



PALES Position Statement on Laparoscopic Surgery in COVID-19 Pandemic ver 1.0 2 April 2020

"It wasn't raining when Noah built the Ark"

Howard Ruff

In the context of COVID-19, community transmission poses a threat against safety of everyone especially doctors in the frontline.

A lot of discussions have been generated in the past week. As surgeons of PALES, it is our responsibility to inform, educate and raise the level of awareness to prevent, control and eliminate transmission of infection during this crisis especially in Covid-19 hot zones.

Solid data on spread of coronavirus during aerosol generating procedures is still unfounded. However, in laparoscopy, generation of artificial pneumoperitoneum and surgical smoke produced by the use of energy devices become risks for aerosol exposure ^{1, 2, 3, 4,5} particularly when there are leaks in trocar sites and during evacuation of pneumoperitoneum. Therefore, for patients who are Covid-19 positive, suspect or asymptomatic, the most important aspect to consider at this point in time is for each surgeon to wear standard surgical personal protective equipment (PPE) which includes a face shield / goggles, N95 mask/ PAPR if available, double gloves, water proof surgical gown & booties and mitigate all aspects of risks from exposure while taking care of patients especially during surgery. ^{5, 6, 7}

We have gathered resources ^{4,8 - 20} available and reviewed various recommendations pertaining to and involving the use of artificial pneumoperitoneum in laparoscopy during COVID-19 and the effects of microparticles generated from surgical smoke. We hope that this set of recommendations for our local setting will help you prepare your team well during this crisis and beyond.

Phase 1 (Preparedness & Screening)

- 1) Delay all elective procedures
- 2) Intentional Postponement of non-emergent, urgent procedures
- 3) When in doubt, treat all cases as COVID-19 positive unless proven otherwise
- 4) Create COVID-19 ORs and workspace separate from NON-Covid-19 OR
- 5) Designate COVID-19 surgical team & Non- COVID-19 teams with no crossing of rooms & staff
- 6) Organize Work flow for efficiency and safety of both patients and health care workers
- 7) Make sure necessary equipments / instruments to mitigate aerosol transmission are available such as filters and vacuum suction systems.
- 8) Simulate Work flow in laparoscopy with the goal of eliminating risk for the whole surgical team while providing care for the patient

Phase 2 (Surgical Workflow Recommendations)

Pre-operative

- 1) Create a team to Assess and triage* cases for surgery
- 2) Screen every patient comprehensively, including a CT chest even in asymptomatic for ALL cases especially in non-emergent, Urgent cases such as cancer
- 3) Discuss the risk on possibilities of COVID-19 infection with the patient

Intra-operative

- 1) Need for a negative pressure room for established COVID-19 PCR positive patients, those with lung CT scan findings of interstitial pneumonia with a probability of COVID-19 and / or patients high risk of COVID-19 based on PSMID interim guidelines ²⁰
- 2) Standard or enhanced PPE is imperative for every member of the surgical team taking care of the COVID-19 positive and suspect patient. These include Goggles, Face Shield, PAPR, Hazmat suits, double gloves, shoe covers. Proper Donning must be maintained, with a Donning Quality officer.
- 3) Special attention to maintain integrity of PPE at all times
- 4) During the procedure, prevention and elimination of aerosol transmission is most crucial.

The following recommended principles apply:

- Limit laparoscopic procedure to the most proficient surgeon
- DO NOT reuse trocars (integrity of trocar is necessary to avoid air leak)
- Make appropriately sized incision for trocar sites to avoid gas leak
- Keep pneumoperitoneum intraabdominal pressure as low as possible without compromising the surgical field. (8-10mm Hg, not to exceed 12mmHg)
- Minimize trendelenburg position
- Set electrosurgical power settings to a minimum.
- Keep instruments blood free.
- Minimize changing of instruments
- Use suction liberally to reduce surgical smoke.
- DO NOT open trocar valves to evacuate surgical smoke or gas during the procedure
- Consider using an outside filter device attached to a vacuum suction unit if which may be attached to one of the trocars
- Establish strict protocols to maintain pneumoperitoneum avoiding gas leaks that may aerosolise the virus including small port site incisions,
- Completely evacuate pneumoperitoneum through a filter device into a vacuum suction unit prior to specimen extraction and trocar removal before closure or during conversion.

