prior to anesthesia in these patients is not just a suggestion but a strong recommendation.

Lastly, the most important thing in anesthesia management is to establish a balance between costs (disadvantages) and benefits. Undoubtedly, keeping away from the patient's airway is important for the protection of health care providers, but the distance from the airway cannot be used as a basis for anesthesia management. Despite all mentioned doubts about the safety of spinal anesthesia in COVID-19 patients, this technique can still be one of the recommended methods to reduce the risk of infecting the operating room staff, if all the above considerations are taken into account. In other words, the relative and absolute contraindications for spinal anesthesia are precisely the same for COVID-19 and nonCOVID-19 patients. Therefore, hemodynamically unstable patients, patients suffering from severe respiratory distress, or those presenting with coagulopathy, for example, are not suitable to undergo intrathecal anesthesia.

Conflicts of interest

The authors declare no conflicts of interest.

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The paradox of COVID-19 and pediatric anesthesiology: opinion of the Pediatric Anesthesia Committee of the Brazilian Society of Anesthesiology

Anestesiologia pediátrica e o paradoxo da COVID-19: opinião do Comitê de Anestesia em Pediatria da Sociedade Brasileira de Anestesiologia

Dear Editor,

During this initial phase of the COVID-19 pandemic, caused by the SARS-CoV-2 virus, anesthesiologists have been facing questions from all directions. For those who work with children, the uncertainties are even greater, considering the scarce evidence available on the pediatric population. Are children, in fact, spared from the most severe forms of the disease? What is the transmission potential of the asymptomatic and mild forms? Which patients should be considered high risk for SARS-CoV-2 transmission? How should we manage airways? Societies of anesthesiology and hospitals have developed their protocols and recommendations based, almost exclusively, on data from adult patients. Therefore, adapting those recommendations to children requires, in addition to common sense, knowledge of the specificities of such a heterogeneous group.

Data from China, the United States and Italy have shown that children comprise 1–5% of COVID-19 cases diagnosed.[1] The Virtual Pediatric Systems Collaborative Group – that receives information from pediatric ICUs of 177 hospitals, predominantly American – registered, until April 14, 2020, 186 ICU COVID-19, related admissions with three deaths.[2] The largest case series in children published to date, from

the Center of Disease Control and Prevention of China, described asymptomatic, mild and moderate forms of the disease in 90% of patients. Moreover, the mean age of children with COVID-19 observed was 6.7 years.[3] The reason for the low incidence of severe forms in children, and the very low mortality in this group, remains to be explained, although the relationship to immunological immaturity is speculated. Taking into account that most cases are asymptomatic or mild, the risk of transmitting the virus (individually) is expected to be low. However, to accurately assess how much oligosymptomatic individuals can spread the virus is a complex task. A case report on a 6 month-old child with mild symptoms described a positive nose swab for SARS-CoV-2 until the 16th inpatient day, showing that children can be vectors of the virus, even if asymptomatic.[4]

The identification of patients with COVID-19 during pre-anesthetic assessment requires some considerations. First, given that pre-school children have six to eight upper airway infections a year[5] caused by rhinovirus, influenza, syncytial respiratory virus, among others and, second, that children infected by SARS-CoV-2 will have mild and non-specific clinical presentations, it is impossible to clinically distinguish COVID-19 from other frequent respiratory infections in the young pediatric population. Given the scarcity of confirmatory laboratory tests in Brazil and other countries, this drawback implies in expansion of precaution measures and increase in costs. If diagnosis confirmation is not possible, anesthesiologists will consider children with upper airway infections as suspected COVID-19, and will need to apply appropriate protocols to reduce viral dissemination and risk of contamination. Consequently, more personal protective equipment will be required at a time of critical availability worldwide.

During induction of general anesthesia in suspected and confirmed patients, avoiding positive pressure ventilation using a face mask is recommended in order to reduce aerosol dissemination. One of the known precepts of pediatric anesthesia is to manage the airway from less to more invasive approach, in that facial mask ventilation is routinely practiced. The rationale for this approach is due to the fact that children have more reactive airways and exacerbated respiratory reflexes. Less invasive airway management is associated with lower risk of respiratory complications, such as laryngospasm and bronchospasm.[6] However, at this point in time, the priority is to minimize spreading the virus and the risk of contamination to anesthetists and their assistants. Toward that end, the best option seems venous anesthetic induction with rapid sequence intubation and microbiological filter between the tracheal tube and the breathing circuit. The tracheal tube cuff provides additional safety, and minimizes leakage to the environment.

