Editorial

Med Crit. 2022;36(5):262-264

doi: 10.35366/106506

Bronchoscopy in COVID-19

Broncoscopia en COVID-19

Broncoscopia na COVID-19

José Javier Elizalde-González*

At the IX International Congress of Pulmonary Diseases in Copenhagen in August 1966, Dr. Shigeto Ikeda presented the prototype of the modern fiberoptic bronchoscope that he had developed in Japan, with sampling capabilities through bronchial lavage, brushing and biopsy forceps, being able to document since then in photo or video the findings and maneuvers carried out and that contributed to a significant advance in medicine, with clear advantages over the classic rigid bronchoscope developed in Germany by Dr. Gustav Killian (1860-1921), known as the father of the bronchoscopy.

Over time, bronchoscopy has become an essential element in the study of pulmonary problems of various kinds, both acute and chronic, as well as a fundamental piece in the management of certain conditions that can put life in danger, such as hemoptysis, aspiration of foreign bodies, thoracic blunt trauma, airway burn, complete pulmonary atelectasis and to perform difficult and selective intubation among others.

Although it is a skill of the expert in pulmonary diseases, it is also part of the curriculum of other medical specialties, such as critical care medicine, in which it is intended to resolve minor problems, aspirate retained secretions, resolve atelectasis and take representative microbiological samples of pulmonary infections among others, the simplest part of the vast catalog of bronchoscopic procedures and techniques available today.

It is generally considered that every ICU should have the capability to perform emergency bronchoscopy around the clock, to timely resolve a wide range of diagnostic and therapeutic issues. This has been a C recommendation by the British Thoracic Society for more than twenty years.

Mechanical ventilation does not constitute a contraindication to perform the procedure, and in fact in a Mayo Clinic bronchoscopy series of 198 patients, 75% of them were critically ill under mechanical ventilation. Of course there is an implicit higher risk in this population, especially in the form of associated hypoxemia proportional to the PEEP level.

The COVID-19 patient deserves some special considerations especially since bronchoscopy is located between the aerosol generating procedures with a risk of transmission of acute respiratory infections to healthcare workers in the same way as upper airway surgery, intubation, nebulization, positive pressure non-invasive ventilation, open airway suction, tracheostomy cannula change, manual ventilation, patient disconnection and ventilator circuit manipulation between others.

That is why patients with severe pneumonia due to SARS-CoV-2 should be considered high risk for the health team, especially if they undergo bronchoscopy.

However, bronchoscopy is a relatively simple procedure in experienced hands, it is safe with complications in general of less than 1%, great versatility and profitability, for which it is considered a first-line diagnostic and therapeutic method in critically ill patients with or without COVID-19.

In bronchoscopy, a series of intubated and non-intubated ICU patients with hypoxemic respiratory failure has been seen to lead to a 59 to 63% change in therapeutics, with a diagnostic yield between 13 and 74% depending on different factors.

It is known from the beginning of the pandemic that the results of the viral genome sequence made by the Chinese researchers in conjunction with other reports, showed a similarity of 75 to 80% to the SARS-CoV and even more closely related to several bat coronaviruses (86.9 to 95%). The close phylogenetic relationship to RaTG13 provided evidence for a bat origin of SARS-CoV-2. These authors then successfully isolated the virus (named nCoV-2019 BetaCoV/Wuhan/WIV04/2019), in Vero and Huh7 cells using precisely a bronchoalveolar lavage fluid (BALF) sample from an ICU patient that underwent a bronchoscopic procedure and based on that findings, they conclude that this new disease should be transmitted through the airway, although they couldn't rule out other clinical possibilities. This is how bronchoscopy has contributed significantly to advancing knowledge of COVID-19 and understanding of the pandemic we are experiencing.

Throughout more than two years of the pandemic, practically all hospital activity has had to be rethought, with the unfortunate consequence of having stopped normal medical practice, which included performing

* Head Pulmonary Service, INCMNSZ & ABC Medical Center staff. Professor of Medicine, UNAM. Mexico.

How to cite: Elizalde-González JJ. Bronchoscopy in COVID-19. Med Crit. 2022;36(5):262-264. https://dx.doi.org/10.35366/106506

www.medigraphic.com/medicinacritica

bronchoscopy in response to traditional medical indications. COVID-19 and the millions of patients who have suffered severely from it have consumed all the attention and all the available resources; virtually all bronchoscopic procedures in this period have been performed on patients with this viral condition, and the logistics to do it to the few non-COVID patients has been complicated and expensive, having to implement additional routines and tests, such as new lung CAT-scann and RT-PCR for SARS-CoV-2.

Potential diagnostic bronchoscopic indications in critically ill COVID-19 patients include but are not limited to additional testing in patients with suspected COVID-19 and negative swabs, in the non-responder evaluation of infection by alternative germ, evaluation of co-infection, evaluation of complications, and concurrent diagnostic evaluation, always keeping in mind that the results can modify the treatment. Therapeutic indications include therapeutic aspiration, management of persistent lobar or larger atelectasis and the performance of percutaneous dilatational tracheostomy (for prolonged intubation greater than 3 weeks).

In times of pandemic, the risk to the patient and health personnel must always be weighed against the benefit provided by the information obtained and whether it is able to induce changes in therapy.

The IDSA/ATS guidelines suggest the use of non-invasive sampling with semi-quantitative cultures for the diagnosis of ventilator-associated pneumonia and hospital-acquired pneumonia through tracheal aspirate instead of invasive techniques with quantitative cultures: bronchoscopic bronchoalveolar lavage (BAL) and protected specimen brush (PSB), and Mini-BAL or non-invasive sampling with quantitative cultures (weak recommendation, with low-quality evidence).

