



AMASI GUIDELINES FOR
CONDUCTING MINIMAL ACCESS SURGERY DURING
COVID-19 PANDEMIC

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Dear Friends

As the COVID-19 pandemic hovers between stage 2 (local transmission) and stage 3 (community transmission) in India, it is necessary that the surgical community develops certain guidelines to regulate the surgical procedures. The COVID-19 disease is caused by a new variant of the coronavirus family, called SARS-CoV2. As the information about its pathophysiology and transmission keeps on evolving, the guidelines have to be fluid, with a strong probability of being adapted to newly acquired information as time passes. As of today, 8th April, 2020, we have developed the following recommendations, keeping the environment in which the Indian Surgeon works in mind. As new information and knowledge is gained, the guidelines may be updated from time to time.

Pre-operative:

1. All elective cases should be avoided. Only emergency and semi-urgent cases (selected malignancy) can be scheduled. Some examples of patients in which surgery is indicated and those in whom it can be deferred are given below:
 - a) Surgery indicated:
 - i) Nearly obstructing bowel cancer
 - ii) Operable GI cancers requiring frequent transfusions
 - iii) Rectal cancers after neoadjuvant chemoradiation with no response to therapy
 - iv) Early stage rectal cancers where adjuvant therapy not appropriate
 - v) GI Cancers with pending evidence of local perforation and sepsis
 - vi) Perforated, obstructed, or actively bleeding (inpatient transfusion dependent) GI cancers
 - vii) GI Cancer with sepsis
 - viii) Bleeding/septic hemorrhoids not amenable to office procedures like banding and not responding to conservative management.

- ix) Perianal abscess
 - x) As part of step-up approach for acute infected necrotizing pancreatitis.
 - xi) Uncomplicated appendicitis not responding to antibiotic treatment.
 - xii) Complicated appendicitis.
 - xiii) Symptomatic cholecystitis not responding to conservative management.
 - xiv) Symptomatic cholelithiasis with cholangitis.
 - xv) Hinchey class 3 diverticulitis and Hinchey class 1&2 diverticulitis not responding to antibiotics.
 - xvi) Bariatric and metabolic surgery:
 - (1) Patients in hemorrhagic shock • Patients in septic shock • Necrotizing soft tissue infections • Perforated viscus • Airway emergencies • Risk of Ischemic bowel • Specific Bariatric: Perforated marginal ulcer, bleeding, anastomatic or staple-line leak, obstruction particularly internal hernia, gastric band perforation or prolapse
 - (2) To be considered on a case-by-case basis depending on inability to postpone surgery: revisions for dysphagia, severe GERD, pain, dehydration/malnutrition, slipped band, anastomatic strictures at risk for aspiration
 - b) Surgery can be deferred:
 - i) Malignant polyps, either with or without prior endoscopic resection
 - ii) Prophylactic indications for hereditary conditions
 - iii) Large, benign appearing asymptomatic polyps
 - iv) Small, asymptomatic colon carcinoids
 - v) Small, asymptomatic rectal carcinoids
 - vi) Bariatric: primary gastric bypass, sleeve, duodenal switch, gastric band • Revisions for weight gain.
2. Pre-operative assessment should included detailed history taking about prior travel to any region with high number of infected Covid-19 cases, contact with any Covid-19 case or history of fever, cough, myalgia, bodyache, upper respiratory tract infection. If possible and available, RT-PCR/ELISA test for COVID-19 should be done. However, in stage 3 of the pandemic, the possibility of false-negative (7 days for RT-PCR & 14 days for ELISA test) should be kept in mind and all due precautions should be taken considering every patient as potentially infected.

