Linezolid a potential treatment for COVID-19 coinfections

Dear Editor,

The novel coronavirus (COVID-19) was first reported in China in December 2019 and rapidly spread to other parts of the world. Since then, many efforts have been made to identify the disease behavior. Based on published literatures, the most common symptoms of this disease were fever and cough followed by dyspnea and myalgia. Headache and digestive system symptoms were less common. Lung involvement caused by pneumonia is also a common finding in about 70% of patient's CT scans and in severe cases; COVID-19 can be complicated by acute respiratory disease syndrome (ARDS), sepsis and septic shock, multiple organ failure, including acute kidney injury and cardiac injury.[1,2] Bacterial coinfections may also accompany this viral disease that need to be treated by antibiotics based on clinical demonstration.

Since this disease affects various organs and the behavior of the virus is unknown, many coinfections may accompany COVID-19. One of them may be bacterial infections, such as the ones caused by gram-positive pathogenic bacteria. Some researchers showed activity of teicoplanin against SARS-CoV and proposed it as a potential treatment for COVID-19. Ticoplanin is a glycopeptide antibiotic routinely used to treat bacterial infections.[3]

Now, we propose another antibiotic of this family which has activity against staphylococci, including methicillin-resistant staphylococcus aureus (MRSA), glycopeptides, enterococci, including vancomycin resistant strains, penicillin-susceptible Streptococcus pneumoniae, S. pyogenes, and other antibacterial agents. This antibiotic named linezolid was a good treatment for bacterial nosocomial pneumonia in our COVID-19 patients. We used it in COVID-19 patients who were suffering from bacterial pneumonia with intravenous dose of 600 mg of linezolid every 12 hours for 7 to 10 days and they all recovered and discharged from hospital. In addition, old researches have confirmed better clinical and microbiological efficacy of linezolid compared to vancomycin, which is a common and popular antibiotic prescribed by doctors.[3] Linezolid superiority is due to its better penetration into the respiratory secretion compared to vancomycin. Spinoni et al also used linezolid to treat a COVID-19 patient who was initially treated with ticoplanin and ceftazidime/avibactam. Then they replaced ticoplanin by linezolid.[4] Thus, in our experience, linezolid is effective for treating pneumonia in COVID-19 patients, and our goal was sharing this experience to improve clinical status of COVID-19 patients and decrease mortality caused by coinfections.

Conflicts of interest

The authors declare no conflicts of interest.

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GAWA during COVID-19 pandemic: a setback?

Dear Editor,

The year of 2020 will undoubtedly be marked by the beginning of the SARS-CoV-2 pandemic which, by the risk of transmission via aerosols and droplets, demanded adjustments by all medical and surgical specialties, particularly Anesthesiology, by its presence in the so-called *frontline*.

In Portugal, the majority of patients are tested for SARS-CoV-2 (*Reverse Transcription-Polymerase Chain Reaction* SARS-CoV-2). However, since the test is not preceded by isolation, and given its low sensitivity (around 70%), pre-

cautions to minimize exposure are maintained despite a negative test result.

Thus, given the presented information, Regional Anesthesia is currently given preference – both Neuraxial and Peripheral – to General Anesthesia with the need for airway management. Airway management represents one of the moments of highest risk of transmission through generation of aerosols, hence requiring the use of Personal Protective Equipment (PPE) by all parties involved, as well as allowing for time of air renewal and hygienisation of the room. Both the optimization of the Operating Room times and the rational use of the PPEs are important factors to consider when finally returning to elective surgery.

However, there are some circumstances where general anesthesia cannot be avoided. The definition of general anesthesia, according to the American Society of Anesthesiologists (ASA),[1] which was reviewed in 2019, mandates for the loss of consciousness, with lack of response to painful stimuli which might be associated with: need for airway interventions in a way to keep its patency; possibility of inadequate spontaneous ventilation or neuromuscular depression with need of positive pressure ventilation; and eventual deterioration of cardiovascular function.

