Impact of the COVID-19 pandemic on anesthesiologists in India: A cross-sectional online survey of the practices, preparedness, and mind-set

Gauri Raman Gangakhedkar, Sohan Lal Solanki
Department of Anesthesiology, Critical Care and Pain, Tata Memorial Hospital, Homi Bhabha National Institute, Mumbai, Maharashtra, India

Abstract

Background and Aims: India is one of the five worst hit countries in the world due to COVID-19, by the fourth week of June 2020. The impact of COVID-19 on the health practices is well-documented but there are no studies assessing its impact on anesthesiologists in India. This study aims at assessment of the impact of COVID-19 on the practices followed, the preparedness, and mindset of anesthesiologists in India.

Material and Methods: Using Google forms, a cross-sectional, questionnaire-based survey was conducted between the 5th and 22nd of May, 2020, among trainees and practicing anesthesiologists, in India. The anesthesiologists were invited to participate, using their e-mail addresses and through the social media platforms such as Facebook and WhatsApp. The responses that were generated, were analyzed using SPSS version 23 (IBM, Armonk, NY).

Results: Of the 707 anesthesiologists who participated, 68.3% had already worked in a COVID-19 specialty unit. Only 41.7% of the anesthesiologists felt confident that they had sufficient knowledge to deal with COVID-19 infected patients. Fear of catching the infection and infecting loved ones were important causes of anxiety, which was seen in 95% of the participants. Majority of the participants, (64.5%) did not think that elective surgical procedures could be restarted at this point.

Conclusion: COVID-19 has had grave impact on anesthesiologists, on the professional and personal front, and will possibly cause near-permanent changes in the work culture. Restarting elective surgical procedures, will require meticulous planning. In spite of their self-perceived under-preparedness to combat COVID-19, an overwhelming majority of participating anesthesiologists were prepared to contribute to the management of COVID-19.

Keywords: Airway, anaesthesiologists, coronavirus, COVID-19, crisis management, critical care, infection control, operating room, personal protective equipment, preparedness, pandemic, resource allocation

Introduction

On the 24th of March, 2020, when COVID-19 had infected 536 people in the country, a complete central lockdown was announced by the Government of India, in an attempt to break the chain of transmission, and possibly delay and decrease the spread of infections in the country.¹,² A crucial objective of the lockdown was to conserve the scarce resources, buy time to equip the infrastructure, and train the medical personnel to tackle this new threat. In keeping with this objective, hospitals were asked to create isolation facilities, procure Personal Protective Equipment (PPE), train their clinical and paraclinical medical personnel, and postpone elective surgical procedures, to allocate the available resources for COVID-19.³

Address for correspondence: Dr. Sohan Lal Solanki,
Department of Anesthesiology, Critical Care and Pain, Tata Memorial Hospital, Mumbai - 400 012, Maharashtra, India.
E-mail: me_sohans@yahoo.co.in
As the specialty that is at the forefront of COVID-19 management due to expertise in airway and ventilatory management, including intensive care expertise, anesthesiologists have been at the helm of management of COVID-19 the world over.\[^4,5\] Airway manipulation results in close contact with the aerosols released and thus put the anesthesiologist at a very high risk of infection.\[^6\] It was thus inevitable, that the COVID-19 pandemic has had a significant impact on anesthesiology as a science and has forced a change in practices and attitudes among anesthesiologists.

We undertook this survey-based study to understand the impact of COVID-19 on anesthesia practices in India, and Indian anesthesiologist’s perspective toward pandemic and also to see if the impact and response to the disease, was similar to the global picture.

**Material and Methods**

The survey was aimed at assessing the impact of COVID-19 on both anesthesia trainees and practicing anesthesiologists across the country. The Indian Society of Anesthesia (ISA) has more than 32,000 members. According to the Medical Council of India and the Diplomate National Board, there are approximately 15,000 anesthesia residents in the country. Presumably there are some anesthesiologists who are not members of the ISA, for which we added 3,000 anesthesiologist. With this in mind, we arrived at the estimated number of 50,000 anesthesiologists in the country. A sample size of 655 was calculated with a confidence level of 99% and margin error of 5%, based on this. A questionnaire was designed to assess the impact of COVID-19 on anesthesia practices in India. The said questionnaire comprised of questions that comprised of basic epidemiological data, nature of the workplace, work experience with COVID-19 and mental and academic preparation to work with COVID-19 patients in this pandemic. This questionnaire was externally validated for relevance, clarity, simplicity, and ambiguity, on a four-point scale for each parameter, for each question, by 10 independent anesthesiologists (trainees and consultants). After validation, it was formulated as a Google form. Anesthesiologists were invited to participate using their email addresses and through other social media platforms such as WhatsApp and Facebook, between 5\(^{th}\) and 22\(^{nd}\) of May, 2020. Filling the questionnaire and submission was considered as consent for participation in this survey.

