load from the blood viral detection ranges only from 0% to 1%.<sup>[4]</sup> The presence of the virus in blood and plasma was detected on Day 2 or Day 3 after the onset of symptoms or in the severe stage of infection.<sup>[5,14]</sup> There was no plasma viral load data detected during the incubation period.<sup>[5]</sup> In symptomatic cases, an elective surgery would have been postponed anyway, until the patient is well. On

the other hand, in emergency gynecological cases, most patients are asymptomatic

2. The primary viral transmission is through respiratory droplets, and some suggest the possibility of an oral-fecal route.<sup>[7,11,14]</sup> However, there is no documented oral-fecal transmission yet. It has not been proven as a mode of transmission<sup>[11,15]</sup>
3. No airborne transmission has been proven<sup>[11]</sup>
4. HIV, Hepatitis B and C patients who underwent endoscopic surgeries do not have risk of transmission to HCWs, even though these viruses were present in the surgical smoke plume. No proven cases have been reported<sup>[12]</sup>
5. The presence of virus in the gut has been documented. However, gynecological surgery does not involve opening the bowels<sup>[5,14]</sup>
6. In asymptomatic COVID-19-positive patients (in incubation period), surgery may accelerate and exacerbate disease progression of COVID-19 postoperatively, with evidence of 20.6% mortality rate as compared to 2.3% in COVID-19 patients without surgery; 44.1% of patients required ICU care as compared to 26.1% COVID-19 patients without surgery; median time of symptoms' onset to dyspnea was 3.5 days compared to 8 days in COVID-19 patients without surgery. However, patients in ICU were mostly older patients with underlying comorbidities who has undergone more difficult surgeries with longer operating time.<sup>[16]</sup>

Therefore, the exposure risk during surgery only arises from:

1. Spontaneous unprotected (patients without face mask) patient's breathing<sup>[11]</sup>
2. Intubation and extubation (AGP) procedures<sup>[2,9]</sup>
3. Improper ventilation exhaust systems in the operating theater.<sup>[17]</sup> Hence, the importance of the Anesthesia Gas Scavenging System
4. Surgery that involve fecal soiling.<sup>[18]</sup>

It is advised that:

1. COVID-19 screening swab test should be taken to determine patient's status before all surgery, including laparoscopy<sup>[19-21]</sup>
2. If the result is negative within 24 h, the surgery can be performed with the usual protection gear. Do not allow a prolonged window period as this may lead to surgery being done on a potentially COVID-19-positive patients in their incubation period, which may not only lead to the risk of exposure to health-care workers but also a more accelerated and aggressive COVID-19 disease to the patients postoperatively.<sup>[16,20]</sup>
3. If the interval between a negative swab test and surgery is longer,<sup>[22]</sup> HCW need to be in full PPE despite patient's swab test was negative.<sup>[23]</sup>
4. The anesthesia and surgery should be performed by an experienced anesthetist and surgeon, respectively, to minimize the procedure time<sup>[24,25]</sup>

5. In an emergency case, a swab should be done before surgery, and full PPE should be donned.<sup>[26,27]</sup> Laparoscopic surgery can be performed provided it is agreed by both surgical and anesthetic teams that it is the most appropriate surgical route (This also applies to elective cases).<sup>[28]</sup> If the swab came back as positive, contact tracing can be done to all surgical and anesthetic members involved, and a positive COVID-19 swab would also explain an unexpected postoperative lung infection.

Specific recommendations for laparoscopic surgery:<sup>[27]</sup>

1. For asymptomatic patients who were negative for COVID-19 in their viral swab test, the laparoscopic procedures should be encouraged as with usual practice
2. During intubation and extubation, all HCWs should vacate the operating room until the anesthetist has prepared the patient<sup>[3,29]</sup>
3. In view of the pandemic with limited resources and time, the procedure should involve only a privileged and an experienced anesthetist, surgeon, and their assistants<sup>[30]</sup>
4. Ensure supporting staffs are highly trained and that effective equipment are readily available for safe and efficient surgery
5. Avoid obese patients with high comorbidities, especially patients with sleep apneas, chronic lung disease, and metabolic disorders
6. If there is a need to use a uterine manipulator, ensure that thorough cleaning and protection of perineum from contamination before, during, and postoperative is performed. May consider bowel preparation before all laparoscopic procedures
7. Beware of the high risk of explosive dispersion of bodily fluid with specimen removal (both abdominally and vaginally)
8. It is also recommended that CO2 leakage is minimized to reduce the much "feared" AGP. This will also shorten the surgical procedure as the operating field is always "opened."

