# Evidence Search Service Results of your search request

## Covid19: oxygen delivery

**ID of request:** 28098  
**Date of request:** 8th March, 2021  
**Date of completion:** 12th March, 2021

If you would like to request any articles or any further help, please contact:  Ms Assad Lahlou at [assad.lahlou@nhs.net](mailto:assad.lahlou@nhs.net)

Please acknowledge this work in any resulting paper or presentation as: Evidence search: Covid19: oxygen delivery. Ms Assad Lahlou. (12th March, 2021). LONDON, UK: Barts Health Knowledge and Library Services.

**Sources searched**  
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**Date range used** (5 years, 10 years): Since 2010   
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**Search terms and notes** (full search strategy for database searches below):

Concept 1: COVID-19

Concept 2: Oxygen delivery

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## A. Systematic Reviews

#### BMJ open respiratory research

**Classification of aerosol-generating procedures: a rapid systematic review.** (2020)

Jackson Tanya, Deibert Danika, Wyatt Graeme, Durand-Moreau Quentin, Adisesh Anil, Khunti Kamlesh, Khunti Sachin, Smith Simon, Chan Xin Hui S., Ross Lawrence, Roberts Nia, Toomey Elaine, Greenhalgh Trisha, Arora Isheeta, Black Susannah M., Drake Jonathan, Syam Nandana, Temple Robert, Straube Sebastian

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In the context of covid-19, aerosol generating procedures have been highlighted as requiring a higher grade of personal protective equipment. We investigated how official guidance documents and academic publications have classified procedures in terms of whether or not they are aerosol-generating. We performed a rapid systematic review using preferred reporting items for systematic reviews and meta-analyses standards. Guidelines, policy documents and academic papers published in english or french offering guidance on aerosol-generating procedures were eligible. We systematically searched two medical databases (medline, cochrane central) and one public search engine (google) in march and april 2020. Data on how each procedure was classified by each source were extracted. We determined the level of agreement across different guidelines for each procedure group, in terms of its classification as aerosol generating, possibly aerosol-generating, or nonaerosol-generating. 128 documents met our inclusion criteria; they contained 1248 mentions of procedures that we categorised into 39 procedure groups. Procedures classified as aerosol-generating or possibly aerosol-generating by ≥90% of documents included autopsy, surgery/postmortem procedures with high-speed devices, intubation and extubation procedures, bronchoscopy, sputum induction, manual ventilation, airway suctioning, cardiopulmonary resuscitation, tracheostomy and tracheostomy procedures, non-invasive ventilation, high-flow oxygen therapy, breaking closed ventilation systems, nebulised or aerosol therapy, and high frequency oscillatory ventilation. Disagreements existed between sources on some procedure groups, including oral and dental procedures, upper gastrointestinal endoscopy, thoracic surgery and procedures, and nasopharyngeal and oropharyngeal swabbing. There is sufficient evidence of agreement across different international guidelines to classify certain procedure groups as aerosol generating. However, some clinically relevant procedures received surprisingly little mention in our source documents. To reduce dissent on the remainder, we recommend that (a) clinicians define procedures more clearly and specifically, breaking them down into their constituent components where possible; (b) researchers undertake further studies of aerosolisation during these procedures; and (c) guideline-making and policy-making bodies address a wider range of procedures.

#### Canadian journal of anaesthesia = Journal canadien d'anesthesie

**High-flow nasal cannula for acute hypoxemic respiratory failure in patients with COVID-19: systematic reviews of effectiveness and its risks of aerosolization, dispersion, and infection transmission.** (2020)

Agarwal Arnav, Basmaji John, Muttalib Fiona, Granton David, Chaudhuri Dipayan, Chetan Devin, Hu Malini, Fernando Shannon M., Honarmand Kimia, Bakaa Layla, Brar Sonia, Rochwerg Bram, Adhikari Neill K., Lamontagne Francois, Murthy Srinivas, Hui David S. C, Gomersall Charles, Mubareka Samira, Diaz Janet V., Burns Karen E. A, Couban Rachel, Ibrahim Quazi, Guyatt Gordon H., Vandvik Per O.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=dabf44a620d56e25f9e1db502e807fe9)