Data was collated from the survey forms and analyzed. Frequencies were used to describe the demographic data. Data analysis for comparisons based on practice setting, years of practice, screening tests used and preferred antivirals was done using Chi-square or Fisher’s Exact test with \(P < 0.05\) considered as significant. Statistical analysis was done using SPSS version 23 (IBM, Armonk, NY).

**Results**

A total of 707 anesthesiologists participated in the survey, of which, 369 (52.2%) were females; 138 (19.5%) of the participants were trainees and a majority of them (47.4%), worked in public hospitals. There were no incomplete questionnaires. A total of 36.6% of the participating anesthesiologists were between 31 and 40 years of age and 26.2% were between 21 and 30 years of age. Of the participants, 41.3% of the anesthesiologists had less than 5 years of experience, while 169 (23.9%) had more than 20 years of experience. Among their areas of work, 96.6% of the anesthesiologists were attending to patients in the operating rooms (OR), but a large proportion of them, were also attending to patients in the Intensive Care Units (45.3%) and providing anesthesia services even outside the OR (41.2%). The demographic details are mentioned in Table 1. While 50.5% of the participants attested to having attended over 20 cases in the OR per week, before the pandemic, the number saw a sharp decline to only 5% of the participants still performing more than 20 cases per week. A significant number of work places had a rotatory policy at work, as was reported by 67.9% of the participants, to reduce exposure to COVID-19.

The survey revealed that 54.7% of the participants worked in hospitals that catered to patients infected with COVID-19 and 68.3% had already worked in a COVID-19 specialty unit, either in their own hospitals, or having been posted in designated COVID-19 hospitals as per Government policy. However, only 15.3% had been quarantined due to contact with COVID-19 positive individual [Table 1].

When a patient was detected as COVID-19 positive after arrival in the hospital, 50.4% of the participants stated that these patients were isolated in the same hospital, but in other set ups, COVID-19 positive patients were shifted to dedicated COVID-19 hospitals. Dedicated ORs for COVID-19-positive individuals were available in 38% of the institutes while 14.6% are in the process of creating such dedicated set ups. Negative pressure intensive care units (ICUs) are available in only 18.7% of the institutes and negative pressure OTs are rarer still (11%). A staggering 70.7% of anesthesiologists remain unaware of the number of fresh air changes in their respective institutes.

Screening protocols were not uniform across the country but eliciting travel history (92.9%), contact history (89%), symptomatic assessment (88%), and history of stay in containment zones (81%) were the most common protocols.
Use of Infrared thermometers, occupational history, pre-operative RT-PCR, and even HRCT chest were also cited as screening procedures frequently [Chart 1].

Scavenging systems are available in just 26.6% of the OR. With respect to sanitation practices between two cases, 84% of the responses indicated that mopping was the preferred mode of sanitation. Fumigation (44.1%) and OR washing (30.4%) was done less frequently. UV lights are used rarely (0.3%). The use of Sodium hypochlorite (68.9%), soap and water (61.5%), and isopropyl alcohol (52.1%) seem to be the most popular practices for disinfection of reusable equipment such as laryngoscopes. 40.3% of the participants still continue to reuse disposable/one-use equipment. After each case, 62.4% of the anesthesiologists changed all the disposable equipment that was used. Most frequently, the healthcare providers, used alcoholic hand-rub (92.2%), changed gloves (90.7%) or washed their hands (89.8%) between two cases. Change of PPE was followed by 43% and a small number of participants (9.6%) stated that a new healthcare worker was brought in to do the next case. Various techniques are being implemented to reduce aerosolization during anesthesia procedures, including the use of aerosol boxes, plastic drapes, rapid sequence intubation, clamping tube before connecting to circuit, use of low flow anesthesia, scavenging, intravenous rather than inhalational induction, preferring the use of regional anesthesia over general anesthesia, use of multiple HME filters, use of videolaryngoscopes and avoiding non-invasive ventilation in varying frequencies, as mentioned in Chart 2.

The PPE policies in the various set-ups were reasonably similar. In the Out Patient Department (OPD), N-95 masks, gloves, and eye shields/visors were the most commonly used PPEs. A small proportion of participants have stopped OPD assessment of patients. In the OR, along with N-95 masks, gloves, and eye shields, PPE gowns/jumpsuits and shoe covers are being used additionally. Of the 707 participants, 320 work in ICU as well. In the ICU, the use of N95 masks, gloves, eye shields, PPE gowns/jumpsuits and shoe covers seems to be common. The details of PPE usage are elaborated in Chart 3. The responses indicate that only 46.5% of the people were satisfied with the current PPE strategy in their institutes.

