Pacific Journal of Medical And Health Sciences
ISSN No. 2456-7450 | January to March, 2021 (Volume 3, Issue 1) pp-01-07

PJMHS
PACIFIC JOURNAL OF MEDICAL AND HEALTH SCIENCES

Short Review

Planning Surgery in COVID-19 Era- A Challenge

Dr. Ripudamanjit Kaur
PG Resident, Department of Surgery
Pacific Medical College and Hospital
Bhilon Ka Bedla, Udaipur (Raj.)

Dr. Gurudutt Bhaskar Basrur
MS, FRCS, Professor of Surgery
Pacific Medical College and Hospital
Bhilon Ka Bedla, Udaipur (Raj.)

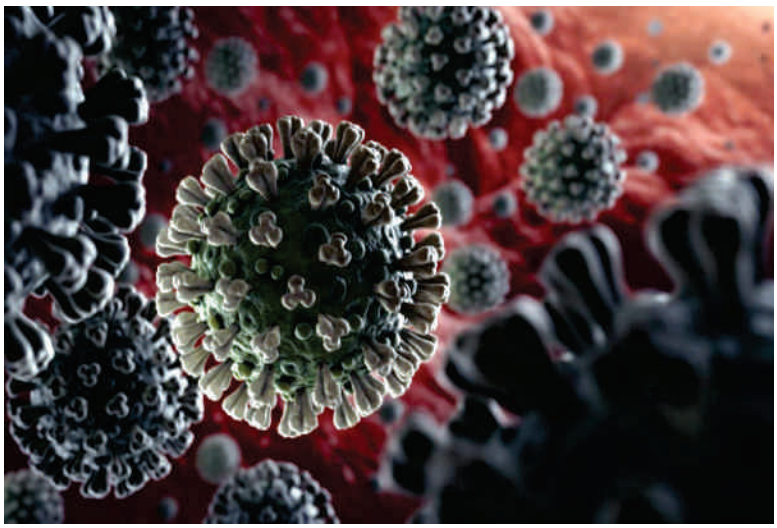
ABSTRACT

Coronavirus disease 2019, an illness caused by Coronavirus (CoV) causes symptoms ranging from common cold to severe respiratory distress and is a highly contagious disease. In view of this spreading infection Health care workers and public have been following various safety protocols. Although most of the elective surgeries are being postponed because of COVID-19 but still Surgeons are doing some elective and emergency surgeries keeping in view the complexity of the disease and urgency for the surgery and its significant impact on morbidity and/or mortality; surgeries are being planned following the COVID-19 related safety protocol and monitoring of health status of the patient.

KEYWORDS: COVID-19, Coronavirus, Surgery

INTRODUCTION

Coronavirus disease 2019 (COVID-19) the new pandemic, caused by the highly contagious single stranded mRNA virus with an incubation period of up to 14 days. It spreads by respiratory secretions, runs a mild course in 80% of patients, while 14% needing hospitalization and oxygen therapy, and 5% needing intensive care/ventilatory management.[1,2] India witnessed an outbreak of the coronavirus, in late January 2020 when three Indian students travelled to the southern state of Kerala from Wuhan in China - the epicenter of the outbreak. All three tested positive for COVID-19, confirming a local contagion. At the same time, several other cases were detected in other parts of the country, most of which were linked to people with a travel history to affected countries. Infections increased rapidly since March, with a significant growth in testing[3]