PURPOSEWe conducted two World Health Organization-commissioned reviews to inform use of high-flow nasal cannula (HFNC) in patients with coronavirus disease (COVID-19). We synthesized the evidence regarding efficacy and safety (review 1), as well as risks of droplet dispersion, aerosol generation, and associated transmission (review 2) of viral products.SOURCELiterature searches were performed in Ovid MEDLINE, Embase, Web of Science, Chinese databases, and medRxiv. Review 1: we synthesized results from randomized-controlled trials (RCTs) comparing HFNC to conventional oxygen therapy (COT) in critically ill patients with acute hypoxemic respiratory failure. Review 2: we narratively summarized findings from studies evaluating droplet dispersion, aerosol generation, or infection transmission associated with HFNC. For both reviews, paired reviewers independently conducted screening, data extraction, and risk of bias assessment. We evaluated certainty of evidence using GRADE methodology.PRINCIPAL FINDINGSNo eligible studies included COVID-19 patients. Review 1: 12 RCTs (n = 1,989 patients) provided low-certainty evidence that HFNC may reduce invasive ventilation (relative risk [RR], 0.85; 95% confidence interval [CI], 0.74 to 0.99) and escalation of oxygen therapy (RR, 0.71; 95% CI, 0.51 to 0.98) in patients with respiratory failure. Results provided no support for differences in mortality (moderate certainty), or in-hospital or intensive care length of stay (moderate and low certainty, respectively). Review 2: four studies evaluating droplet dispersion and three evaluating aerosol generation and dispersion provided very low certainty evidence. Two simulation studies and a crossover study showed mixed findings regarding the effect of HFNC on droplet dispersion. Although two simulation studies reported no associated increase in aerosol dispersion, one reported that higher flow rates were associated with increased regions of aerosol density.CONCLUSIONSHigh-flow nasal cannula may reduce the need for invasive ventilation and escalation of therapy compared with COT in COVID-19 patients with acute hypoxemic respiratory failure. This benefit must be balanced against the unknown risk of airborne transmission.

#### The Cochrane database of systematic reviews

**Oxygen targets in the intensive care unit during mechanical ventilation for acute respiratory distress syndrome: a rapid review.** (2020)

Cumpstey Andrew F., Oldman Alex H., Smith Andrew F., Martin Daniel, Grocott Michael Pw

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=b0e2503d564d719beb07990181d89848)

BACKGROUNDSupplemental oxygen is frequently administered to patients with acute respiratory distress syndrome (ARDS), including ARDS secondary to viral illness such as coronavirus disease 19 (COVID-19). An up-to-date understanding of how best to target this therapy (e.g. arterial partial pressure of oxygen (PaO2) or peripheral oxygen saturation (SpO2) aim) in these patients is urgently required.OBJECTIVESTo address how oxygen therapy should be targeted in adults with ARDS (particularly ARDS secondary to COVID-19 or other respiratory viruses) and requiring mechanical ventilation in an intensive care unit, and the impact oxygen therapy has on mortality, days ventilated, days of catecholamine use, requirement for renal replacement therapy, and quality of life.SEARCH METHODSWe searched the Cochrane COVID-19 Study Register, CENTRAL, MEDLINE, and Embase from inception to 15 May 2020 for ongoing or completed randomized controlled trials (RCTs).SELECTION CRITERIATwo review authors independently assessed all records in accordance with standard Cochrane methodology for study selection. We included RCTs comparing supplemental oxygen administration (i.e. different target PaO2 or SpO2 ranges) in adults with ARDS and receiving mechanical ventilation in an intensive care setting. We excluded studies exploring oxygen administration in patients with different underlying diagnoses or those receiving non-invasive ventilation, high-flow nasal oxygen, or oxygen via facemask.DATA COLLECTION AND ANALYSISOne review author performed data extraction, which a second review author checked. We assessed risk of bias in included studies using the Cochrane 'Risk of bias' tool. We used the GRADE approach to judge the certainty of the evidence for the following outcomes; mortality at longest follow-up, days ventilated, days of catecholamine use, and requirement for renal replacement therapy.MAIN RESULTSWe identified one completed RCT evaluating oxygen targets in patients with ARDS receiving mechanical ventilation in an intensive care setting. The study randomized 205 mechanically ventilated patients with ARDS to either conservative (PaO2 55 to 70 mmHg, or SpO2 88% to 92%) or liberal (PaO2 90 to 105 mmHg, or SpO2 ≥ 96%) oxygen therapy for seven days. Overall risk of bias was high (due to lack of blinding, small numbers of participants, and the trial stopping prematurely), and we assessed the certainty of the evidence as very low. The available data suggested that mortality at 90 days may be higher in those participants receiving a lower oxygen target (odds ratio (OR) 1.83, 95% confidence interval (CI) 1.03 to 3.27). There was no evidence of a difference between the lower and higher target groups in mean number of days ventilated (14.0, 95% CI 10.0 to 18.0 versus 14.5, 95% CI 11.8 to 17.1); number of days of catecholamine use (8.0, 95% CI 5.5 to 10.5 versus 7.2, 95% CI 5.9 to 8.4); or participants receiving renal replacement therapy (13.7%, 95% CI 5.8% to 21.6% versus 12.0%, 95% CI 5.0% to 19.1%). Quality of life was not reported.AUTHORS' CONCLUSIONSWe are very uncertain as to whether a higher or lower oxygen target is more beneficial in patients with ARDS and receiving mechanical ventilation in an intensive care setting. We identified only one RCT with a total of 205 participants exploring this question, and rated the risk of bias as high and the certainty of the findings as very low. Further well-conducted studies are urgently needed to increase the certainty of the findings reported here. This review should be updated when more evidence is available.

