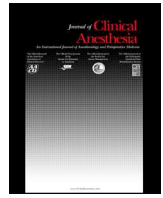




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## Correspondence

## Airway management strategies for the Covid 19 patients: A brief narrative review



Dear Editor,

World Health Organization declared the coronavirus disease 2019 (Covid-19) outbreak as pandemic on March 12, 2020 [1]. There is an increasing number of Covid-19 patients in critical condition and requiring tracheal intubation [2]. The Coronavirus Pandemic influenced the whole world. However, China and Italy are at the forefront with the pandemic centers and a large number of patients. In this context, recommendations regarding patient management from these regions are important. However, implementation of recommendations specific to airway management constitutes the basic principles in patient survival. Here, we aimed to determine the strategies and recommendations performed during the airway management of Covid 19 patients.

We retrieved 42 potentially eligible articles from initial database searches (Fig. 1). A total of 2 outcome analysis were included for the qualitative synthesis. Chinese outcome analysis included the data of 80,409 patients [3]. Italian outcome analysis included the data of 25,058 patients [4]. The comparison of two included studies is shown in Table 1.

Valuable suggestions on airway management were declared in both outcome analyzes. In the Italian group's study, the use of checklist was put forward. It was previously emphasized that the checklist increases patient safety and therefore should be included in routine anesthesia resident training program [5]. It becomes extremely important for effective planning before tracheal intubation of Covid 19 patients.

In both analyzes it is recommended to use rapid sequence intubation with videolaryngoscopes instead of direct laryngoscopes to minimize the risk of contamination. Another common recommendation was the choice of an experienced practitioner during tracheal intubation to increase the first pass success rate. Aerosol-generating potential is the main concern for noninvasive ventilation. Nevertheless Chinese group declared that bilevel positive airway pressure machine was widely used for the patients with acute hypoxemic respiratory failure. On the other hand, the Italian group concluded that non-invasive ventilation was insufficient for Covid-19-induced respiratory failure management. The results in this issue are controversial. In a different Italian study from Lombardy region, the data of 1591 consecutive patients were analyzed [6]. Among 1287 critical patients, a total of 137 patients (11%) required noninvasive ventilation and 1150 patients (88%) needed tracheal intubation and mechanical ventilation. In another retrospective study conducted in China, 318 patients diagnosed with Covid 19 infected pneumonia were included [7]. Seventeen of these patients had High Flow Nasal Cannula support, however 7 (41%) patients experienced failure. The failure rate was 63% (7/11) in those with PaO<sub>2</sub>/

FiO<sub>2</sub> ≤ 200 mmHg. High Flow Nasal Cannula is recognized by World Health Organization for the treatment of patients with respiratory failure caused by COVID-19 [8]. However, the use of airborne isolation was recommended because the system can theoretically increase the risk of viral spread through aerosol generation. Considering that the Horowitz rate is low in patients with Covid 19 pneumonia, noninvasive mechanical ventilation success rate might be low [9].

The importance of creating an airway management team and the closed loop communication was mentioned in the consensus guidelines for managing the airway in patients with COVID-19 [10]. In particular, it is important to have a strategy if difficulty arises. In Sorbello et al.'s [4] study team roles and ergonomics were described clearly for elective tracheal intubation. However there was no recommendation for neither the team work nor the principles of airway management team in Meng et al.'s [3] outcome analysis.

In the Consensus statement of Safe Airway Society the use of a second-generation supraglottic airway device was recommended as its higher seal pressure during positive pressure ventilation decreases the risk of aerosolisation of virus-containing fluid particles [11]. Similarly the Italian group recommended a second generation supraglottic airway device as a rescue technique following the failed tracheal intubation.

Awad et al. [12] updated the perioperative considerations and operating room protocols in patients with suspected and confirmed Covid 19. Previously for an anticipated difficult airway, awake bronchoscopic trans-nasal intubation with reserved self-respiration was recommended with proper sedation and sufficient topical anesthesia by the Chinese Society of Anesthesiology Task Force on Airway Management [13]. In Italian paper the authors concluded that awake tracheal intubation with videolaryngoscopy is faster than with flexible bronchoscopy and could be considered. In this situation, awake tracheal intubation protocols in the operating room for anticipated difficult airway should be followed [14].

The important precautions during extubation were declared in both papers. Sorbello et al. [4] especially emphasized that more care should be taken after documented difficult airway management or prolonged tracheal intubation. Advanced techniques in extubation include tube exchange catheters, Bailey maneuver and staged extubation set [15].

Airway management of patients with Covid-19 is a high risk procedure. The airway should be considered as potentially difficult and complicated. The evidence about airway management is limited however further research is warranted as the number of cases increases. This paper presents the current picture of airway management strategies for Covid 19 patients.

