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Editorial

Bronchoscopy use in the COVID-19 era



The patient infected with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), whether symptomatic or not, can transmit the virus to the respiratory mucosa of other individuals. The mean duration of the transmission risk after the beginning of infection is 20 days, although not yet well defined [1]. This transmission is mainly by droplets (large droplets) during coughing but also by expired air (fine droplets) during maneuvers at risk of aerosolization. There is also a possible transmission either by contact (handling, contaminated surfaces) or by conjunctival route [2,3]. An endoscopy of the respiratory system, in the same way as resuscitation, aerosol therapy or respiratory physiotherapy greatly increases the exposure and the risk of contamination [2,4]. For bronchial endoscopy, coughing and direct access to the airway (transmission by fine droplets) explain this over-risk.

In the current context where it is not possible to test for virus infection each patient, symptomatic or not, the same precautions are required for performing a bronchoscopy whether the patient is affected, suspect or without clinical evidence of coronavirus disease 2019 (COVID-19).

Based on this knowledge, 3 questions are raised in the era of COVID-19 epidemic:

- has bronchoscopy a role in the diagnosis of COVID-19? This question was widely treated by the American Association of Bronchology and Interventional Pulmonology (AABIP) statement [5]. Bronchoscopy has a limited diagnostic role in COVID-19, due to substantial risk for contamination, considering the non-invasive and less contaminating option, which is the collection of upper respiratory samples via nasopharyngeal and oropharyngeal swabs. In case of intubated patient, the respiratory specimen collection can include tracheal aspirates and non-bronchoscopic alveolar lavage (N-BAL);
- must the indication of bronchoscopy be modified during COVID-19 epidemic? Indeed, only urgent indications should be maintained, and the personnel limited to what is strictly necessary for bronchoscopy realization. Among these indications, we include therapeutic bronchoscopies for symptomatic tracheal or bronchial stenosis, symptomatic airway obstruction by mass or plug, foreign body aspiration, massive hemoptysis or migrated stent. Among diagnostic bronchoscopy, we can accept the suspicion of lung cancer (central lesion, atelectasis, peripheral nodule, mediastinal staging, mild or moderate hemoptysis) or suspected infection in immuno-compromized patients. Other indications

such as, chronic cough, interstitial lung diseases, common infections, should be delayed;

- if bronchoscopy indication is maintained, which precautions are required to reduce the contamination risk? Indeed, in case that the indication of bronchoscopy is maintained, the protection to be put in place does not differ from that proposed for other airborne transmission infections such as tuberculosis. To transport the patient, use pre-established preferential routes to minimize the exposure of healthcare professionals and other patients, by making the latter wear a mask. Make sure that transport personnel follow standard precautions and wear personal protective equipment (PPE). The patient must wear a surgical mask during installation, which will be removed just at the start of the procedure. The operator and staff must wear protective clothing such as a waterproof over-gown or over-gown and plastic apron, a cap, non-sterile gloves and protection against projections and fine droplets with a facemask type FFP2 (or better FFP3 if available) as well as protective glasses or face protective visors. Eyeglasses do not provide this protection. Hand hygiene with a hydro-alcoholic gel is imperative before and after the endoscopy as well as after removing the protective equipment and the FFP2 [2,3,6].

The endoscopy room, strictly closed during the procedure, must ensure the renewal of air in accordance with the legislation. Additional ventilation or rest time in the room, depending on the ventilation rate, is desirable. The disinfection of endoscopes is done in the usual way because the virus is sensitive to the disinfectants used. In this context, the use of a disposable bronchoscope [5] must be considered and proposed in order to reduce the risk of aerial and manual exposure when cleaning the soiled endoscope. The bio-cleaning of surfaces likely to have been soiled (armchair, stretchers, tables, devices and floors) must be carried out with the usual disinfectant detergent product. The High Council of Public Health [7] in its opinion of February 18, 2020 recommends disinfecting the soil with bleach at a concentration of 0.5% (5000 ppm) or with any other product validated by standard EN 14476. The waste disposal system must respect the waste disposal route for infectious risk.