There are some issues to take into account while complying with the recommendation. Children are less tolerant to apnea during anesthesia induction. Although classical rapid sequence intubation reduces release of aerosols efficaciously, ventilating with a low pressure (10–12 cm H_2O) facial mask may be necessary until onset of action of drugs, particularly for younger children.[7] The laryngeal mask is an alternative in case of intubation failure, and should be placed early. Its use should be weighed for asymptomatic or low suspicion COVID-19 patients, as long as low pressures are used and no air leakages are observed. Extubation, an aerosol-generating event, is another critical moment. Covering the patient with plastic barriers minimizes contamination of the anesthesiologist. Deep extubation is also useful, because it reduces risk of coughing. It should, however, be avoided if the anesthetist is not used to the technique.[8]

Other relevant issues in pediatric anesthesia should be considered in the current scenario. Aimed at reducing the risk of contamination, the number of individuals in the operating room should be the minimum required for safe anesthetic induction: two anesthetists and one anesthesia assistant, for example. In the current scenario, the presence of parents, therefore, is not encouraged. Pre-anesthetic medication gains, thus, more relevance to reduce pre-operative anxiety and facilitate vein puncture. Midazolam and Ketamine (oral or intramuscular route) are safe options in most cases. Alfa-2 adrenergic agonists, although increasingly used in pediatric anesthesia, have slow onset of action, and the intranasal administration can make their use difficult. As previously described, venous induction is recommended. If attaining venous access is not possible beforehand, inhalation induction should be careful, avoiding face mask positive pressure ventilation.

As we learn more about the behavior of the new SARS-CoV-2 virus, some questions will be answered, but many others will come up. Soon, we will have more evidence and better quality for the pediatric population; we will describe details of the occupational exposure risk for anesthetists and other health professionals better; and we will learn the effects of the interventions and measures taken rapidly due to the urgency the scenario requires. Until then, based on adult oriented protocols, children will be anesthetized in a less ''pediatric'' manner for an undetermined period. On the other hand, as soon as we overcome the pandemic, we will surely have undergone a transformation, having revised our practices and gathered valuable lessons from this time.

Conflicts of interest

The authors declare no conflicts of interest.

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Prone positioning in management of COVID-19 hospitalized patients

Uso do decúbito ventral para o manejo de pacientes com COVID-19 hospitalizados em enfermaria

Dear Editor,

Since Zhe Xu, reported a 50 year-old man with confirmed COVID-19 and pathologically Acute Respiratory Distress Syndrome (ARDS),[1] the other researchers such as Heymann et al. emphasizes occurrence of ARDS in these patients.[2] Many treatments and interventions have been suggested for this syndrome and some of them have been approved. We suggest prone positioning. Some benefits have been stated for this position including: improved ventilation-perfusion matching, recruitment of lung dependent regions, optimized chest wall mechanics, and enhanced drainage of tracheobronchial secretions.[3] Besides these declared benefits, there were not any consistent results about the effects of this position in ARDS cases. So Beitler et al. worked on a meta-analysis of seven clinical trials and finally reported that Prone positioning significantly reduces mortality from ARDS in patients with low tidal volume.[4]

We applied prone position in 10 randomly selected patients, which had COVID-19 (70% male and 30% female) and were hospitalized in a non-ICU ward specific for COVID-19 patients. Tracheal intubation was not applied for any patients. None of them used mechanical ventilation. The mean age of patients was 41 years-old. 30% of them had history of underlying diseases (hypertension or diabetes). We observed that mean SPO_2% was 85.6% and 95.9% before and after positioning, respectively, and administrating this position show remarkable change in SPO_2%. Also, the feeling of dyspnea decreased to 40% of cases and all patients were discharged from the hospital. Mean hospitalization duration for these patients was 4.8 days and no deaths occurred (Table 1). Written informed consent was obtained from all the participants.

While our results may not show statistically worth information, we clinically observed improvement in respiration status and SPO_2% of patients by applying prone positioning, so it seems that this position can help COVID-19 patients who suffer from a mild form of the disease and reduce mortality. But more precise and valid studies about this protective intervention are needed.

Author's contribution

All authors met the criteria for authorship contribution based on recommendations of the International Committee of Medical Journal Editors.

Conflicts of interest

The authors declare no conflicts of interest.

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