Address for Correspondence
Dr. Gurudutt Bhaskar Basrur
gurudutt58@hotmail.com

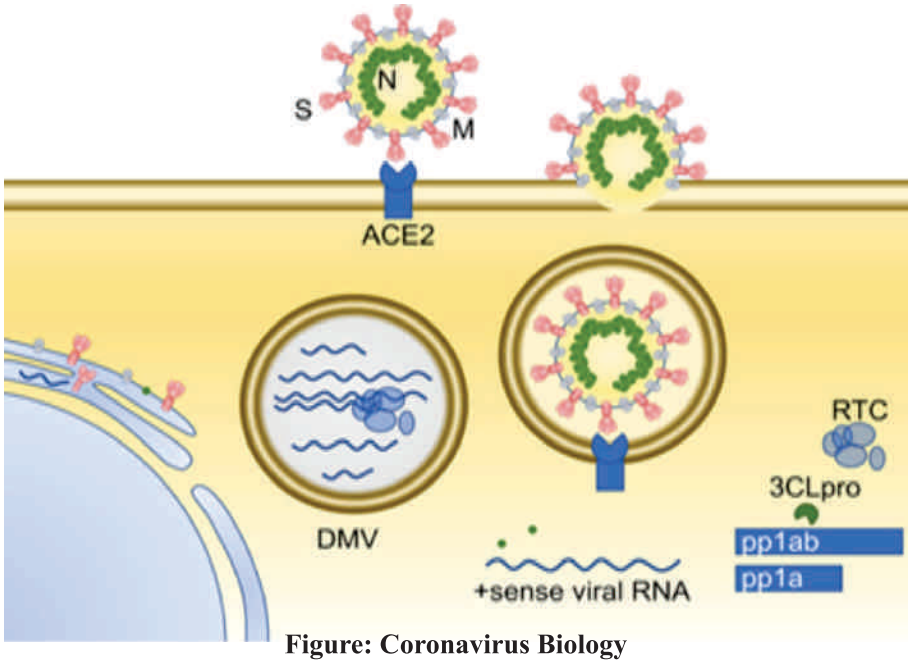


Figure: Coronavirus Biology

Healthcare systems worldwide are responding to an emerging infectious syndrome caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) virus. COVID-19 patient can progress from asymptomatic or mild illness to hypoxemic respiratory failure or multisystem organ failure, necessitating intubation and intensive care management.[2] Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases. A novel coronavirus (nCoV) was identified on 7 January 2020 and was temporarily named "2019-nCoV". It was subsequently named the "COVID-19 virus".[5] Healthcare providers, are at the frontline of this epidemic, and they need to be aware of the best available evidence to guide therapeutic management of patients with COVID-19 and to keep themselves safe while doing so.[2]

Following the spread of infection India's healthcare workers and public officials were vigilant in their fight against the virus. Despite that, the country's healthcare infrastructure was not enough in the face of an epidemic. Data from 2017 showed India had less than 0.5 hospital beds per 1,000 people. Moreover, the country's population density was one of the highest in the world, making it harder to contain local transmissions if strict precaution measures are not followed. A lacking healthcare infrastructure also remained a major cause for concern. This was because of an inadequate public system that shifted the weight to the private sector, which was not prepared for an emergency of this magnitude.[3]

After imposing lockdown to control spread of infection, elective surgeries where banned in different parts of India for some specified time as elective surgeries are non-urgent surgeries. A cancelled or delayed elective surgery has unintended consequences that may inflict significant harm in terms of morbidity and mortality in 50% of patients.[6] Varying degrees of complexity of diseases and urgency of surgeries, such as for malignancies following chemoradiation, impending obstruction of large hernias, poor perioperative outcomes when surgeries such as for hip are not operated upon were some considerations for restarting elective surgeries. Such patients may have been deprived of access to timely surgical care, because of uncertainty on predicted course of COVID-19 in them.[7]

Recommendations for starting elective surgical procedures should consider the local capacity of operating rooms, disease burden of the pandemic, overflowing case demand, backlog of surgical procedures, normal surgical demand, nature of disease that necessitates surgery and national priorities after evaluating institutional resources, as the risk of elective surgeries outweigh benefits.[8]

If patient is COVID-positive pre-operatively or if they contract COVID-19 illness postoperatively causing severe interstitial pneumonia and associated ARDS, cardiac injury and kidney failure along with impaired immunity which followed surgery will result in poor perioperative outcome.[1]

A roadmap to resume elective surgeries should detail timings for reopening elective surgeries, COVID-19 testing facilities, adequate PPE supplies, conservation policies for PPE and case prioritization and scheduling[6]. A sustained reduction of new COVID-19 cases with an appropriate number of intensive care beds and trained staff for non-elective patient care are needed to restart elective surgery.[7,8]

