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Safe anesthesia practices for obstetrics patients with COVID-19

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ABSTRACT

There is a plethora of systematic reviews and available reports that summarize the implications of COVID-19 on healthcare workers. Most of these studies have had their limitations owing to their implementation in small centers. Recently, a humongous focus of interest has been inflicted upon the safest healthcare practices for a parturient with COVID-19 [2]. But not much has been explored in this topic due to the impact of the pandemic on the overall clinical facilities. Despite the diligent initiatives of researchers to highlight the recent trends of healthcare practices in such trying times, the extent of such risk determinants has not been thoroughly understood [3]. This is because most studies have been limited owing to smaller sample sizes and general intricacies arising from the virus outbreak. This paper aims to conduct an all-inclusive review of the most efficient and recommended anesthesia practices for obstetrics among patients having COVID-19 infection. It covers some of the most general considerations including guiding standards that would aid a reader to acquire a thorough understanding of the on-going and proposed practices in the emergency and peri-operative areas [8]. This review paper would serve as a guiding manual for multiple healthcare settings across the world with all the valuable information necessary to strengthen the current healthcare policies and strategize better ones in the near future [3]. Having such reviews also help to fulfill the literature gap with a better comprehension of the current clinical practices and the standards to comply with.

Keywords: Anesthesia, epidural analgesia, COVID-19, parturient, gesta***tion***

INTRODUCTION

Ever since late 2019, the world has been suffering the alarming consequences of the novel beta coronavirus scientifically known as SARS-CoV2 (4). The outbreak of this pandemic has created a humongous stir across the globe with its unprecedented disruption of most services. There has been a huge crisis in the provision of clinical and surgical services as well [5]. Reportedly, the viral transmission occurs via droplets and aerosols. In such trying times with complete nationwide lockdowns as imposed in mid-2020 by multiple nations, this global crisis has been placing a humongous burden on medical and health care facilities. However, specific clinical practices and healthcare guidelines have evolved to curtail the

impact of this virus [8]. Almost overnight all selective anesthetic facilities were stopped. Resources were coherently diverted to include variations that can provide alternative support services with the best and safest care facilities for a critical parturient with COVID-19 infection.

BACKGROUND OF THE CHOSEN ISSUE

The general comprehension of COVID-19 has been evolving. There is humongous information on a wide variety of aspects concerning the pandemic including its infection control and anesthetic management [10]. In this regard, pregnant women whose immunity is supposed to be relatively depressed has a theoretical assumption of having a higher possibility of viral contraction [1]. However, recent shreds of evidence suggest that women in their gestation period are no longer at risk of infection than other adults nor their condition is thought to be relatively more severe in them [2]. Having said that, most reports and published literature have very limited information regarding the same that warrants an additional review. Since limited investigations exhibit severe complications of COVID-19 and pregnancy, therein lays the significance of this review initiative that primarily focuses on assessing this unexplored area of research. Owing to the paucity of information, the analysis and management of parturient infection and its vertical transmission to the unborn baby (fetus) is still ambiguous [4].

At the beginning of the pandemic, a plethora of assumptions was made that predicted the impact of such criticalities upon maternity services. Of particular importance, the major concerns were with the labor epidural services [20]. However, in the UK, a survey snapshot emerged in May 2020, guaranteed that the epidural analgesia service provisions to laboring females were not dramatically impacted by the viral pandemic. In this aspect, the most popular recommendation of the safest anesthesia services corresponds to the epidural services both in predicted or confirmed parturients. The intent is however to reduce the need for general anesthesia services especially for urgent deliveries that are characterized by a plethora of complications and critical procedures [20].

The way this virus has been disseminating, taking the necessary precautions, and associated measures have become pertinent in daily lives. Hence, with the humongous crunch of bedside testing, all parturients requiring anesthesia-mediated services are assumed to be the carriers of COVID-19 [4].

Considering the background of this, the review paper aims to highlight the clinical characteristics of pregnant patients supposedly with COVID-19 infection, the necessary safety preparation, and above all various anesthetic regimen and available guidelines [8]. This review paper may be of adequate benefit to anesthesiologists across the globe to be much more aware of the present evidence concerning obstetric patients and COVID-19. This detailed review casts light on the available evidence, recommendations, and valuable expert opinions pertaining to the provision of services related to obstetric anesthesia.