Recommended laparoscopic techniques refinement to reduce CO2 leakage:<sup>[31-33]</sup>

- a. Ensure skin incisions are just adequate for port cannulation only (for a good seal)<sup>[34,35]</sup>
- b. Liberal use of suction to decompress the abdomen before removing ports, specimens or at the end of the surgery, to remove the telescopic port<sup>[36]</sup>
- c. If there is a need to change to bigger ports during the surgery, it is best to use the biggest port intended from the beginning. This is to reduce leakage during port changing<sup>[34,36]</sup>
- d. For hemostasis, avoid the use of monopolars cautery, as it generates a lot of surgical smoke plume. It also requires more pneumoperitoneum to be released or aspirated to clear the operating field, and this will increase operating time. The use of electrocautery and ultrasonic dissectors-hemostat should also be minimized, as they produce smoke plume and water vapor (aeroionization).<sup>[37]</sup>

- Sharp and blunt dissection is preferable whenever possible
- e. To suture, deliver the needle directly through the abdominal wall, the thinnest part would be at the inguinal ligament area. Do ONLY intracorporeal suturing
  - f. Avoid pulling the cannula in and out of the port for whatever reasons. If there is a dire need, decompress the abdomen first, to prevent CO<sub>2</sub> expulsion through the ports
  - g. Use a 10 mm telescope. A larger diameter cannula (11 mm or 12 mm) will deliver faster CO<sub>2</sub> insufflation compared to 5 mm telescope in 5.5 mm ports. It will also provide surgeon with better quality and bigger view of the operating field, resulting in easier and faster surgery
  - h. Ensure the sealing caps and valves of reusable cannula have no cracks, which may cause gas leakages. It is best to use disposables for high-risk cases to avoid missing a defective cannula port
  - i. Minimize Trendelenburg's position to reduce the need for higher positive pressure ventilations<sup>[38]</sup>
  - j. Use smoke filtering devices which can filter smoke and aerosolites.<sup>[39,40]</sup> Apart from viruses (some had claimed filtering 99.9% of viruses), it will also filter chemicals, particulates, and bacteria. The filter will be attached to the cannula port. This further enhances the protection of the already appropriately garbed HCW. This step would not be available for laparotomies
  - k. Change smoke filters into active filtering devices. Filters that are used will cause the flow of CO<sub>2</sub> or smoke through the connected stop cock will be delayed and slow. This would lead to a slow decompression of the abdomen or clearing of a smoky surgical field. This will increase operating time and testing surgeons' patience (one of the main reasons that many did not use smoke filtering devices in laparoscopy). A slight modification may help by making the filtering devices as an active filter by connecting to a suction device.

## CONCLUSION

In general, laparoscopic surgery is neither a contraindication nor a fearful approach in this pandemic period. All cases should be individualized and stratified accordingly. The risk of airborne transmission of SARS-CoV-2 from abdominal source during surgery has not been documented and substantiated.<sup>[41]</sup> Laparotomy also exposes HCW to airborne viruses through the surgical smoke plume. Laparoscopy as a whole offers shorter patient-HCW contact and exposure time. The only setback is that the procedure may be prolonged in the hands of an inexperienced surgeon, which will then increase risk of exposure. However, this is only applicable if the patient is categorized as the person under investigation (PUI) or the COVID-19 positive patients. Therefore, it is important to get the mandatory viral swab test done within the shortest window period possible, for all cases going for the surgical process.