3. Where testing has not been done, every case should be considered as a potentially infected patient and due precautions taken.
4. There is evidence that surgery in infected but asymptomatic patients is associated with a more severe disease manifestation in the post-operative period and a mortality rate as high as 20%. This possibility should be explained to the untested patient and consent taken accordingly.
5. Intubation during administration of general anesthesia results in aerosolization, putting the anesthesia team and OT personnel at risk. Hence, if a surgery can be done under regional anesthesia (open surgery), it should be given preference. For example, groin hernia surgery for an obstructed/incarcerated hernia could be done by open approach under regional anesthesia while laparoscopic approach would require general anesthesia and intubation. Under such circumstances, open repair of groin hernias should be preferred.
6. For intubation and other anesthesia practices, the guidelines issued by Anesthesia and Airway Societies should be followed. In general, following point should be noted:
 - a) Minimum 1 hour time gap to be given between two procedures/surgeries. 30 minutes for deep cleaning and 30 minutes for UV sterilization.
 - b) Donning of PPE shall be done in procedure room/ OT Room and Doffing shall be done in the Wash area
 - c) Laminar flow/AC not to be started until intubation is done.
 - d) Post surgery all anesthesia equipment to be cleaned with 1% sodium hypochlorite solution.
 - e) OT slippers to be washed in soap and water immediately after surgery/procedure.
 - f) Stretcher to be sprayed with 1% Sodium Hypochlorite solution after shifting patient.
- g) Intubation Protocols:
 - i) Full body PPE kit to be worn along with N95 mask and Face Shield.
 - ii) Video laryngoscope to be used for Intubation.
 - iii) N95 mask not to be reused in this case.
 - iv) AC or laminar flow not to start before completion of intubation procedure
 - v) All contaminated material, which needed to be reused (e.g. video laryngoscope device) to be immediately kept in separate bag for

- sterilization. Screen part of VL to be kept in UV Chamber after cleaning with alcohol based sanitizer while blade will go for ETO sterilization.
- vi) Use bacterial/viral filter (yellow colour) (e.g. Intersurgical or Thermovent HEPA of Portex) only. No HME filter to be used.
 - vii) Attach bacterial / viral filter or Thermovent HEPA to ETT before intubation.
 - viii) Connect another bacterial/viral filter (yellow colour) of intersurgical or Thermovent HEPA filter of portex to expiratory end of circuit
 - ix) You may create hood over patient head while doing airway procedure if feasible.
 - x) Avoid positive pressure ventilation before intubation if possible. Use rapid acting muscle relaxant (eg succinylcholine) for intubation. If unavoidable, use tight fitting mask and gentle positive pressure ventilation before intubation. Do not start positive pressure ventilation till cuff of ETT is inflated and connected to the circuit. Avoid unnecessary disconnection and if needed than keep filter on the ETT.
 - xi) Extubation shall be done with same level of precaution as intubation. Minimize coughing while extubation. stop laminar airflow(20 mins prior) or AC before extubation.
7. There is not much scientific evidence to support the notion that Minimal Access Surgery poses a higher risk to the OT personnel as compared to conventional surgery, specific to COVID-19. Prior studies have demonstrated the presence of other viruses from infected tissues in surgical smoke. Sudden desufflation through the main canula outlets at the end of the procedure, defective valves allowing leakage of gases during instrument exchange and sudden desufflation for specimen extraction are the events which can potentially release aerosolized virus particles into the OT environment. Precautions as enumerated below should be taken during these steps. The potential benefit of minimum direct contact with body tissue in MAS, inability to filter the aerosolized particles in open surgery, shorter hospitalization duration with reduced footfalls in hospital when MAS is adopted as compared to open surgery should be weighed when considering laparoscopic versus open approach.
8. The OT personnel should however be aware of the possibility of viral contamination to staff during surgery, whichever approach is adopted and take precautions accordingly.

9. Minimum personnel should be there inside the operation theater. Every person should be aware of possible risks of Covid-19 transmission and precautions to be taken. The surgeon should oversee the training and education of the OT personnel in this matter.
10. The personnel in OT should don adequate Personal Protective Equipment (PPE). The correct manner of putting on and removing PPE, with safe disposal should be taught to all the involved personnel. Safe donning and doffing of PPE can be learnt by watching videos available online. For illustration, we are providing links of the videos posted by Public Health England:
https://www.youtube.com/watch?v=kKz_vNGsNhc and
<https://www.youtube.com/watch?v=oUo5O1JmLH0>
11. The operation trolley should be prepared and kept covered. The laparoscopic trolley should be ready. The anesthesia trolley should be prepared and checked. Adequate amount of gas in cylinders should be confirmed to avoid running out of gas mid-surgery with changing of cylinders that leads to increase in OT time.
12. Once the preparations are done, only then should the patient be brought inside the theater.
13. Sufficient quantities of all types of suture materials, drugs etc. and any other operative requirement should be there within the OT. OT personnel should not be moving out of the OT. An outside staff member should be designated as runner to obtain emergency equipment or material not there in OT in case it is required. He should hand it over to another staff who has donned PPE but has not entered OT. This staff member can then hand over the material to the OT personnel without entering the OT at the OT door itself.