Proper communication with patients regarding the need for advancing or deferring surgical care facilitates planning the elective list and provides psychological safety. Discretionary, time insensitive, equivocal non-essential surgical procedures can be planned later, on a case-by-case basis with proper communication to patients.[9]

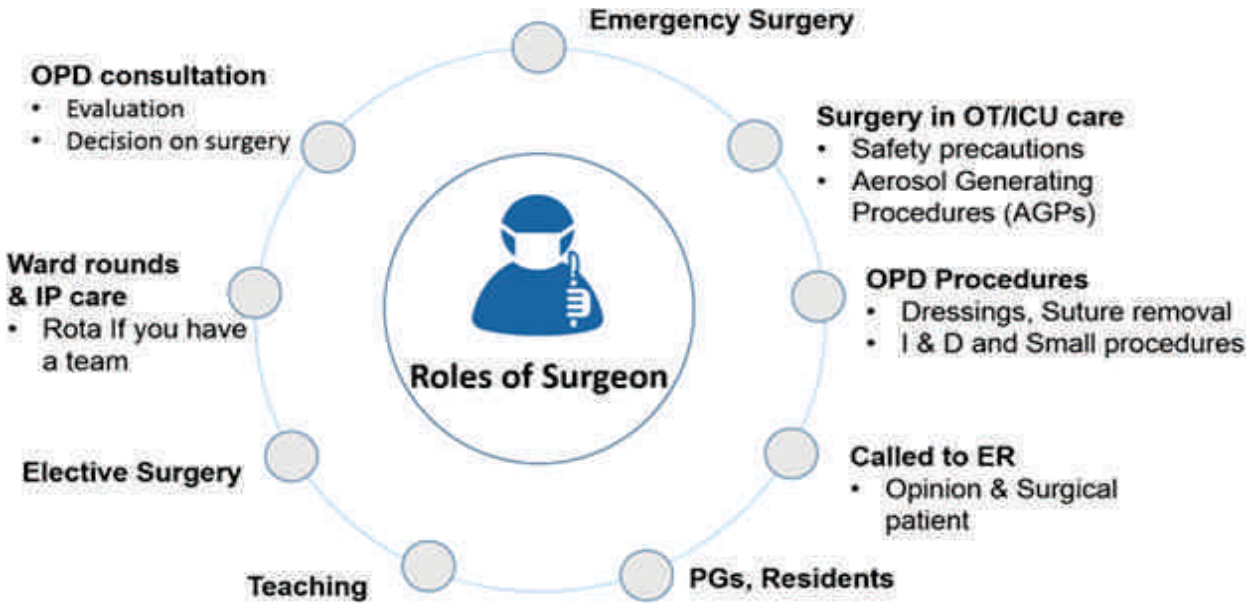


Figure 2: Depicting the various Roles of a Surgeon during COVID-19 Pandemic [10]

A detailed pre-anesthetic check-up is done to rule out COVID-19 illness by a detailed history of recent high-risk travel or presence of COVID-like symptoms, followed by physical examination and routine laboratory investigations. Pre-operative assessment and remote instructions using telemedicine facilities can be utilized whenever feasible. [11, 12] Any finding suggestive of COVID illness warrants appropriate medical care and cancellation of surgery. [13] Surgeon should discuss post-operative outcomes, especially of high risk procedures and in-patients who are older adults, frail or post COVID-19. This will help in advanced planning for patient care.[9]

COVID specific modifications in transfer of patients directly to operating room (OR), allocating same person to single patient for different phases, fixed shortest possible route away from public, dedicated trolleys and bare necessities inside OR, specific team time out, guidelines for PPE use, psychological and physical safety of patients, perioperative anesthetic plan and postoperative pain management strategies should be decided in preoperative period for smooth outcome.[11-17]

Regional anesthetic techniques preserve respiratory function, avoid aerosolization and hence viral transmission and must be preferred over general anesthesia whenever possible. Following procedure specific guidelines inside OR and reviewing specimen pick up protocols will aid smooth intraoperative care.[18-20]