Regarding the bronchoscopy use for intubated patients with COVID-19 in the intensive care unit (ICU), measures taken for ICU staff protection must be the same as the ones for endoscopy room staff. When available, a single-use (disposable) flexible bronchoscope should be preferred as less equipment is involved in set-up, post-procedure disinfection and transport [8], to a standard re-usable fiberoptic bronchoscope and the patient should not be

disconnected from the ventilator to avoid contamination [4]. Intubation of patient using fibreoptic bronchoscope should be avoided, as there is an increased risk of contamination due to aerosolization [4]. In addition, a thorough disinfection of all surrounding devices is mandatory after the procedure [4], [7].

These measures are likely to evolve rapidly depending on the evolution of knowledge and the epidemiological situation but today these guidelines are shared by many bronchology societies around the world [9].

Disclosure of interest

The authors declare that they have no competing interest.

References

- [1] Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet* 2020;395:1054–62.
- [2] Société Française d'Hygiène Hospitalière. Avis relatif aux mesures d'hygiène pour la prise en charge d'un patient considéré comme cas suspect, possible ou confirmé d'infection à 2019-nCoV. Avis du 28 Janvier 2020; 2020 [Available from: <https://www.sf2h.net/wp-content/uploads/2020/01/Avis-prise-en-charge-2019-nCoV-28-01-2020.pdf>].
- [3] Société Française d'Hygiène Hospitalière. Avis relatif aux indications du port des masques chirurgicaux et des appareils de protection respiratoire de type FFP2 pour les professionnels de santé. Avis du 4 Mars 2020; 2020 [Available from: <https://www.sf2h.net/wp-content/uploads/2020/02/Avis-Masque-SF2H-SPLF-04.03.2020.pdf>].
- [4] Société Française d'Anesthésie Réanimation. Propositions pour la prise en charge anesthésique d'un patient suspect ou infecté à Coronavirus COVID-19; 2020 [Available from: <https://sfar.org/propositions-pour-la-prise-en-charge-anesthesique-dun-patient-suspect-ou-infecte-a-coronavirus-covid-19/>].
- [5] Wahidi MM, Lamb C, Murgu S, Musani A, Shojaae S, Sachdeva A, et al. American Association for Bronchology and Interventional Pulmonology (AABIP) Statement on the Use of Bronchoscopy and Respiratory Specimen Collection in Patients with Suspected or Confirmed COVID-19 Infection. *J Bronchology Interv Pulmonol* 2020. <http://dx.doi.org/10.1097/LBR.0000000000000681>.
- [6] Ferioli M, Cisternino C, Leo V, Pisani L, Palange P, Nava S. Protecting health-care workers from SARS-CoV-2 infection: practical indications. *Eur Respir Rev* 2020;29:200068. <http://dx.doi.org/10.1183/16000617.0068-2020>.
- [7] Haut Conseil de la Santé Publique. Relatif au traitement du linge, au nettoyage d'un logement ou de la chambre d'hospitalisation d'un patient confirmé à SARS-CoV-2 et à la protection des personnels. Avis du 18 février 2020; 2020 [Available from: https://www.hcsp.fr/Explore.cgi/Telecharger?NomFichier=hcspta20200218_corsarcovnetdesloctpodesper.pdf].
- [8] Pritchett MA, Oberg CL, Belanger A, De Cardenas J, Cheng G, et al. Society for advanced bronchoscopy consensus statement and guidelines for bronchoscopy and airway management amid the COVID-19 pandemic. *J Thorac Dis* 2020. <http://dx.doi.org/10.21037/jtd.2020.04.32>.
- [9] Lentz RJ, Colt H. Summarizing societal guidelines regarding bronchoscopy during the COVID-19 pandemic. *Respirology* 2020. <http://dx.doi.org/10.1111/resp.13824>.

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