Hydroxychloroquine (HCQ) as a prophylaxis was being taken by 45.5% of the respondents, while 7.4% of them were using alternative chemoprophylaxis. We found that younger anesthesiologists, those who had already worked in COVID-19 units or those whose hospitals were admitting COVID-19 patients, were more likely to be consuming HCQ ($P = 0.000$) [Table 2]. Among those who chose not to take HCQ, the most common reason that was cited, was the lack of evidence to support its use (48.1%) followed by the fear
of side effects (32.5%). Vitamin C and Multivitamin tablets were the most popular forms of alternative chemoprophylaxis. 64.6% of the anesthesiologists had received COVID-19 training in some form or the other. 55.5% had watched COVID-19 training videos. 55.1% had been a part of some hospital-based training and 50.6% had attended COVID-19 related webinars. Younger anesthesiologists were more likely to have undertaken training for the same (P = 0.002) [Table 3]. Based on the level of knowledge and training they possessed, 41.7% of them felt confident that they had sufficient knowledge to deal with COVID-19 infected patients, 34.2% were however not sure if the knowledge was sufficient. 95.5% of the anesthesiologists agreed that COVID-19 had been an additional source of stress, with 34.8% of them feeling the need for intervention. Fear of infecting their loved ones, getting infected themselves, fear of infecting co-workers, financial difficulties, and fear of stigmatization were cited as the most frequent causes. 54.9% of the participants were mentally prepared to work in COVID-19 wards and ICUs and 26.9% were in the process of making up their minds.

Majority of the participants, (64.5%) did not think that elective surgical procedures could be restarted at this point. When the elective procedures are resumed however, spacing out the procedures, use of PPE for all patients and mandatory testing for all patients, were felt necessary.

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**Table 2: Comparison of Working in a COVID facility and taking HCQ prophylaxis**

| Does the institute treat COVID positive patients? | Does your hospital treat Covid positive individuals | Total | p |
|--------------------------------------------------|--------------------------------------------------|-------|---|
| Are you taking HCQ prophylaxis?                  | Total                                            |       |   |
| No                                               | 133                                             | 71    | 181 | 385 |
| Yes                                              | 84                                              | 32    | 206 | 322 | 0.000 |
| Total                                            | 217                                             | 103   | 387 | 707 |

| Has the individual worked in a COVID specialty unit/ hospital | Have you been posted in a Covid Speciality Unit/Ward/ICU | Total | p |
|-------------------------------------------------------------|--------------------------------------------------------|-------|---|
| Are you taking HCQ prophylaxis?                             | Total                                                  |       |   |
| No                                                          | 302                                                   | 83    | 385 |
| Yes                                                         | 181                                                   | 141   | 322 | 0.000 |
| Total                                                       | 483                                                   | 224   | 707 |

**Table 3: Comparison of Years of Experience and COVID Training**

| Did you receive any training with regards to Covid? | Total | p |
|----------------------------------------------------|-------|---|
| Experience (Years)                                 |       |   |
| <5                                                 | 79    | 213 | 292 |
| 6-10                                               | 50    | 78  | 128 | 0.002 |
| 11-20                                              | 50    | 68  | 118 |
| >20                                                | 71    | 98  | 169 |
| Total                                              | 250   | 457 | 707 |
Discussion

In the Indian scenario, given the shortage of trained health care workers in proportion to the vast to the population and an already overburdened public health system; the impact on the preparedness, handling capacity of large number of patients’ in pandemic and physical and mental health of physicians specially of an anesthesiologist is likely to be immense. This could eventually impact the management of COVID-19 and non-COVID-19 surgical, non-surgical, critically ill and even patients visiting the out-patient departments. The lockdown led to reduced mobility of patients and implementation of central policies also changed how hospitals function. Thus, not only did COVID-19 changed the way anesthesiologists work, it also mandated a change in basic protocols, work patterns, and social and professional behaviour. To the best of our knowledge, this survey is the first of its kind from India. Through our survey, we explored both the impact of the pandemic, and the anesthesiologists’ perception regarding the same.

There is substantial evidence to suggest that elective surgical procedures could unnecessarily expose the patients to the virus. Additionally, given the global shortage of PPE, conservation of those, by reducing the number of elective procedures, remains as an option. The COVIDSurg Collaborative has predicted that globally, 28,404,603 procedures are likely to have been postponed on rescheduled on account of the pandemic. This impact is clearly visible in the Indian scenario too, with only 5% of the participating anesthesiologists performing more than 20 cases per day as opposed to 50.5% of them having done so, before the pandemic, as noted in our survey.

