

(REVIEW ARTICLE)



High-Risk Surgeries during the COVID-19 Epidemic

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GSC Advanced Research and Reviews, 2021, 07(02), 035–041

Publication history: Received on 28 March 2021; revised on 02 May 2021; accepted on 05 May 2021

Article DOI: <https://doi.org/10.30574/gscarr.2021.7.2.0098>

Abstract

Introduction: The prevalence of coronavirus has led to minimal and emergency surgeries. It is recommended that surgery should be performed if it is necessary during the treatment process in order not to interfere with the treatment of patients, but surgery, which are more likely to transmit COVID-19, should be identified in order to have a safe surgery and improve the safety of patients and staff. Therefore, the present study aimed to identify surgeries with the possibility of transmitting COVID-19.

Method: The present study was conducted by an integrated review method. Searching was performed by keywords COVID-19, surgery, operating room, anesthesia, and instructions on PUBMED, Science Direct, Ovid, and ProQuest databases; and 98 studies were obtained. It decreased to 42 items after removing the duplicate items and reviewing the abstract of articles, and finally 23 studies were selected for review based on the inclusion criteria. The inclusion criteria were English and Persian languages; the relevance of articles on COVID-19, surgery and anesthesia.

Results: Tracheostomy, ear, nose and throat, maxillofacial, and head and neck surgeries such thoracotomy are high-risk surgeries for the COVID-19 transmission.

Conclusion: High-risk surgeries should be performed the full preventive precautions against the COVID-19 transmission.

Keywords: COVID-19; Operating room; High-risk surgery; Safe surgery.

1. Introduction

COVID-19 started in China in December 2019 and has spread all over the world [1, 2]. In this epidemic, many people around the world have been infected, and the medical staff are at high risk [3]. Furthermore, the COVID-19 epidemic has not only changed the process of care and treatment worldwide [4-6], but has also affected the global economy [6]. Its effects has been so significant that the World Health Organization [WHO] has considered the COVID-19 epidemic as a global crisis [5].

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The disease is new and it is necessary to share experiences in this field [7]. Unfortunately, the ways of its clinical prevention and manifestations have not been diagnosed. Since the prevention and screening programs, cutting the chain of disease transmission [1], are the most important strategies for combating the disease [4].

Coronavirus has not only affected the treatment procedures of infections, internal medicine, virology, epidemiology [4], but has also involved other groups including radiology [8], anesthesia, intensive care, nursing management, and home care [6]. Cases such as trauma in positive patients need emergency treatment and follow-up [4]. Employees are more likely to become infected; and the transmission of the disease to them is high [4]. In Wuhan of China, 63% of employees were infected [1080 out of 1716 individuals] [9] and 6 died [8] most of whom were emergency employees [8].

Canceling the elective surgeries and performing minimal and emergency surgeries are the ways to reduce the transmission of COVID-19 [10-12]. The reduction in the number of elective surgeries is due to the reduction of disease transmission and the promotion of immunity, as well as the reduction of equipment consumption and the storage of resources and equipment [13], but it has disrupted the treatment of some patients [10, 11]. If necessary, the relevant actions and surgeries should be performed to not interfere in their treatment procedures [10, 14]. Therefore, it is recommended that surgeries be performed in emergencies if necessary in the treatment of patients [10, 11, 15, 16].

However, many questions and challenges have arisen about surgery, resource management, and human resources [6]. In this regard, the most important concerns of surgeons are to perform safe and effective surgeries [14] and protect employees [15] and it is necessary to ensure the employees' safety [17]. In order to have a safe surgery [18] and improve the safety of patients and staff and control the infection, it is necessary to pay more attention to the prevention of the COVID-19 transmission [19] and ensure the availability of necessary equipment and staff safety minimums using the appropriate instructions [20].

In order to improve safety in the operating room and protect employees, there is a need for regular disinfection based on protocols [10, 19, 21], screening patients and identifying vectors [6, 7, 10, 13, 15], identifying the carrier staff [22], using the minimum number of individuals in the workplace [22] and observing the social distance [6, 7, 23, 24], training staff about the transmission and exposure to patients with COVID-19 [14], and it is suggested identifying the surgeries, which are more likely to transmit COVID-19 to take full precautions in them and decrease the risk of transmitting the infection in these cases. Therefore, the present study was conducted to identify the measures and surgeries with the possibility of transmitting high COVID-19.