CLINICAL OUTCOMES/FEATURES OF COVID-19 DURING GESTATION

There is a plethora of physiological changes that occur during the period of gestation. These variations may increase the likelihood of virus contraction. Besides, the global knowledge of epidemiology, disease progression, pathogenesis, and implications of the coronavirus is changing continually with the gradual emergence of more evidence and information. It is therefore even more crucial to acquire a stronger comprehension of the issues with special reference to the anesthesia considerations for pregnant females [1].

Peripartum and related services amidst such crucial time cannot be deferred or postponed owing to the over-burden imposed by the virus outbreak. It is crucial to have a prompt identification of the patients with a higher risk of infection. This is needed to restrict the dissemination of the viral infection to other parturient and medical/clinical professionals. Some of the commonly observed clinical features identified with COVID-19 include fever, cough, sore throat, nausea, shortness of breath, headache, diarrhea, and vomiting. From this list, it is apparent that many of these characteristic features could be attributed to the constitutional features of gestation. Thus, the utility of temperature monitoring has been limited as the fundamental screening tool. Screening based on travel and contact history has also restricted authenticity as almost every country has been contracted owing to community transmission. Therefore, parturient with symptoms of respiratory

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tract disorders and travel history must be considered to be at a higher risk of infection and must be kept isolated unless they are tested negative [15].

The clinical features of parturient include a vast plethora of ailments including higher intubation rates, organ failure, and many more. The physiological changes occurring during pregnancy predispose these female patients to a wide variety of infections including pneumonia and other fatal consequences. But evidence suggests that the clinical course of the novel coronavirus is relatively mild in pregnant females (). Perhaps this is attributed to the sex-related immunological disparities between males and females which could provide a possible explanation for the higher rate of mortality among the infected males.

OBSTETRIC ANESTHESIA AND ITS REORGANIZATION DURING COVID-19

All across the globe, there are numerous clinical teams that are involved in the management and care of obstetric patients, particularly for the cesarean section. Such a team has expert professionals including anesthesiologists, obstetricians, labor nurses, critical care teams, and more. A well-established protocol is created in general with appropriate cognitive guidelines to streamline the intervention of COVID-19 patients [8]. Adequate care must be taken to ensure that safe anesthesia practices are carried out in the labor and critical care unit. There must be proper lines of communication between the anesthesia team and the obstetrician [4]. Safer practices in the trying times of COVID-19 include the reorganization of a dedicated team including the paramedical staff that has been allocated primarily for the provision of faster services. It is recommended to provide early information about the likelihood of a suspect emergency (COVID-19 positive) caesarian section [13]. This enables the quick response team to arrange for the best of practices in terms of the safety of the concerned individual under supervision. This would initiate the safety preparedness of the operating room and reduce donning time and medical errors [12]. If the patient is an emergency suspect while his test reports are pending, he must be taken care of as a positive case. This ensures the safety of other patients admitted to the same medical unit and limit the possibility of contraction.

SAFE ANESTHESIA PRACTICES DURING COVID-19

The anesthesia management of pregnant females with suspected or positive COVID-19 infection inflicts a humongous challenge for all healthcare professionals. This is owing to the pathophysiology and rapid transmission through carriers. The most fundamental goal in the operation theatre is to limit the possible occurrence of cross-contamination by incorporating the safest and most protected anesthesia services with stringent guidelines and stern infection control measures in the perioperative procedural room [10].

There is a range of recommended standards for safe anesthesia services for all aestheticists around the world. They are majorly intended to provide professional guidance to the professionals and facility administrators to improve and maintain the quality, standards, and safety of the predefined anesthesia care for obstetrics with COVID-19 [7]. These practices are often considered to be stern futuristic goals as they are categorically implemented and accepted as mandatory in many healthcare settings across the world. However, in certain rural areas with under-developed healthcare facilities, the obstetricians do face numerous challenges in resource allocation and maintenance of the safety anesthesia service which have led to a humongous impact on pregnant patients. The anesthesia provision under such circumstances must be restricted to specified procedures that are considered to be essential for emergency lifesaving purposes [13].

All pregnant patients having suspected or confirmed infection must be triaged. Their current physiological conditions need to segregate properly. Pregnant females having hypoxemia or tachypnea must be taken care of properly.