Procedures like tracheostomy should be done only when there is absolute indication as in head and neck surgeries. [17] Limit laparoscopy whenever possible to reduce aerosolization[21]. Use smoke evacuator when electrocautery is used.[21] Use of HEPA filters attached to suction, use of ultra-low particulate air filtration (ULPA) while desufflation of pneumoperitoneum to prevent surgical plume aerosolizing virus into OR environment.[21]

Enhanced recovery protocols with fast-tracking of patients inside OR can be done to avoid patient stay in ICU. This also helps reduce length of stay and unwanted post-anesthesia complications. Post-discharge care and follow up can be done by telemedicine for minor/day care procedures to reduce risk of infection. Guidelines for COVID-19 testing in postoperative period for symptomatic patients or who develop influenza like illness (ILI) must be established.[7,8]

Precautions such as limited personnel inside OR during Aerosol generating procedures (AGPs), use of negative pressure in OR if possible, treatment of exhaust air by high efficiency particulate air filtration or exhausting it more than 3 meters above tallest point of hospital building, modifications of anesthetic techniques, use of barrier devices and of total intravenous anesthesia while performing AGPs to help prevent covid transmission.[11,13,15,17,22-36]

Limited number and movement of personnel inside OR is crucial, especially when AGP is taking place, as it reduces the exposure risk and preserves PPE supply. This might require overnight or out of hours activities to optimise resource utilisation. Role identification of team members, phased opening of operating rooms, increasing OR availability time, grouping of similar cases organised during different shifts will help limit movement of personnel within OR.[8,22,36,37]

Table 1: Surgical Society of Oncology (SSO) guidelines in alliance with BSO and ISO have proposed three categories as follow [38]

Category I	Low-risk patients with non-life threatening disease	The treatment can be postponed for 6 to 8 weeks after telecommunication
Category II	Intermediate-risk patients presenting with non-life threatening disease, but with a potential for further increase in morbidity and mortality if there is a delay in treatment	Oral chemotherapy or short course radiotherapy can be given.
Category III	High- risk patients, with life threatening disease	Surgery is proposed

Table 2: Risk comparison of open, laparoscopic, and robotic-assisted surgery under COVID-19 circumstances [10, 38, 39]

Particulars	Open surgery	Laparoscopy surgery	Robot-assisted surgery
Health personnel	Usually 3 bedside staff	Usually 3 bedside staff	Usually 1 bedside staff,console staff (remote)
Length of stay (LOS)	Longer	Short	Short
Aerosol generation	Less aerosol formation, unconfined dispersion, unfiltered (no data on COVID-19 in aerosols and risk)	Intraabdominal dispersion, limited by filters or locks (no data on COVID-19 in aerosols and risk)	Intraabdominal dispersion, limited by filters or locks (no data on COVID-19 in aerosols and risk)
Smoke	Maximal exposure	Confined, filtered	Confined, filtered
Blood, Bio-fluids	Additional blood loss, Continuous exposure	Hardly if any blood loss, exposure at limited intervals	Hardly if any blood loss, exposure at limited intervals
Abdominal pressure (mmHg)	0	10–15	< 10
Perioperative cleaning of instruments	Large number of instruments, heavy blood contamination	Limited number of instruments, less blood contamination	Large surface of robot, limited number of instruments, less blood contamination

Due to rising COVID-19 cases ban on elective surgeries has largely affected many of us emotionally and psychologically.Tait et al. demonstrated that cancellation of planned pediatric outpatient surgeries has a considerable impact on patients and their families both emotionally and economically.[40,41] Herrod et al. performed a study to quantify the economic and psychological impact of the cancellation of operations during the so-called 'Winter National Health Service (NHS) Crisis' due both to an anticipated seasonal rise in admissions and an unexpectedly severe epidemic of influenza. It was also summarised that the higher intensity of these emotions was associated with the shorter length of the cancellation period. This seems understandable because cancellation of the surgery one or few days before the proposed date has to be very emotionally demanding.[41] One of the main issues associated with COVID-19 pandemic is a general fear in population. Patients may be concerned about catching the COVID-19 infection while seeking care in COVID19-designated receiving hospitals and so, understandably, avoid or delay seeking care.[41,42]