2. Methods

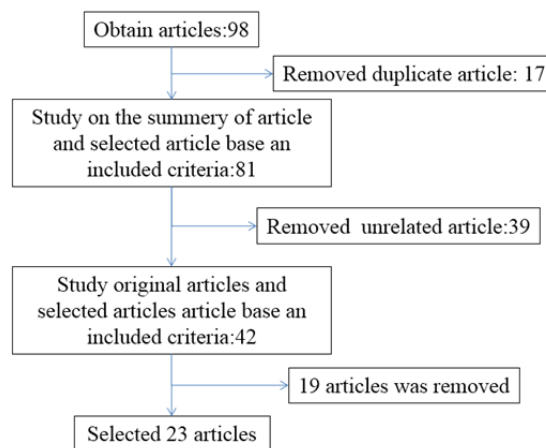


Figure 1 Selection of study

The present study was conducted by a systematic review method via meta-synthesis and integrated review [25-27] and searched for keywords COVID-19, surgery, operating room, anesthesia and instructions on PUBMED, Science Direct, Ovid, and ProQuest databases, and found 98 studies. After identifying duplicate items, number of articles decreased to 81. In the next step, abstract of the articles were reviewed with the inclusion and exclusion criteria. The inclusion criteria were articles in English and Persian and their relevance to COVID-19, surgery and anesthesia. The articles were included in the study if they had the inclusion criteria. The studies were separately and simultaneously investigated by two

researchers and appropriate articles from their views were included in the study and analyzed [28]. 23 out of 81 studies related to the research were finally identified and selected for review. Figure 1 shows the selection of studies.

3. Results

3.1. Patients with high-risk surgery for staff

- In tracheostomy, the ear, nose and throat surgeries, nasal pituitary surgery, maxillofacial surgery, thoracotomy and thyroid surgeries have been investigated as high-risk surgeries.

Measures taken at patient's airways are high risk for the COVID-19 transmission [29], including

- Tracheal suction [without a closed system]
- Laryngoscopy
- Tracheal intubation
- Bronchoscopy/gastroscopy
- Front-of-neck airway (FONA) procedures (including tracheostomy, cricothyroidotomy)

The usual airway management should be adapted and performed by taking the necessary precautions in positive coronavirus patients [29]. Tracheostomy is more likely to transmit coronavirus; hence, maximum caution should be exercised in embedding a tracheostomy [30].

Physicians and medical staff are at high risk for developing the disease while providing care because the risk of transmitting the disease through respiratory secretions is high; hence, the treatment and diagnostic procedures in the throat and airways and upper gastrointestinal tract and upper aero-digestive tract such as ear, nose and throat surgeries and head and neck surgeries, otolaryngologists-head and neck surgeons should be full protective measures [31]. Furthermore, in ear surgery, such as mastoid surgery, the dispersion of secretions is possible while using the Pheresis drill [31, 30].

Thoracic surgery is more likely to transmit the disease due to its accompanying procedures such as bronchoscopy, double lumen resection, and pulmonary resection, bronchoscopy, double-lumen endotracheal tube placement, airway surgery, laparoscopy and possibly lung surgery particularly with parenchymal lung leaks [13]

3.2. Deciding to have surgery in high-risk surgeries

These surgeries are risky for employees in the field of infection. Surgeons are challenged about their decisions and it is difficult to decide about surgery [13]. Therefore, decisions should be made for performing surgeries if necessary [12], reducing the elective surgeries as much as possible, and limiting surgeries to necessary surgeries and emergencies [11, 14]. It is important to screen patients based on the need for surgery and not to interfere with their treatment according to the recommendation to not perform elective screening operations [10, 11]. In the case of deciding to have surgery, screening should be performed before elective surgery in terms of symptoms, coronavirus testing, and CT scan of lung; and the results should be attached to the file [11, 15, 24].

Patients may be asymptomatic, and have mild hypoxia, mild respiratory symptoms, or multisystem organ failure, respiratory failure, and need the intubation and special care [23]. In some cases, the coronavirus has neurological symptoms that may not be diagnosed early [32]. The initial stroke symptoms should be taught to employees. Stroke patients in the emergency department should be examined in terms of COVID-19 because their stroke may be due to COVID-19 [32]. Therefore, the disease symptoms should be checked continuously in all clients and staff; and the patients and those around them and those who were in contact with them should undergo the additional tests in the case of doubt about COVID-19.

The transport of patients among wards should be avoided as much as possible [4], and outpatients should be only admitted; and the counselling, preparation, follow-up, training and queuing should be done remotely by phone [4, 7, 14, 15].