Ultimately, the guiding principles would be of reducing the anesthetic and surgical duration, ensuring the availability of full protective gear for HCWs during surgery and identifying status of the patient prior to embarking into surgical treatment. For all surgical cases, elective, semi-emergency, or emergency, the anesthetist and surgeon (as a team) will have to decide which approach is the safest and fastest to deliver treatment.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Máca J, Peteja M, Reimer P, Jor O, Šeděnková V, Panáčková L, *et al.* Surgical injury: Comparing open surgery and laparoscopy by markers of tissue damage. *Ther Clin Risk Manag* 2018;14:999-1006.
2. Brücher BL, Nigri G, Tinelli A, Lapeña JFF, Espin-Basany E, Macri P, *et al.* COVID-19: Pandemic Surgery Guidance. *4Open*; 10 April, 2020. Available from: [https://www.4open-sciences.org/articles/fopen/full\\_html/2020/01/fopen200002s/fopen200002s.html](https://www.4open-sciences.org/articles/fopen/full_html/2020/01/fopen200002s/fopen200002s.html). [Last accessed on 2020 Apr 24].
3. Kwak HD, Kim SH, Seo YS, Song KJ. Detecting hepatitis B virus in surgical smoke emitted during laparoscopic surgery. *Occup Environ Med* 2016;73:857-63.
4. Wang W, Xu Y, Gao R, Lu R, Han K, Wu G, *et al.* Detection of SARS-CoV-2 in different types of clinical specimens. *JAMA* 2020;323:1843-4. [Doi: 10.1001/jama.2020.3786].
5. Chang L, Yan Y, Wang L. Coronavirus disease 2019: Coronaviruses and blood safety. *Transfus Med Rev* 2020;34:75-80.
6. Livingston EH. Surgery in a time of uncertainty. *JAMA* 2020;323:2254.
7. Givi B, Schiff BA, Chinn SB, Clayburgh D, Iyer NG, Jalisi S, *et al.* Safety recommendations for evaluation and surgery of the head and neck during the COVID-19 pandemic. *JAMA Otolaryngol Head Neck Surg* 2020;146:579.
8. Liu Y, Song Y, Hu X, Yan L, Zhu X. Awareness of surgical smoke hazards and enhancement of surgical smoke prevention among the gynecologists. *J Cancer* 2019;10:2788-99.
9. Gu J, Han B, Wang J. COVID-19: Gastrointestinal manifestations and potential fecal-oral transmission. *Gastroenterology* 2020;158:1518-9.
10. Tran K, Cimon K, Severn M, Pessoa-Silva CL, Conly J. Aerosol generating procedures and risk of transmission of acute respiratory infections to healthcare workers: A systematic review. *PLoS One* 2012;7:e35797.
11. Modes of Transmission of Virus Causing COVID-19: Implications for IPC Precaution Recommendations. World Health Organization. Available from: <https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations>. [Last accessed on 2020 Apr 25].
12. Morris SN, Fader AN, Milad MP, Dionisi HJ. Understanding the "Scope" of the Problem: Why laparoscopy is considered safe during the COVID-19 pandemic. *J Minim Invasive Gynecol* 2020;27:789-91.
13. COVID-19: Good Practice for Surgeons and Surgical Teams. Available from: <https://www.rcseng.ac.uk/standards-and-research/standards-and-guidance/good-practice-guides/coronavirus/covid-19-good-practice-for-surgeons-and-surgical-teams/>. [Last accessed on 2020 Apr 25].
14. Zhang W, Du RH, Li B, Zheng XS, Yang XL, Hu B, *et al.* Molecular and serological investigation of 2019-nCoV infected patients: Implication of multiple shedding routes. *Emerg Microbes Infect* 2020;9:386-9.
15. Pan Y, Zhang D, Yang P, Poon LL, Wang Q. Viral load of SARS-CoV-2 in clinical samples. *Lancet Infect Dis* 2020;20:411-2.
16. Lei S, Jiang F, Xia ZY, Xia Z. Author's reply – Clinical characteristics and outcomes of patients undergoing surgeries during the incubation