Intraoperative:

14. During intubation, minimum personnel should be there within the OT. The surgical team should wait outside till intubation has been done.
15. The incision ports should be as small as possible to avoid any leakage around the canulas once pneumoperitoneum is established.
16. To allow optimum lung functioning, the intraoperative pneumoperitoneum pressure should be kept the lowest possible and the time duration in which the patient is kept in Trendelenburg position should also be kept to a minimum.
17. The electrocautery should be used at the lowest power setting and charring of tissues should be avoided to minimize the creation of smoke.

18. Suction devices should be used to evacuate excessive smoke and aerosol from the abdomen. Preferably, suction machines with two bottles in serial circuit should be used, with the first bottle completely filled with hypochlorite solution to allow the gas to bubble through it before it is evacuated into the second bottle.
19. For routine evacuation of smoke and fumes, a member of the operating team should be designated for this and he/she should use the side channel for controlled evacuation. Ideally, the evacuation should be done through proprietary equipment (e.g. Megadyne Megavac Plus Smoke evacuator, Johnson and Johnson, Ethicon Division). However, looking to the high cost of such devices, surgeons may adopt other safe modes of evacuation.
20. At the end of the procedure, the complete desufflation should be done gradually through the side channel of the designated side channel.
21. In case of conversion to open or before removing any specimen from the abdomen, complete desufflation should be done as described above.
22. Usage of intra-abdominal drains should be minimized.
23. Fascial closure of port sites ≥ 10 mm should only be done after complete desufflation.

Post-operative:

24. Only the anesthesia team should remain in the OT during extubation. Remaining members should exit the OT and but NOT remove their PPEs in case their assistance for some complication is required inside the OT.
25. Proper removal of the PPE and its safe disposal should be done. After removing PPE, no one should enter the OT till it has been cleaned and sterilized.
26. The OT and instruments should be considered as potentially infected and adequate cleaning and sterilization of the same should be done before posting another case in the OT.
27. The OT personnel in charge of cleaning and sterilizing the OT should be the last to exit the OT and the last to remove their PPEs.
28. Exit sequence:
 - 1st: Surgical Team
 - 2nd: Patient after extubation.
 - 3rd: Anesthesia team
 - 4th: Cleaning and sterilization crew.

REFERENCES:

1. Alp E, Bijl D, Bleichrodt RP, Hansson B, Voss A. Surgical smoke and infection control. *J Hosp Infect.* 2006 Jan;62(1):1-5.
2. American College of Surgeons. COVID-19: Considerations for Optimum Surgeon Protection Before, During, and After Operation. Updated April 1, 2020. <https://www.facs.org/covid-19/clinical-guidance/surgeon-protection>. Accessed 2nd April, 2020.
3. American College of Surgeons. COVID-19: Elective Case Triage Guidelines for Surgical Care. Online March 24, 2020. <https://www.facs.org/covid-19/clinical-guidance/elective-case>. Accessed 26th March, 2020.
4. American College of Surgeons. COVID-19: Guidance for Triage of Non-Emergent Surgical Procedures Online March 17, 2020. <https://www.facs.org/covid-19/clinical-guidance/triage>. Accessed 20th March, 2020.
5. American College of Surgeons. COVID-19: Recommendations for Management of Elective Surgical Procedures. Online March 13, 2020. <https://www.facs.org/covid-19/clinical-guidance/elective-surgery>. Accessed 20th March, 2020.
6. Baggish MS, Poiesz BJ, Joret D, Williamson P, Refai A. Presence of human immunodeficiency virus DNA in laser smoke. *Lasers Surg Med.* 1991;11:197–203 .
7. Capizzi P J, Clay R P, Battey M J. Microbiologic activity in laser resurfacing plume and debris. *Lasers in Surgery & Medicine*, 1998,23: 172-174.
8. Centers for Disease Control and Prevention (CDC). Interim Guidance for Healthcare Facilities: Preparing for Community Transmission of COVID-19 in the United States <https://www.cdc.gov/coronavirus/2019-ncov/healthcare-facilities/guidance-hcf.html> March 15 2020.
9. Choi SH, Kwon TG, Chung SK, Kim TH. Surgical smoke may be a biohazard to surgeons performing laparoscopic surgery. *Surg Endosc.* 2014, 28 (8): 2374-80.
10. Diagnosis and treatment of novel coronavirus pneumonia (version 6 02-19. General Office of National Health and Family Planning Commission of the People's Republic of China. Novel coronavirus pneumonia prevention and control program (Fifth Edition).
11. Ferenczy A, Bergeron C, Richart RM. Human papillomavirus DNA in CO2 laser-generated plume of smoke and its consequences to the surgeon. *Obstet Gynecol.* 1990, 75:114-118.