Mouthwash should be done using Chlorhexidine, and nasal irrigation by Betadine should be done an hour before surgery, and then three times a day before surgery [33]. Surgery should be performed in a room with negative pressure ventilation [15]; and the minimum number of staffs should be in the operating room during the surgery. [15, 18, 19, 24,

29, 30, 34, 35]. Touch the file with clean gloves, and do not use gloves contaminated with beds, etc. to touch the files; and it is recommended that patient files should be electronic.

The maximum safety equipment should be used to reduce the risk of contracting the disease from staff to these patients. The employees should preferably use shields and do hand rubbing before entering the rooms [10, 11, 15]. Disposable equipment should be used, or the equipment should be disinfected before surgeries according to the protocol for positive COVID-19 [15, 18, 19, 24, 29, 30, 35]. Employees should not have intensive shifts because too much work pressure can reduce their body resistance and increase the risk of infection [8]. It should be emphasized that the resulting death has a direct association with the lack of protective equipment [1]; hence, the necessary protective equipment should be available and sufficient [20, 36, 37].

3.3. Anesthesia

Anesthesia staff should use masks, shields and cover during the intubation and extubation of patients [15, 19, 24, 29, 30, 35]. Use masks, shields and full face safety equipment during the intubation, extubation, and surgery [15, 19, 24, 29, 30, 35]. The intubation devices should be preferably disposable or disinfected according to the protocol for positive patients [19, 33, 38]; and HMV filter should be used on the exhalation pathway and before the device [38].

3.4. Postoperative care

Clean all discharges using the disinfectants [39]. The beds should be fully disinfected [19, 33, 38]. Garbage should be collected in two-layer bags [39]. The rooms should be fully disinfected, and all unused surfaces and equipment should be disinfected after the patients leave [19, 33, 38].

3.5. Recovery

The staff should wear shields and masks; or glasses and masks, and special sleeves and gloves [15, 19, 24, 29, 30, 35]. Conscious patients should be transferred to recovery; and stretchers should be disinfected after transporting the patients [19, 33, 38]. Disposable equipment should be used for patients or they should be disinfected after patient discharge according to the COVID-19 protocol for positive patients [15, 19, 24, 29, 30, 35]. They should wear suitable masks in transporting patients to prevent the transmission of the disease [22].

3.6. Postoperative care

The patient care and follow-up should be done by phone and remotely as much as possible [7, 15].

4. Discussion

Giviet al, classified the patients' actions into three categories: low-risk, moderate-risk, and high-risk, and emphasized the use of maximum safety equipment in high-risk measures. High-risk measures include the intubation and extubation of patients, tracheostomy, suction of pharyngeal secretions in positive patients, positive nose pack in positive patients, perineal abscess discharge, removal of an external object in an awakened patient, facial injuries associated with fracture, and the need for fracture fixation [31].

Ahmed et al. also emphasized the patient screening [11], not performing the unnecessary surgeries [11], failure to perform high-risk procedures such as non-emergency and elective endoscopy [11], and use of safety equipment [11]. Furthermore, Dashraath et al, have suggested the patient screening in terms of fever and respiratory symptoms and then performing coronavirus testing, and considered it necessary to observe all precautions in suspected emergency patients for whom coronavirus testing was impossible [24].

For screening patients, studies have indicated that they should not have any symptoms 72 hours before surgery and the coronavirus testing should be negative twice in 24 hours [15, 24]. Elsteret al, also suggested 14-day quarantine before surgery to screen symptoms and argued that the staff should be quarantined for 14 days if they were in contact with sick people without any protection. However, 8-9 days later, they could return to work if their coronavirus test results were negative [15].

Studies have emphasized to take remote measures by phone as often as possible. Counseling, patient preparation, follow-up care, and patient queuing should be performed by phone if possible for necessary surgeries [4, 7, 14, 15]. Therefore, care providers need to do their utmost to protect themselves, their colleagues and other patients with the right preventive measures [23]. Staff training and preparedness in this field should be consider [4].

5. Conclusion

High-risk surgeries should be performed the full preventive precautions against the COVID-19 transmission.

Compliance with ethical standards

Acknowledgments

The ethical approval was obtained from the Ethical Review Committee of Shahid Beheshti University of Medical Sciences (ethical code No: IR.SBMU.PHARMACY.REC.1399.133). The authors also wish to thank Ethical Review Committee and research Committee member of School of Nursing and Midwifery, Shahid Beheshti University of Medical Science.

Disclosure of conflict of interest

The authors declared no conflicts of interest with respect to the research, authorship, and/or publication of this article.

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