- period of COVID-19 infection. *E Clin Med* 2020;22:100331.
17. Bowdle A, Munoz-Price LS. Preventing infection of patients and healthcare workers should be the new Normal in the Era of novel coronavirus epidemics. *Anesthesiology* 2020;133:463-4.
  18. Zhang JZ. Severe acute respiratory syndrome and its lesions in digestive system. *World J Gastroenterol* 2003;9:1135-8.
  19. Kimmig R, Verheijen RHM, Rudnicki M, for SERGS Council. Robot assisted surgery during the COVID-19 pandemic, especially for gynecological cancer: A statement of the Society of European Robotic Gynaecological Surgery (SERGS). *J Gynecol Oncol* 2020;31:e59.
  20. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, *et al.* Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. *Lancet* 2020;395:507-13.
  21. Singh AK, Gillies CL, Singh R, Singh A, Chudasama Y, Coles B, *et al.* The Prevalence of Comorbidities and Their Association with Mortality in Patients with COVID-19: A Systematic Review and Meta-Analysis. *Diabetes Obes Metab.* 2020;22:1915-24.
  22. Lauer SA, Grantz KH, Bi Q, Jones FK, Zheng Q, Meredith HR, *et al.* The incubation period of coronavirus disease 2019 (COVID-19) from publicly reported confirmed cases: Estimation and application. *Ann Intern Med* 2020;172:577-82.
  23. Verbeek JH, Rajamaki B, Ijaz S, Sauni R, Toomey E, Blackwood B, *et al.* Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff. *Cochrane Database Syst Rev* 2020;(4).
  24. Cohen SL, Liu G, Abrao M, Smart N, Heniford T. Perspectives on surgery in the time of COVID-19: Safety first. *J Minim Invasive Gynecol* 2020;27:792-3.
  25. Barone M. How to face with minimally invasive abdominal surgery during Covid-19 outbreak? Surgical and anesthesiological concerns. *Eurasian J Med Oncol* 2020;4:181-4.
  26. Brat GA, Hersey S, Chhabra K, Gupta A, Scott J. Protecting surgical teams during the COVID-19 outbreak: A narrative review and clinical considerations. *Ann Surg* 2020. doi: 10.1097/SLA.0000000000003926.
  27. Repici A, Maselli R, Colombo M, Gabbiadini R, Spadaccini M, Anderloni A, *et al.* Coronavirus (COVID-19) outbreak: What the department of endoscopy should know. *Gastrointest Endosc* 2020;92:192-7.
  28. Leung NH, Chu DK, Shiu EY, Chan KH, McDevitt JJ, Hau BJ, *et al.* Respiratory virus shedding in exhaled breath and efficacy of face masks. *Nature medicine* 2020;26:676-80. [Doi: 10.21203/rs.3.rs-16836/v1].
  29. Romano F, Gustén J, De Antonellis S, Joppolo CM. Electrosurgical smoke: Ultrafine particle measurements and work environment quality in different operating theatres. *Int J Environ Res Public Health* 2017;14:137.
  30. Kamer E, Çolak T. What to do when a patient infected with COVID-19 needs an operation: A pre-surgery, Peri-surgery and Post-surgery Guide. *Turkish J Colorectal Dis* 2020;30:1-8.
  31. Mallick R, Odejinmi F, Clark TJ. Covid 19 pandemic and gynaecological laparoscopic surgery: Knowns and unknowns. *Facts Views Vision Obgyn* 12. 2020;3:7.
  32. ESGE Recommendations on Gynaecological Endoscopic Surgery. Available from: <https://esge.org/wp-content/uploads/2020/04/ESGE-Gynaecological-surgery-during-Covid-outbreak-updated-31-March-2020.pdf>. [Last accessed on 2020 Apr 26].
  33. Zheng MH, Boni L, Fingerhut A. Minimally invasive surgery and the novel coronavirus outbreak: Lessons learned in China and Italy. *Ann Surg* 2020;272:e5-6.
  34. Altınbaş ŞK, Tapisiz ÖL, Üstün YE. Gynecological laparoscopic surgery in the shade of COVID-19 pandemic. *Turkish J Med Sci* 2020;50:659-63.
  35. Tuech JJ, Gangloff A, Fiore FD, Michel P, Brigand C, Slim K, *et al.* Strategy for the practice of digestive and oncological surgery during the Covid-19 epidemic. *J Visceral Surg* 2020;157:S7-S12.
  36. Ramos RF, Lima DL, Benevenuto DS. The brazilian college of surgeons recommendations regarding laparoscopic surgery response to the COVID-19 pandemic. *Rev Col Bras Cir* 2020;47:e20202570.
  37. Mintz Y, Arezzo A, Boni L, Chand M, Brodie R, Fingerhut A. Tech comm of the eur associat.for endo surg. A low cost, safe and effective method for smoke evacuation in laparoscopic sugery for suspected coronavirus patients. *Ann Surg* 2020;272:e7-8.
  38. Aquino-Aquino PV, Habana MA, Abat MA, Go-Du J, Sua-Lao C, Aranzamendez JA, *et al.* PSGE statement on minimally invasive gynecologic surgeries during the COVID-19 pandemic in the Philippines. March 30, 2020. *J Minim Invasive Gynecol* 2020;27:1215-6.
  39. Cooper Z, Bernacki RE. To face coronavirus disease 2019, surgeons must embrace palliative care. *JAMA Surg* 2020;155:681-2. [Doi: 10.1001/jamasurg.2020.1698].
  40. Vigneswaran Y, Prachand VN, Posner MC, Matthews JB, Hussain M. What is the appropriate use of laparoscopy over open procedures in the current COVID-19 climate? *J Gastrointest Surg* 2020;24:1686-91.
  41. Update On Guidance To Surgeons On Triaging Surgeries During COVID-19. College of Surgeon Academy of Medicine of Malaysia. Available from: [http://csamm.org.my/news\\_covid19\\_triage.html](http://csamm.org.my/news_covid19_triage.html). [Last accessed on 2020 Apr 30].