Anesthesia care provision at standards relatively lower than the mandatory guidelines would not be construed as safe or well-acceptable practices [8]. In many countries, the safest anesthesia standards are related to individual anesthesia experts. In many cases, the installation of monitoring devices essentially plays a humongous role in providing safe anesthesia as a means of an extension of clinical skills or human senses instead of their replacement. Whatever the cases may be, the goal is always to deliver the best possible care and ongoing refinement

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by complying with and exceeding the accepted standards implemented for safer anesthesia practices.

GENERAL STANDARDS FOR SAFE ANESTHESIA PRACTICES DURING COVID-19

Anesthesia services are considered to be the most essential component of standard healthcare facilities with proper resources. Due to the humongous impact of the virus outbreak across the globe, it is the judicious duty of the healthcare administrators to ensure that medically trained and well-accredited anesthesia specialists are involved in delivering the safest and most efficient services possible for obstetrics in contracted patients [7]. Such professionals must develop appropriate organizations for the incorporation of standards of practice as autonomous professional specialties. They must form links with appropriate groups to ensure the safest anesthesia practices (local anesthesia to be precise). During pregnancy, the condition becomes way more serious although anesthetic agents do not necessarily have a teratogenic impact on pregnant mothers. But anesthesia and surgery during the period of gestation are slightly intricate if the person is infected with COVID-19. There are a series of considerations that medical professionals need to consult and adhere to in case of assessing the safest anesthesia procedure for obstetrics in COVID infected patients. In such criticalities, the COVID-19 outbreak has presented unique difficulties to anesthesiologists for patients during the time of labor and delivery. In such situations where unlike surgical procedures, there cannot be any delay, multidisciplinary approaches are to be undertaken. As mentioned earlier, this fast-paced delivery process involves a greater number of healthcare staff whose coordinated efforts intend to deliver the safest anesthesia procedure to these patients across disciplines. In this context, a range of reports and literature mentions that anesthesiologists intervening patients in labor or delivery need to acquire a thorough comprehension of the presentation and clinical outcomes of COVID-19 infection in pregnant patients and identify the clinical overlap between pregnancy-related and pandemic-related symptoms. The anesthesia unit needs to ensure that the proper institutional protocols are in place that assists them in providing the safest labor analgesia or delivery anesthesia for C-section delivery and related surgical procedures. These predefined policies must focus their attention on the risk stratification of the patients, reduce the risk of significant exposure to COVID-positive patients or healthcare professionals, and manage the availability of personal protective equipment (PPEs).

Data so far, while limited, states that although the gestational period itself does not posit adequate risks for diseases it is essentially important to understand the presentation of the pandemic infection in parturient to provide the safest of labor or delivery services to them. Certain non-specific symptoms related to COVID-19 tend to overlap with many labor and pregnancy-based symptoms. For example, pre-eclampsia often presents with severe headache, chorioamnionitis is frequently presented with fever in labor or postpartum, and subjective dyspnea is frequently common especially in the third trimester. Such overlaps might significantly delay the identification of COVID-19 infection in pregnant patients in the healthcare settings where a vast majority of testing is mostly recognized based on symptoms. But the virus infection is not essentially regarded as a contradiction to delivery or labor analgesia. Neurologic challenges or complications have not been observed or reported earlier post neuraxial procedures in obstetrics having COVID-19 infection [6]. A functional delivery epidural procedure remarkably lowers the possibility that intubation would be needed during cesarean delivery. In this aspect, in case of COVID-19 infection in pregnant females, this inflicts a humongous advantage to avoid further compromise of respiratory functioning arising from mechanical ventilation or intubation [15]. In the case of a safe anesthesia system, avoiding aerosol-generating processes (AGP) also reduces the risk factors for healthcare professionals on the labor room or delivery floor. Hence, the sheer benefits of labor anesthesia in pregnant women within COVID-19 outweigh certain hypothetical concerns, particularly in such trying times. Also, from a practical point of view, all anesthesia professionals must ensure that the patients wear masks at all times [17]. In some cases, depending on local epidemiology and healthcare practice patterns, some settings might also consider changing some of their routine practices to enhance social distancing by undertaking predefined steps. This includes conducting intrapartum assessments over telephonic conversations rather than in-person

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encounters that often include pre-anesthetic evaluations as well.