DISCUSSION

Social distancing, providing adequate scrubs and PPEs, strict and frequent hand hygiene, self-policing, mask protocols, chemoprophylaxis for at risk professionals, diagnostic screening/testing policy, post-exposure quarantine policy, taking a shower before going home, advice on nutrition and electrolyte rich diet are some of the measures that can be done aiming at providing physical and psychological safety to health care professionals.[9]

For teaching professionals, steps taken to keep their families safe will also help them achieve psychological safety. Prolonged working hours with PPEs may lead to electrolyte imbalance, heat stroke, fatigue, exhaustion and post-traumatic stress and may need psychological support for them. Debriefing the team at frequent intervals to evaluate how the plan is working and what needs to be improved, will help in smooth running of theatres for elective work.[17,43]

Returning safely is as important as opening up theatres for elective surgeries after this pandemic. The key parameters that help overcome challenges of scheduling elective surgeries, prevent perioperative COVID-19 transmission and that aid successful anesthetic and surgical outcome in patients will be resolving the human factors and overcoming the technical obstacles that COVID-19 has brought to us.[44]

- Stagger the operations
- No visitors or observers in OT
- Minimum health care workers in operating room during anesthesia
- Controlled smoke (aerosol) evacuations — suggestions are still dynamic
- Complete PPE protection during surgery
- Minimum HCWs during reversal from anesthesia
- Use of minimal energy source
- Sanitize the room with 1% hypochlorite solution (every equipment used)
- Surgeons and personnel not needed for intubation should remain outside the operating room until anesthesia induction and intubation are completed for patients with or suspected of having COVID-19 infection
- Keep the doors of OT open for sufficient time between cases (1 h between cases)[38]

WHO continues to encourage individuals to take care of their own health and protect others by:

1. Washing hands frequently with water and soap or using hand-sanitizing gel
2. Maintaining social distancing (keeping a distance of 1 metre (3 feet) between yourself and anyone who is coughing or sneezing
3. Avoiding touching eyes, nose and mouth
4. Wearing a mask as needed
5. Following respiratory hygiene (covering your mouth and nose with your folded elbow or tissue when you cough or sneeze, then disposing of the used tissue immediately)
6. Seeking medical care early if you have a fever, cough and difficulty in breathing; and
7. Staying informed and following advice given by your health care provider, national and local public health authority, or employer on how to protect yourself and others from COVID-19.[5]

FINANCIAL SUPPORT AND SPONSORSHIP: None.

CONFLICTS OF INTEREST: There are no conflicts of interest.

REFERENCES

1. Lei S, Jiang F, Su W, Chen C, Chen J, Mei W, et al. Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection. EClinicalMedicine, 21, Article ID: 100331.
2. John R. Greenland, Marilyn D. Michelow, Martin J. London. COVID-19 Infection: Implications for Perioperative and Critical Care Physicians.

Anesthesiology June 2020, Vol. 132, 1346–1361.