12. Garden JM, O'Banion MK, Shelnitz LS, et al. Papillomavirus in the vapor of carbon dioxide laser-treated verrucae. *JAMA*. 1988, 259:1199—1202.
13. General Office of National Health and Family Planning Commission of the People's Republic of China, Office of National Administration of Traditional Chinese Medicine.
14. Hensman C. Chemical composition of smoke produced by high-frequency electrosurgery in a closed gaseous environment. *Surgical Endoscopy*, 1998, 12(8): 1017-1019.
15. http://www.med.umich.edu/surgery/mcccn/documents/Emergency-General-Surgery-in-a-COVID19-Patient-3_19_20.pdf. Accessed 24th March, 2020.
16. http://www.med.umich.edu/surgery/mcccn/documents/OR-Checklist-for-COVID-19-or-PUI-Patient-3_20_20.pdf. Accessed 24th March 2020.
17. http://www.med.umich.edu/surgery/mcccn/documents/Surgery-for-COVID19-or-PUI-Patient-3_21_20.pdf Accessed 24th March, 2020.
18. In SM, Park DY, Sohn IK, et al. Experimental study of the potential hazards of surgical smoke from powered instruments. *Br J Surg*. 2015, 102:1581—1586.
19. Kwak HD, Kim SH, Seo YS, et al. Detecting hepatitis B virus in surgical smoke emitted during laparoscopic surgery. *Occup Environ Med*. 2016, 73:857—863.
20. Li C I, Pai J Y, Chen C H. Characterization of smoke generated during the use of surgical knife in laparotomy surgeries. *J Air Waste Manag Assoc*, 2020, Feb 12.
21. Liana Zucco, Nadav Levy, Desire Ketchandji, Mike Aziz, Satya Krishna Ramachandran, Anesthesia Patient Safety Foundation, <https://www.apsf.org/news-updates/perioperative-considerations-for-the-2019-novel-coronavirus-covid-19/>, 2020 Feb 12.
22. Risk of acquiring human papilloma-virus from the plume produced by the carbon dioxide laser in the treatment of warts. Gloster HM Jr, Roenigk RK. *J Am Acad Dermatol*. 1995, 32:436—41.
23. S. Lei et al., Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection, *EClinicalMedicine* (2020).
24. SAGES. <https://www.sages.org/recommendations-surgical-response-covid-19/>. Accessed 1st April, 2020.

25. SAGES. <https://www.sages.org/resources-smoke-gas-evacuation-during-open-laparoscopic-endoscopic-procedures/>. Accessed 1st April, 2020.
26. Wax RS, Christian MD. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. *Can J Anaesth*. 2020 Feb 12.
27. Wisniewski PM, Warhol MJ, Rando RF, Sedlacek TV, Kemp JE, Fisher JC. Studies on the transmission of viral disease via the CO₂ laser plume and ejecta. *J Reprod Med*. 1990, 35:1117–23.
28. Zheng MH, Boni L, Fingerhut A. Minimally invasive surgery and the novel coronavirus outbreak: lessons learned from Italy. *Annals of Surgery*, 2020.
29. Zheng MH, Ma JJ, Wu C. Twenty year progression and future directions of minimally invasive surgery. *Chin J Pract Surg*. 2020, 40: 23-26.