There is a growing fear that whenever elective surgical procedures are resumed, the possibility of second wave of infection would undo the efforts that have been taken to achieve control over the pandemic. Given the current state of affairs in India, which shows rapidly rising number of infections, this does not appear to be a safe time to restart elective surgical procedures, particularly in areas where such an exponential rise in infections can be seen. Also, some type of procedures, like cancer surgeries and transplant surgeries are more prone for postoperative SARS-CoV-2 infection because of immunocompromised condition of these patients. This view for continuing/restart elective surgeries is reflected by our participants with 64.5% of the participants not willing to restart surgical procedures at this point. When asked about the precaution to be taken when re-starting procedures, spacing out procedures, use of PPE, thorough screening were felt necessary, in keeping with the COVIDSurg Collaborative advice for rigorous screening of staff and patients, proper spacing, and careful patient selection.

The current screening protocols remained more or less adherent to the current testing guidelines provided by the central government, with some additional tools being used, in the form of meticulous history taking, IR thermometers, even preoperative HRCT screening.

Negative pressure isolation chambers and OR are recommended for COVID-19 patients to prevent airborne transmission. Our survey suggests that most institutes do not have these facilities. However, 18.7% of the ICU and 11% of the ORs were in the process of converting to negative pressure zones for better management of COVID-19. Since the decrease in viral load is directly proportional to the number of air changes, (1 air change = 63% drop in viral load), conventionally ventilated ORs require at least 20 min between two cases. Surprisingly, only 29.3% of the anesthesiologists were aware of the number of air changes in their OR.

Tsamakis et al. mirror the sentiments of the Indian anesthesiologists, when they state that front line healthcare workers felt vulnerable, depressed and displayed moderately severe anxiety. They also found that these feelings of inadequacy and psychological distress did not seem to have an impact on the desire to provide quality health care to patients. Similarly, in our survey, we found that 95.5% of the anesthesiologists felt that COVID-19 had led to added anxiety among them, however, 81.1% of them, were either mentally prepared to serve in such times, or were in the process of preparing themselves. Shanafelt et al. conducted listening sessions in Stanford to understand the sources of anxiety. Their findings were congruent with ours, where we found that fear of catching the infection and infecting loved ones were important causes of anxiety. While this is a valid source of anxiety, studies in China and those from the UK did not find community transmission of COVID-19 from healthcare workers, including anaesthesiologists, as statistically significant. As stated by Miller et al., the economic impact of the Pandemic forms a significant factor in the anxiety plaguing anesthesiologists.

HCQ appears to have some role in prophylaxis after 4 maintenance doses and is currently recommended in India for healthcare workers. In our study we found that 45.5% of the respondents used HCQ for prophylaxis. We found that more of the younger anesthesiologists, were likely to have worked in COVID-19 units, possibly explaining why these individuals were not only more likely to have had a history of quarantine, but also more likely to be using HCQ as chemoprophylaxis. Vitamin C and Zinc are being explored for their preventive roles through various clinical trials. They remained the most popular modes of chemoprophylaxis among those who chose to not take HCQ.

Various national and international organizations have laid out guidelines with regards to the conduct of cases in the time of this pandemic including the Indian Society of Anesthesiology. When asked about the measures taken to reduce aerosolization...
and to prevent transmission of disease in the OR setting, we found the use of aerosol boxes, plastic drapes, rapid sequence intubation, clamping tube before connecting to circuit, use of low flow anesthesia, scavenging, intravenous rather than inhalational induction, preferring the use of regional anesthesia over general anesthesia, use of multiple HME filters, use of videolaryngoscopes and avoiding non-invasive ventilation were popular.[11,21,23]

The limitations of our study were that, although a large number of anesthesiologists were invited to participate in the study, the participation was limited from east Indian states. Though only a small fraction of anesthesiologists have institutional practice, most of our participants belonged to institutes.

Conclusion

Our survey successfully brings to light, the grave impact that COVID-19 has had on anesthesiologists, both on the professional and personal front, which is likely to create near-permanent changes in the work culture for anesthesiologists across the country. The survey suggests that there is no doubt that scheduling of elective surgical cases with have to be meticulously well-planned and will have to be delayed till there is some control over the number of cases. The most inspiring finding of our study was that in spite of their self-perceived under-preparedness to combat COVID-19, an overwhelming majority of the participating anesthesiologists were prepared to do their bit as front-line warriors. The authors feel confident that this survey will provide insight into the minds of practising anesthesiologists, in the midst of the pandemic.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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