3. Coronavirus (COVID-19) in India - statistics & facts. John Elflein. May 10, 2021
4. John R Greenland, Marilyn D Michelow, Linlin Wang, Martin J London. COVID-19 Infection: Implications for Perioperative and Critical Care Physicians. National Library of Madicine.[pubmed]
5. www.who.int , World Health Organization (WHO)
6. Philip F Stahel, How to risk-stratify elective surgery during the COVID-19 pandemic? National Library of medicine. Mar 31, 2020; 14:8.
7. Joint Statement: Roadmap for Resuming Elective Surgery after COVID-19 Pandemic [Internet]. American College of Surgeons. 2020. Available from: https://www.facs.org/COVID-19/clinical-guidance/roadmap-elective-surgery. [Last cited on 2020 May 26].
8. COVID-19: Recommendations for Management of Elective Surgical Procedures [Internet]. American College of Surgeons. March 13, 2020.
9. Soma Ganesh Raja Neethirajan, Akilandeswari Manickam. Scheduling elective surgeries following COVID-19: Challenges ahead. Journal of Anaesthesiology Clinical Pharmacology. Year:2020. Volume 36. Issue 3. Page : 291-296
10. Kimmig R, Verheijen RH, Rudnicki M (2020) Robot assisted surgery during the COVID-19 pandemic, especially for gynecological cancer: a statement of the Society of European Robotic Gynecological Surgery (SERGS). J GynecolOncol 31(3) [PMC free article] [PubMed]
11. Malhotra N, Bajwa SJ, Joshi M, Mehdiratta L, Trikha A. COVID Operation theatre Advisory and position statement of Indian society of anesthesiologists (ISA National). Indian J Anaesth 2020; 64:355-62.
12. Wax RS, Christian MD. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. Directives concrètes à l'intention des équipes de soinsintensifsetd'anesthésiologieprenantsoin de patients atteints du coronavirus 2019-nCoV. Can J Anaesth 2020; 67:568-76.
13. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. JAMA 2020; 323:1061-9.
14. Dexter F, Parra MC, Brown JR, Loftus RW. Perioperative COVID-19 defense: An evidence-based approach for optimization of infection control and operating room management. Anesth Analg. 2020 Jul; 131(1):37-42.
15. Lockhart SL, Duggan LV, Wax RS, Saad S, Grocott HP. Personal protective equipment (PPE) for both anesthesiologists and other airway managers: Principles and practice during the COVID-19 pandemic. Can J Anaesth 2020; 1-11. doi: 10.1007/s12630-020-01673-w.
16. Kim HJ, Ko JS, Kim T-Y. Recommendations for anesthesia in patients suspected of COVID-19 Coronavirus infection. Korean J Anesthesiol 2020; 73:89-91.
17. Coccolini F, Perrone G, Chiarugi M, Di Marzo F, Ansaloni L, Scandroglio I, et al. Surgery in COVID-19 patients: Operational directives. World J EmergSurg 2020; 15:25.
18. Zhong Q, Liu YY, Luo Q, Zou YF, Jiang HX, Li H, et al. Spinal anesthesia for patients with Coronavirus disease 2019 and possible transmission rates in anesthetists: Retrospective, single-centre, observational cohort study. Br J Anaesth 2020; 124:670-5.
19. Lie SA, Wong SW, Wong LT, Ling Wong TG, Chong SY. Practical considerations for performing regional anesthesia: Lessons learned from the COVID-19 pandemic. Can J Anaesth 2020:1-8. doi: 10.1007/s12630-020-01637-0
20. Uppal V, Sondekoppam RV, Landau R, El-Boghdadly K, Narouze S, Kalagara HKP. Neuraxial anaesthesia and peripheral nerve blocks during the COVID-19 pandemic: A literature review and practice recommendations. Anesthesia 2020; 10.1111/anae. 15105. doi: 10.1111/anae.15105. Online ahead of print.
21. Francis N, Dort J, Cho E, Feldman L, Keller D, Lim R, et al. SAGES and EAES recommendations for minimally invasive surgery during COVID-19 pandemic. Surgical Endoscopy Jan1 2020;34:2327-31.
22. Ti LK, Ang LS, Foong TW, Wei BS. What we do when a COVID-19 patient needs an operation: Operating room preparation and guidance. Can J Anaesth 2020; 67:756-8.
23. Peng PWH, Ho PL, Hota SS. Outbreak of a new coronavirus: What anesthetists should know. Br J Anaesth 2020; 124:497-501.
24. 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.
25. Aminnejad R, Salimi A, Saeidi M. Lidocaine during intubation and extubation in patients with coronavirus disease (COVID-19). Can J Anaesth 2020; 67:759.
26. Asenjo, J.F. Safer intubation and extubation of patients with COVID-19. Can J Anaesth 2020; 1-3. doi: 10.1007/s12630-020-01666-9.
27. Søreide K, Hallet J, Matthews JB, Schnitzbauer AA, Line PD, Lai PBS, et al. Immediate and long-term impact of the COVID-19 pandemic on delivery of surgical services. Br J Surg 2020; 10.1002/bjs. 11670. doi: 10.1002/bjs.11670.
28. Chokshi T, Channabasappa S, Vergheese DC, Bajwa SJ,

Gupta B, Mehdiratta L. Re-emergence of TIVA in COVID times. Indian J Anaesth 2020; 64:S125-31.