COMMON CONSIDERATIONS FOR ANESTHESIOLOGISTS FOR OBSTETRICS IN COVID-19 PATIENTS

All anesthetic professionals should remain cognizant of certain standard contradictions to defined neuraxial processes including the use of anticoagulants [16]. However, the choice of anesthetic services must be dictated as per the urgency of the C-section of the patient. In this respect, the level of PPE needed during a cesarean delivery needs to be determined on the basis of the risks pertaining to general anesthesia. In most hospital settings, for obstetrics in patients having COVID-19 infection, regional anesthetic procedures are mostly preferred as the first line of service as it is not an AGP procedure. However, as mentioned earlier, patients must not be kept without a face mask under any given circumstance during the entire procedure [17]. It is worth mentioning that while the regional/local anesthesia procedure is being instituted, none other than the essential personnel are allowed in the procedure room. Among the things needed, only the most necessary medication and equipment must be inside. Also, in cases where general anesthesia is mostly needed considering the situation in the emergency cesarean section, complete air-borne precautionary measures must be undertaken and adhered to by the healthcare staff [13]. Fluid-resistant gowns, surgical masks, gloves, and eye protection devices are to be worn at all times during the entire period of surgery. These PPEs provide adequate protection to the essential personnel against droplets and limits the possibility of contraction [17]. But in case of serious GA procedures in emergency rooms, full-borne PPEs replace the surgical masks with N-95 masks that not only provides protection against droplets but also restricts airborne infection. Thus, deciding upon the choice and potential of anesthetic techniques for obstetric conditions with COVID-19 infection during gestation must follow these considerations and comply with the guiding principles of the healthcare unit to ensure the safest of practice during the pandemic period [18].

NEURAXIAL ANESTHETIC (NA) PRACTICES DURING COVID-19

Intrathecal dissemination of the virus is only possible theoretically and it has not been causatively reported previously. A humongous dilemma and argument were raised in the earlier times regarding the use of neuraxial anesthesia in patients with the viral infection [18]. There have been multiple pieces of evidence that coherently support the uneventful practice of neuraxial anesthetic procedure as one of the safest practices in obstetric patients with immunosuppressed conditions and for the C-section delivery of pregnant females with SARS infections [6]. But there is very limited literature or guiding manual to back this evidence and further research investigation is needed to acquire a deeper understanding of this case. Since the novel coronavirus can present itself with leukopenia as well, it is believed that, till the time stern aseptic conditions are maintained, the risks of infection to the patients must be just the same in patients suffering from other causes of immunosuppression, for example, chemotherapy. Hence, it is difficult at the moment to confidently infer that neuraxial anesthetic techniques are more than safe and must be preferred in such a group of patients with COVID-19 [16]. However, the literature review can generate some words of caution regarding the connection between such anesthetic procedures and hypotension in obstetrics with COVID-19.

While many clinical outcomes suggest that COVID-19 diagnosis and subsequent intervention is not a huge contradiction to NA techniques, the most effective strategy is to ensure the safety of such techniques. As mentioned, regional or local anesthetic services are not wholly contradicted in normal individuals with COVID-19 [21]. Such services essentially avoid the necessity for GA and airway management. However, the sole decision of using a specific anesthetic technique for C-section delivery depends upon a plethora of parameters [14]. Such factors also include the skill of the anesthesia provider. In many clinical trials, it has been impregnably documented that local anesthesia helps to reduce pain sores and relieves postoperative nausea. But during the time of tracheal intubation, the overall transmission risks (respiratory tract infection) increase dramatically for the healthcare staff [15]. Local anesthesia provides some of the most effective benefits that categorically avoid airway manipulation. This, in turn, also significantly reduces the possibility

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of viral aerosolization during intubation as well as extubation. At the same time, maintaining the pulmonary function might significantly reduce many post-operative complications in a pregnant female with COVID-19 [9].