Post Operative

- 1) Follow strictly doffing procedures with the Doffing Quality officer and check for breaks
- 2) Post operative room and equipment decontamination and disinfection management should follow and comply with standards from accredited societies and DOH.
- 3) Devices used for COVID-19 positive or suspects should be segregated, labeled and undergo separate disinfection
- 4) Clinical waste materials should be properly labelled and disposed.

CONCLUSIONS:

1) It is strongly recommended to apply laparoscopy only in selected cases where COVID-19 is absolutely ruled out and in selected patients where benefit of laparoscopy significantly outweighs the risk of potential aerosolization of virus causing COVID-19 transmission and contamination.

2) In laparoscopic approach, mitigation of aerosol transmission from pneumoperitoneum evacuation and surgical smoke by a filter is imperative.

3) Safety of the entire surgical team in the OR should not be compromised.

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. Epub 2005 Jul 5.
- 2) 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.
- 3) 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.
- 4) PAHPBS Recommendations for Surgery in Covid-19 times. 21 March 2020
- 5) PCS Recommendations on Emergency Surgery during Covid Pandemic
- 6) PCS Guidelines on Proper PPE during Covid-19 Pandemic
- 7) WHO rational and appropriate use of PPE https://apps.who.int/iris/bitstream/handle/10665/331215/WHO-2019-nCov-IPCPPE_use-2020.1-eng.pdf
- 8) Zheng MH, Boni L, Fingerhut A. Minimally invasive surgery and the novel coronavirus outbreak: lessons learned from China and Italy. *Annals of Surgery.* 2020. [Accepted for Publication].
- 9) Perioperative Considerations for the 2019 Novel Coronavirus (COVID-19)
- 10) Tran K, Cimon K, Severn , 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(4).
- 11) 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.
- 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) 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.
- 14) 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 .
- 15). 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.
- 16) 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(12):2788–2799.
- 17) Gloster HM Jr, Roenigk RK.) Risk of acquiring human papilloma-virus from the plume produced by the carbon dioxide laser in the treatment of warts. *J Am Acad Dermatol.* 1995, 32:436–41.
- 18) Gu J, Han B, Wang COVID-19: Gastrointestinal manifestations and potential fecal-oral transmission. *J. Gastroenterology.* March 3 2020 [Epub ahead of print].

19) SAGES & EAES updated recommendations on surgery in COVID-19 pandemic. <https://www.sages.org/recommendations-surgical-response-covid-19/>

20) Intercollegiate General Surgery Guidelines in COVID-19 <https://www.rcsed.ac.uk/news-public-affairs/news/2020/march/intercollegiate-general-surgery-guidance-on-covid-19-update>

21) PSMID Interim Guidelines on the clinical management of adult patients with suspected or confirmed COVID-19 infections ver 2.1, march 2020

Triage: risk is referenced form PSMID guideline

	RT-PCR	CT Chest (+)	Clinical Symptoms	Labs	Additional Risks
COVID +	+	+ ARDS, ground glass opacities +/- effusion	fever, cough, myalgia, sore throat	Leukopenia ALT/AST high Low Procalcitonin High CRP High D Dimer High LDH High Ferritin	
Suspect High risk	?	+ ground glass opacities +/- effusion	+/- fever, cough, myalgia, sore throat	Leukopenia/ normal WBC +/- AST/ALT high	>60, Pre-existing DM, HPN, CVD, CKD, Transplant, CLD, HIV, TB
Suspect med risk	?	-	+	Same as above	Same as above
Low risk	?	-	-/+	Normal	None

Treat every patient with pneumonia as probable COVID-19