29. Hung O, Hung D, Hung C, Stewart R. A simple negative-pressure protective barrier for extubation of COVID-19 patients. Can J Anaesth 2020:1-3. doi: 10.1007/s12630-020-01720-6

30. Matava CT, Yu J, Denning S. Clear plastic drapes may be effective at limiting aerosolization and droplet spray during extubation: Implications for COVID-19. Can J Anaesth 2020; 67:902-4.

31. Canelli R, Connor CW, Gonzalez M, Nozari A, Ortega R. Barrier enclosure during endotracheal intubation. N Engl J Med 2020;382:1957-8

32. Markus Rehm, Julia Eichler, Agnes S Meidert, Josef Briegel. Protecting Health Care Workers: Use of a Body Covering Transparent Sheet During and After Intubation of Patients With COVID-19. Anesth Analg. 2020 Aug;131(2):e111-e112.

33. Kearsley R. Intubation boxes for managing the airway in patients with COVID-19. Anesthesia 2020. doi: 10.1111/anae. 15081. [published online ahead of print, 2020 Apr 20].

34. Orser BA. Recommendations for endotracheal intubation of COVID-19 patients. AnesthAnalg 2020; 130:1109-10.

35. Brown S, Patrao F, Verma S, Lean A, Flack S, Polaner D. Barrier system for airway management of COVID-19 patients.Anesthesia & Analgesia. Jul 2020. Vol 131. Issue 1. e34-e35

36. Luo M, Cao S, Wei L, Tang R, Hong S, Liu R, et al. Precautions for intubating patients with COVID-19. Anesthesiology 2020; 132:1616-8.

37. Coronavirus Disease 2019 (COVID-19) [Internet]. Centers for Disease Control and Prevention. 2020. Available from: https://www.cdc.gov/ coronavirus/ 2019-ncov/hcp/infection-control-recommendations. html. [Last cited on 2020 May 26].

38. S. P. Somashekhar, H. V. Shivaram, Santhosh John Abhaham, Abhay Dalvi, Arvind Kumar, DilipGode, Shiva Misra, Sanjay Kumar Jain, C. R. K. Prasad, and Raghu Ram Pillarisetti corresponding author. ASI's Consensus Guidelines: ABCs of What to Do and What Not During the COVID-19 Pandemic. Indian J Surg. 2020 Jun 9: 1–11.

39. Porter J, Blau E, Gharagozloo F, Martino M, Cerfolio R, Duvvuri U et al (2020) Society of robotic surgery review: recommendations regarding the risk of COVID-19 transmission during minimally invasive surgery. BJU Int. 2020 Aug;126(2):225-234 [PubMed]

40. Tait AR, Voepel-Lewis T, Munro HM, Gutstein HB, Reynolds PI. Cancellation of pediatric outpatient surgery: economic and emotional implications for patients and their families. J ClinAnesth 1997; 9:213–9.

41. RadekKaisera, Norbert Svobodaa, Petr Waldaufb and David Netuka. The economic and psychological impact of cancellations of elective spinal surgeries in the COVID-19 era. British Journal of Neurosurgery. 18 Jan 2021.

42. O'Connor CM, Anoushiravani AA, DiCaprio MR, Healy WL, Iorio R. Economic recovery after the COVID-19 pandemic: resuming elective orthopedic surgery and total joint arthroplasty. J Arthroplasty 2020; 35: S32–S6.

43. Greenberg, N., Docherty, M., Gnanapragasam, S. and Wessely, S., 2020. Managing mental health challenges faced by healthcare workers during covid-19 pandemic. BMJ. 2020 Mar 26;368

44. Gurses A, Tschudy M, McGrath-Morrow S, Husain A, Solomon B, Gerohristodoulos K, et al. Overcoming COVID-19: What can human factors and ergonomics offer?. Journal of Patient Safety and Risk Management. 2020;25(2):49-54.