THE MOST COMMON RECOMMENDATIONS FOR SAFE ANESTHESIA CARE

The limited literature and reports that share a narrative review of the obstetric management of pregnant patients with coronavirus infection have guided millions of physicians and healthcare professionals in the steady and safe anesthetic management of this group of patients [2]. Most literature recommends an early epidural anesthetic procedure for a parturient with suspected or confirmed infection [22]. The major purpose of such recommendations corresponds to the avoidance of exacerbation of the woman's respiratory symptoms and secondly to reduce the risk of viral contraction to other workers by avoiding AGP techniques associated with GA [11]. In this respect, an impending outcome of such a recommendation is an enhanced incidence and adversity of intrapartum pyrexia. Such severities categorically increase the risk factors of intrapartum pyrexia which in turn enhances the duration of epidural analgesia procedures. Furthermore, the increase in the patients' metabolic rate is also related to systemic inflammatory responses and the temperature rate which is relatively higher in COVID-19 parturient. However, the optimal time to implement epidural anesthesia in a pregnant female with viral infection is not as simplified as it sounds. The entire decision is usually taken depending on cases that take into account the overall respiratory status of the parturient and her chance of progression to emergency C-section delivery and prolong labor. Healthcare professionals believe that such strategic approaches cohesively reduce the risks of exacerbation of respiratory symptoms and transmission of COVID-19 while also lowering the risk factors of indirect harm to the infant and other parturients for that matter [14].

PSYCHOLOGICAL WELFARE OF THE PATIENTS

As anyone would appreciate, a confirmed positive case drastically increases the stress level of both the patient community as well as the attending clinical team alike. Such circumstances will not be favorable; neither to the mother nor the well-being of the fetus. Hence, it is essential that hospital group assistance and psychological healthcare providers might aid in such cases through the use of telemedicine.

DISCUSSION

From the plethora of literature reviewed so far, it is concluded that the pandemic situation has not significantly disrupted or deiminated the obstetric anesthesia facilities in the maternity unit in most hospital settings. The effectiveness with which medical professionals deliver obstetric anesthesia services depends on how safe the procedure is being carried out and the strict adherence to the standard safety guidelines. Most of the services are impeccably carried out under the able guidance of consultant anesthetists throughout the period of the COVID-19 outbreak. As there has not been much discordance between the total number of labor epidural services prior to and during the entire period of the pandemic, the review detailed the common findings in the most comprehensive way possible. Achieving the epidural response during COVID-19 has therefore been one of the most recommended practices in maternity care units. Furthermore, there has been an overall reduction in the general anesthesia rate in the emergency care units as was recommended in the earliest guidelines following COVID-19 transmission. But a slight increase was observed in the use of GA services particularly for elective C-section deliveries in case of extreme emergencies, but such practices are not frequent and require the consistent vigilance of well-experienced professionals in the chosen medical and healthcare field. Also, such increment in proportion has been attributed specifically attributed owing to the indications precluding the services of neuraxial anesthesia [6].

Reorganizing of the critical care units, emergency, and peri-operative rooms include redeployment of trained and certified professionals with adequate systematic training on handling such critical and sensitive cases during pregnancy [19]. What astonishes people across the globe is the assiduous efforts by most healthcare providers by going out of their comfort zone to encounter the criticalities imposed by COVID-19 in continuing safe and consistent maternity services without any interruption. Moreover, a nationwide multicenter data

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evaluation procedure would be an effective proposition as a means of revisiting and verifying most of the findings stated till now.

CONCLUSION

The total number of COVID-19 positive cases has exceeded 2.5 million across the world. As healthcare professionals continue to care for such patients, they would encounter multiple challenges, especially in obstetric cases. However, a limited dataset on the management and quality anesthesia procedure of the parturient cases with COVID-19 warrants elaborated research so that a common guiding principle is generated worldwide in all emergency and peri-operative units. It is thus paramount that the medical profession shares all the coherent experiences and clinical practices to aid in formulating a multidisciplinary approach in providing the safest and most attentive anesthesia services to obstetrics patients with COVID-19. Most pregnant females suffering from COVID-19 are presented with mild disease. Hence, it is crucial to maintain a high index of suspicion and intervene in all potential suspects as positive cases unless the test results show otherwise. This requires the establishment of a system that requires quicker communication and rapid response measures including dedicated managerial areas and potential workflow. Every medical and healthcare unit across the world functions diligently to train and educate their employees on the most recent propositions and recommendations. They must comply with the institutional safety standards that an anesthesia expert must take. The national societies however have provided a phenomenal job of imparting knowledge on PPEs in order to characteristically ensure that safe anesthesia service care and keeping the healthcare providers safe as well. Avoiding AGPs, reducing the exposure to healthcare staff owing to inadequate PPEs, and other related factors must be kept into consideration.

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