## Flow Diagram

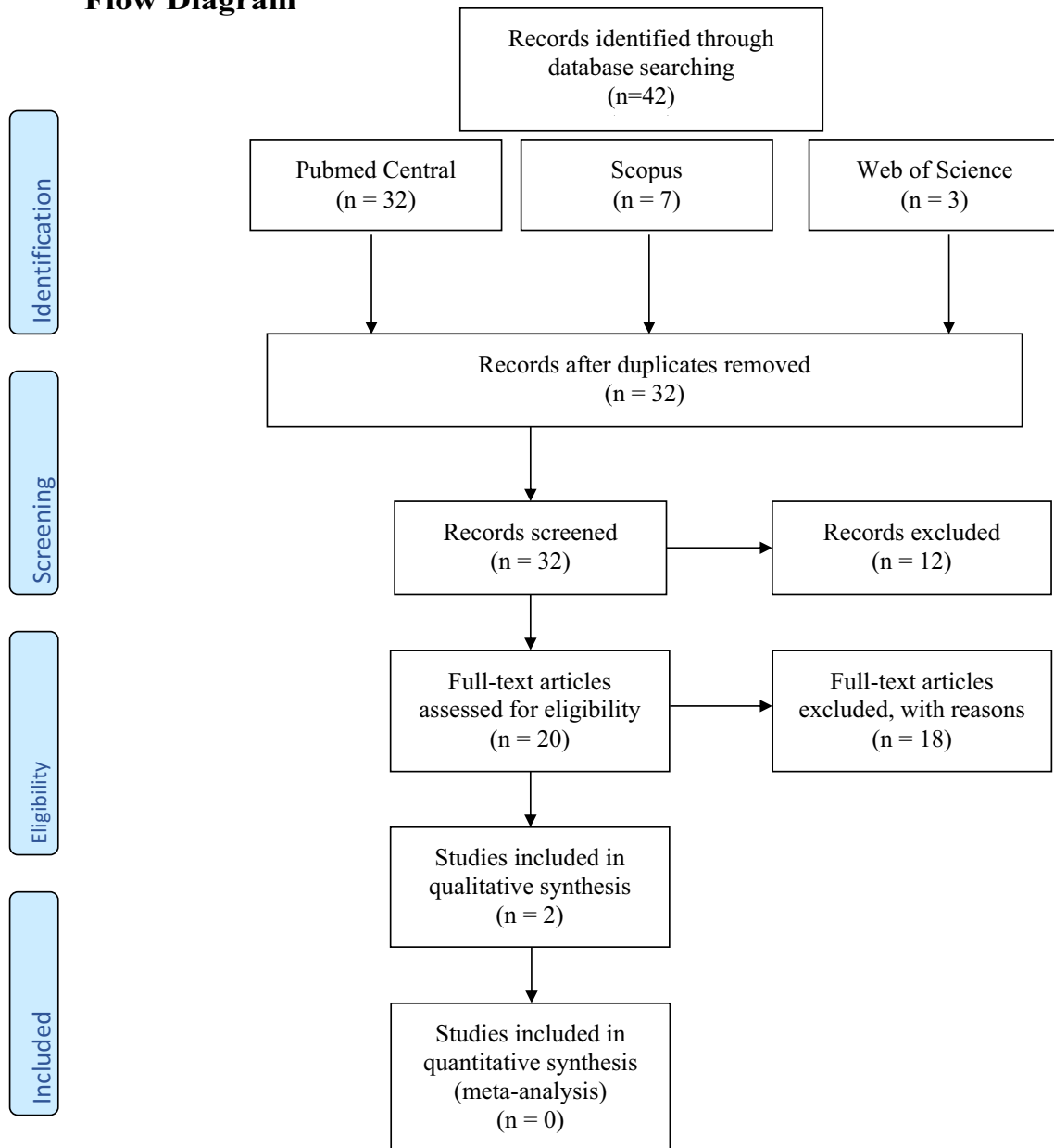


Fig. 1. Study Eligibility Flow Chart.

### Declaration of competing interest

The authors declare no conflicts of interest.

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**Name:** Kemal T. Saracoglu, MD.

**Contribution:** This author helped design and conduct the study,

analyze the data, and write the manuscript.

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**Contribution:** This author helped design and conduct the study, analyze the data, and write the manuscript.

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**Contribution:** This author helped conduct the study and contribute content to the manuscript.

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**Table 1**  
Main characteristics of included studies.

Recommendation	Chinese outcome analysis	Italian outcome analysis
Preoperative evaluation	All required equipments should be packed, disposable devices are recommended	Checklists, cross-checking and pre-planned strategies are recommended
Acronym	OH-MS MAID—Oxygen, Helper, Monitor, Suction, Machine, Airway supplies, Intravenous access and Drugs.	STOP COVID-Secure airway, Team briefing, Organize, Prepare, Checklist, Optimize, Vigilant donning/doffing, Invasive airways evaluation, Debriefing
Difficulties	Consider as potentially difficult and complicated tracheal intubation candidates	Consider the difficulties including triaging, personal protective equipment (PPE) and isolation areas
Noninvasive ventilation	Although there is a risk of aerosol-generation, bilevel positive airway pressure mode is widely used	As there is a risk of viral aerosolisation non-invasive ventilation may be insufficient and there may be a poor response
Awake tracheal intubation	No recommendation	Using videolaryngoscopy is faster than flexible bronchoscopy and should be considered
Cannot intubate, cannot oxygenate scenario	No recommendation	In case of a failure tracheostomy with local anesthesia is recommended An emergency front-of-neck airway should be performed
Tracheal intubation	Rapid sequence intubation and videolaryngoscopes are recommended instead of direct laryngoscopes. Experienced airway operator should be preferred. Chest auscultation after intubation is not recommended. Psychological pressure and burdens may cause challenges.	
Muscle relaxants	Rocuronium 1 mg/kg or succinylcholine 1 mg/kg	Rocuronium 1.2 mg/kg or suxamethonium 1 mg/kg
Introducer	No recommendation	An appropriately sized tracheal tube introducer is advised
Apnoeic oxygenation	No recommendation	Low-flow nasal oxygenation is recommended during intubation attempts
Failed tracheal intubation	No recommendation	Second generation supraglottic device is recommended as a rescue technique.
Airway team	No recommendation	Team roles and ergonomics were described. Team-based simulation and training was mentioned.
Extubation strategies	The same precautions with tracheal intubation.	Tracheal tube exchange manoeuvres, and strategies were mentioned.

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