COMMEC, concerned about the handling of the pandemic, organized the Mexican COVID-19/COMMEC working group, which published at the beginning of 2020 in this same journal the guidelines for the care of critically ill patients with SARS-CoV-2 infection (doi:10.35366/93279 and doi:10.35366/93964). This document establishes in its chapter number 12 that despite obtaining through the bronchoscopic BAL the greater diagnostic power of rRT-PCR for SARS-CoV-2 (93% vs only 63% and 32% of nasopharyngeal and oropharyngeal swabs respectively) and being minimally invasive, its routine use is not recommended because it requires specialized personnel with experience and sophisticated and expensive equipment, in addition to being of high risk for contagion of health personnel within the context of COVID-19 by generating aerosols and producing cough during and after the procedure; therefore, the sampling method of choice will always be the nasopharyngeal swab.

However, the guidelines establish that bronchoscopy may be required in complicated cases with acute respiratory distress under mechanical ventilation with PEEP (emergent, urgent and scheduled indications) in the event of therapeutic failure with progression of the pneumonic process and hypoxemia, where prompt identification of overaggregated pathogens is desirable for antimicrobial adjustment, as well as the usual therapeutic indications (atelectasis, mucous plugs and hemoptysis that do not improve with the usual measures). In this case, it should be performed in a scheduled manner, preferably by an expert and in intensive care rooms that have negative pressure systems, under deep sedation (and preferably neuromuscular relaxation), in order to minimize the cough reflex; this can be done through an endotracheal tube no. 8 or higher (in which the balloon inflation technique will be verified beforehand) and after adjusting the mode and parameters of the ventilator as usual in this procedure under mechanical ventilation. It is further added that in the usual way, the sterile technique of the procedure is mandatory as well as making sure that both the bronchoscopist physician and the support medical staff around the patient's bedside have all the personal protection equipment (PPE) as caps, airtight goggles and/or face shields , high-efficiency N95 face mask, double gown, the outer one with long sleeves and waterproof, double gloves and closed shoes and if possible, a Rosseli bronchoscopic hood, a special reusable barrier specifically designed by my friend Gustavo Ross and myself to protect the healthcare team from aerosols generated during the performance of a bronchoscopy.

This was an initiative shared by many medical societies in the world, the SCCM in the USA, published within the Surviving Sepsis Campaign, its guidelines on the management of critically ill adults with coronavirus disease 2019 (COVID-19), in which it is suggested in intubated patients under mechanical ventilation with suspected COVID-19, to obtain samples from the lower respiratory tract preferably from endotracheal aspirates rather than by bronchoscopic BAL, with a strength of recommendation rated as weak.

In these times of epidemiological contingency, we can affirm that new bronchoscopic goals will have to be established in the patient with COVID-19, which include important aspects such as having a contextualized organization, minimizing the risk of contagion to health personnel, carrying out a timely planning of all actions to be taken and carrying out a proper selection of cases. The stratification of cases includes emergent, urgent, acute, subacute and elective categories for bronchoscopic procedures, which will be carried out with different delay times in these patients, although electively whenever possible. A bronchoscopy in a patient with COVID-19 and massive hemoptysis does not have the same urgency as another neutropenic

patient who does not respond to management, or who requires a percutaneous tracheostomy due to prolonged intubation, so a thorough and daily case-by-case analysis is imperative.

The Society for Advanced Bronchoscopy established in its 2020 consensus statement and guidelines for bronchoscopy and airway management amid the COVID-19 pandemic a series of degrees of recommendations directed both at outpatients (a minority in the pandemic), and those admitted to the hospital and with suspected or known diagnosis of COVID-19, with staffing considerations, specimen handling measures, PPE needs in both suspected and non-suspected cases of COVID-19, as well as a protocol for PPE breach during an aerosol-generating procedure in a suspected or known COVID-19 patient. It is from there and from the collective experience of those of us who perform bronchoscopy in critically ill patients, that they have highlighted aspects such as convening a reduced medical staff, preferably in a room with negative pressure (the bronchoscopist, the respiratory therapist and the anesthesiologist or resident in intensive care with previous training in Anesthesiology), the nurse must be available at a distance, near the closed door, and must have an assistant outside the room. There should be no guests, observers or students. Once the parameters of the mechanical ventilator have been optimized in preparation for performing the bronchoscopy under sedation and relaxation, under full monitoring and before opening the circuit to introduce the instrument into the airway, the endotracheal tube will be temporarily clamped and the same should be done at the end of the procedure, with the instrument a few centimeters away from the Solomonic tube inlet, all this to reduce the release of aerosols, regardless of having a Rosseli hood. The use of disposable bronchoscope instruments will be preferred and the procedure will be expedited, but carried out as planned. The subsequent handling of the equipment is important, with on-site cleaning of the instrument, its transport covered with an identifier, pre-washing, leaking testing, manual washing with enzymatic soap, visual inspection, followed by high-level disinfection or gas sterilization, as well as the disinfection of the area (surfaces and equipment), as important is the exit protocol for the health personnel from the COVID area.

Inexperienced personnel, inadequate facilities and the lack of appropriate PPE constitute absolute contraindications for performing bronchoscopies in the COVID-19 population, which are added to the conventional ones such as severe hypoxemia with inability to improve, rapidly progressive hypercapnia, hemodynamic or electrical heart instability, as well as extreme thrombocytopenia.

It is in this way that we can conclude that bronchoscopy is a non-routine procedure in COVID-19, that the adequate selection of cases is very important and that in expert hands it is a safe and reliable procedure that can contribute to treatment improvement and better outcomes; requiring special considerations and without forgetting the great responsibility of all of us in the way of taking care of our health personnel and our co-workers; personal protection measures, if carried out and monitored jointly, will be better for everyone.

Correspondence:
José Javier Elizalde-González, MD
E-mail: jjeg@unam.mx