The following two clinical cases, both occurring during the pandemic, will present the use of general anesthesia without the need of airway management, named by some authors as General Anesthesia Without Airway (GAWA).[2] Once it is not a study, an institution's Ethics Committee approval was not necessary. The patients were not selected, but rather the result of circumstances.

The first case is of a female, age 45, BMI 32 $kg.m^{-2}$, ASA II, with a non-detectable RT-PCR SARS-CoV-2 test result, diagnosis of unilateral bimalleolar fracture and proposed for ankle arthroscopy and osteosynthesis with tourniquet application above the knee. A spinal anesthesia was performed using levobupivacaine 10 mg and sufentanyl 2,5 mcg, with subsequent prone positioning of the patient for surgery. After 10 minutes, no sensitive, motor, or sympathetic block was accomplished. Due to failure of the spinal block and the patient being in prone position, we converted to general anesthesia, starting by applying an oxygen cannula with analysis of expired gases (Sentri™ ETCO2 nasal cannulae) with a flow of 3 $L.min^{-1}$, which allowed the patient to maintain her surgical mask. Induction was performed with intravascular ketamine 20 mg, fentanyl 100 mcg, and propofol perfusion using Target Controlled Infusion (TCI), Marsh model and target concentration of 3–4 $mcg.mL^{-1}$. The surgery lasted 2,5 hours with tourniquet duration of 108 minutes. Breathing was regular – without tachypnea or hypopnea – as was the capnography curve, and no increase in end-tidal carbon dioxide (EtCO2) was verified. Emergence time was not longer than that usually verified with airway management.

The second case refers to a female patient, 12 years old, BMI 17 $kg.m^{-2}$, ASA I, with a non-detectable RT-PCR SARS-CoV-2 test result, diagnosis of a volar ganglion cyst of the wrist, proposed for its excision. After a nasal oxygen cannula with analysis of expired gases (Sentri™ ETCO2 nasal cannulae) with a flow of 2 $L.min^{-1}$ and without the removal of the surgical mask, fentanyl 50 mcg was administered and a propofol perfusion was initiated using TCI, with a target concentration of 4–5 $mcg.mL^{-1}$. The surgery lasted 45 minutes. No hemodynamic or ventilatory compromise was observed, as well as no delay in emergence from anesthesia.

In this context, it is important to anticipate a scenario in which the patient loses spontaneous ventilation. The use of capnography, an ASA standard form of monitorization, should provide early detection of bradypnea or apnea, and guide the titration of anesthetic agents. If necessary, prompt airway management is essential and may be difficult when the patient is in the prone position, as presented in the first case. The presence of an anesthesiologist skilled in airway management in prone position is critical and quick access to a supraglottic device is essential. In extreme situations, this may require interruption of the procedure and repositioning of the patient in the supine form – which is why we always allow for an extra bed outside the operating room.

Patient selection is key for the success of GAWA. The technique should not be used in patients with increased risk for respiratory depression, those with sleep apnea, obesity, pulmonary disease and predicted difficult airway.[3] Such precautions are common concerns in settings outside the operating room, as in endoscopic retrograde cholangiopancreatography, which often requires deep sedation bordering on general anesthesia with the patient in prone position.[4] Emphasis must be placed on an open, multidisciplinary communication from the start of the procedure (e.g., to discuss anesthetic choice and safety concerns) through the application of the WHO Surgical Safety Checklist.

With the return to elective surgery in times of pandemic, considering inadequacy of regional anesthesia techniques or their failure, GAWA certainly presents advantages, particularly in short duration surgeries in which neuromuscular blockade is considered unnecessary. Simultaneously, considering the specifics of each case, this modality might both be used as a primary strategy as well as a rescue when regional anesthesia fails.

Conflicts of interest

The authors declare no conflicts of interest.

