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Short Communication

# The changes on anesthetic practice for non-intubated bronchoscopic interventions during Covid-19 pandemic

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## KEYWORDS

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Bronchoscopic interventions (BIs) and airway management for bronchoscopy are exceptionally high-risk procedures not only for anesthesiologists, pulmonologists, but also for nursing staff because they expose nurses to COVID-19-containing droplets. However, perioperative changes can be made to the anesthetic management for nonintubated BIs to minimize the spread of COVID-19.

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## Brief communication

Bronchoscopic interventions (BIs), such as endobronchial ultrasound (EBUS), EBUS-guided transbronchial needle aspiration (EBUS-TBNA),<sup>1</sup> and cryotherapy for tracheobronchial

tumors, remain urgent and necessary procedures during the COVID-19 pandemic because BIs are the most powerful and efficient tools for the pathological diagnosis and staging of pulmonary<sup>2</sup> or metastatic lesions.<sup>3</sup> BI without existing endotracheal tubes (nonintubated BI) is often necessary to obtain an appropriately wide field of operation for interventions with different probes. The anesthetic management of non-intubated BIs is challenging due to difficulty achieving an optimal anesthetic depth with stable hemodynamics, adequate oxygenation without intraprocedural cough. In this manuscript, we report changes in our daily practice of non-intubated BIs in the perioperative period, in addition to more conventional issues. Regarding the generation of aerosols,

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droplets, and environmental contamination from exhalation, coughing, and sneezing,<sup>4–6</sup> specific perioperative approaches may be adopted to lower the risks to team members.

## Anesthetic planning

Beyond preoperative assessment, anesthetic planning may be further conducted to establish an effective airway with the least manipulation. The preparation and preoxygenation are suggested as the guidelines of Taiwan Society of Anesthesiologists. To avoid the vigorous manipulations necessary when it is difficult to achieve airway patency and ventilation in a patient, awake supraglottic airways (SGAs) are recommended before anesthetic induction.<sup>7</sup>

## Anesthetic practice and monitoring

Previous reports on anesthetic management have commonly and effectively applied nasal cannula,<sup>8</sup> high-flow nasal oxygenation (HFNO),<sup>9</sup> and SGAs<sup>10</sup> to maintain adequate oxygenation during nonintubated BI. However, during the COVID-19 pandemic, the risk of getting COVID-19 is higher for anesthetic, bronchoscopic, and nursing teams when performing nonintubated BI. The strategy of anesthetic management can help achieve 1) limited airway management with a lower spread of aerosols and droplets, 2) optimal anesthetic depth without accidental coughing during bronchoscopic insertion, and 3) a complete emergence with adequate masking to prevent spreading contamination to other patients and the environment.

Preoxygenation with spontaneous ventilation is suggested as a means for clinicians to avoid mask ventilation after anesthetic induction. SGAs, instead of conventional nasal cannula and HFNO, are applied to ensure optimal sealing of the oral cavity. The possibility for contamination decreases with upper airway management, such as the insertion of oral or nasal airways. After the insertion of SGAs, we apply a plastic cover onto the SGAs to prevent droplets from spreading around the nose and mouth (Fig. 1).

To achieve the optimal anesthetic depth, EEG monitoring, such as that of bispectral index (BIS) level, is recommended. The patient intakes an extra dose of intravenous, short-acting anesthetics, such as propofol or remifentanyl, just before bronchoscopic insertion to inhibit accidental cough during the short period of apneic ventilation when the bronchoscope passes through the vocal cords. The bronchoscopists can also spread local anesthetics thoroughly before bronchoscopic interventions begin. We suggest for the anesthetic depth to be optimized with BIS monitoring and for levels of 40–60 to be maintained during BIs, with natural, spontaneous breathing encouraged to lessen aerosol and droplet production.<sup>5</sup> For BIs requiring longer time, total intravenous anesthetics and analgesics, such as propofol and remifentanyl infusion, are suggested especially for outpatients with a goal of emergence from the program. After the completion of BI, the removal of supraglottic airway devices (SADs) until complete emergence (i.e., being awake with BIS level > 85 and having adequate respiration) is recommended to avoid laryngospasm or bronchospasm and any follow-up manipulations. The SAD can be removed directly with the plastic



**Figure 1** An inserted i-Gel with a plastic cover to prevent droplet spreading.

cover on it with limited contamination. (Fig. 2). We also assist patients in wearing surgical masks properly<sup>11</sup> after the removal of SADs before sending them to the post-anesthesia care unit (PACU).



**Figure 2** Removal of the i-Gel directly and jointly with plastic cover without contamination.

## Postanesthesia care unit

Talking, coughing, and sneezing are common in the PACU among patients receiving BIs<sup>12</sup> before discharge. When patients are sent to the PACU awake and wearing surgical masks, the risks of environment contamination is lessened with minimal postoperative care (but with monitoring). We ensure that the patients in the PACU who have received BIs are situated at least 2 m away from the other patients.<sup>6</sup>

## Conclusion

The safety and success of nonintubated BI during the COVID-19 pandemic depends on adequate preparation, equipment, facilities, collaboration, skill, and experience. Considering the current evidence on the risks of COVID-19 transmission, we suggest implementing this paper's suggested modifications to the anesthetic planning and perioperative management associated with nonintubated BI.

## Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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