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Transesophageal echocardiography probe cover: implementation of a cross-contamination containment strategy during the COVID-19 pandemic

Dear Editor,

In early 2020, in response to the COVID-19 pandemic, the American Society of Echocardiography released its Statement on Protection of Patients and Echocardiography Service Providers During the 2019 Novel Coronavirus Outbreak.[1] Shortly after, additional information was made available in the Perioperative/Periprocedural Transesophageal Echocardiography (TEE) Statement and the Sonographer Statement. These three statements contained multiple recommendations regarding patient selection and stratification, handwashing, droplet, and airborne precautions, limiting examination time and exposure of unnecessary equipment, and following recommended disinfection protocols.

Based on the statements and recommendations from other national medical organization guidelines including those from the American Society of Anesthesiologists and the Anesthesia Patient Safety Foundation, cardiologists at our institution adopted a screening process to more carefully select patients who truly require and will benefit from TEE evaluation. Cases deemed neither urgent nor emergent were postponed. Depending on personal protective equipment availability and preservation strategies, many hospitals implemented a heightened level of precaution in the care of all patients during the COVID-19 pandemic. At our institution, this included N-95 respirators (or powered air-purifying respirators) and gowns for the cardiologist, assisting circulating nurse, and anesthesia team for all patients requiring TEE – asymptomatic, under investigation, or COVID-19 positive. Additionally, technical precautions (e.g., avoiding deep sedation, rapid sequence induction for general anesthesia, avoidance of mask ventilation during induction, use of videolaryngoscopy for intubation, placement of barrier drapes during intubation, and the use of a TEE probe cover, etc.) were adopted. The American Society of Echocardiography later released a statement describing a similar tiered process to the selection of patients for TEE and the reintroduction of echocardiography services at each institution. This statement reaffirms the idea that the TEE examination is an aerosolizing procedure with airborne precautions recommended for COVID-19 positive or high-risk patients.[2] In the perioperative environment, the TEE probe is intermittently and frequently manipulated over a period of several hours during the surgical procedure, resulting in the possible contamination of multiple operating room surfaces. Several studies have demonstrated that anesthesiologists may be responsible for the possible spread of pathogens from the patient to the operating room environment, which may result in cross-contamination between providers and patients.[3,4]

The technique utilized for covering each TEE probe at our institution is described below.

After inserting a clean TEE probe tip into the open end of a standard ultrasound probe cover and placing a rubber band above the wheel to secure the cover to the probe, we cut the opposite (closed) end of the probe cover with sterile scissors. We verify the cut portion of the probe cover is neat and

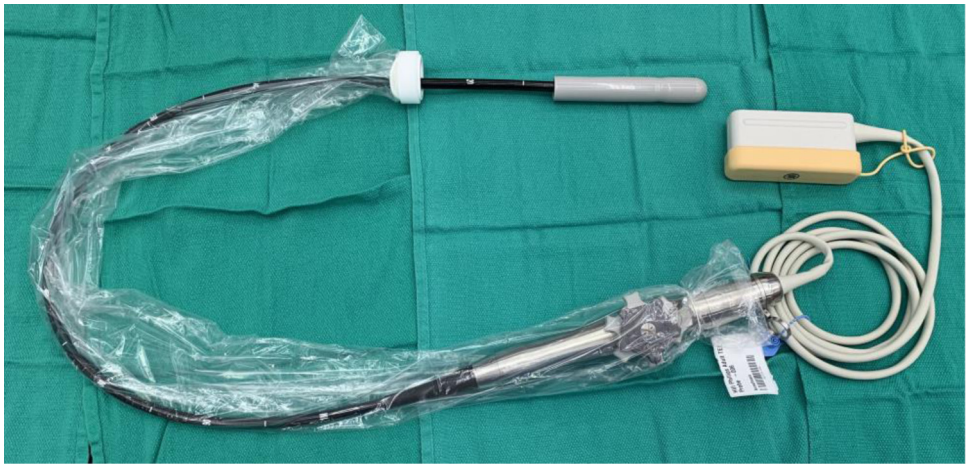

Figure 1 Modified ultrasound probe cover used as a transesophageal echocardiography probe cover.