## B. Original Research

1. **Cardiovascular Disease and Severe Hypoxemia Are Associated With Higher Rates of Noninvasive Respiratory Support Failure in Coronavirus Disease 2019 Pneumonia.**  
   Wang Jing Gennie Critical care explorations 2021;3(3):e0355.

Acute hypoxemic respiratory failure is the major complication of coronavirus disease 2019, yet optimal respiratory support strategies are uncertain. We aimed to describe outcomes with high-flow oxygen delivered through nasal cannula and noninvasive positive pressure ventilation in coronavirus disease 2019 acute hypoxemic respiratory failure and identify individual factors associated with noninvasive respiratory support failure.DesignRetrospective cohort study to describe rates of high-flow oxygen delivered through nasal cannula and/or noninvasive positive pressure ventilation success (live discharge without endotracheal intubation). Fine-Gray subdistribution hazard models were used to identify patient characteristics associated with high-flow oxygen delivered through nasal cannula and/or noninvasive positive pressure ventilation failure (endotracheal intubation and/or in-hospital mortality).SettingOne large academic health system, including five hospitals (one quaternary referral center, a tertiary hospital, and three community hospitals), in New York City.PatientsAll hospitalized adults 18-100 years old with coronavirus disease 2019 admitted between March 1, 2020, and April 28, 2020.InterventionsNone.Measurements and Main ResultsA total of 331 and 747 patients received high-flow oxygen delivered through nasal cannula and noninvasive positive pressure ventilation as the highest level of noninvasive respiratory support, respectively; 154 (46.5%) in the high-flow oxygen delivered through nasal cannula cohort and 167 (22.4%) in the noninvasive positive pressure ventilation cohort were successfully discharged without requiring endotracheal intubation. In adjusted models, significantly increased risk of high-flow oxygen delivered through nasal cannula and noninvasive positive pressure ventilation failure was seen among patients with cardiovascular disease (subdistribution hazard ratio, 1.82; 95% CI, 1.17-2.83 and subdistribution hazard ratio, 1.40; 95% CI, 1.06-1.84, respectively). Conversely, a higher peripheral blood oxygen saturation to Fio2 ratio at high-flow oxygen delivered through nasal cannula and noninvasive positive pressure ventilation initiation was associated with reduced risk of failure (subdistribution hazard ratio, 0.32; 95% CI, 0.19-0.54, and subdistribution hazard ratio 0.34; 95% CI, 0.21-0.55, respectively).ConclusionsA significant proportion of patients receiving noninvasive respiratory modalities for coronavirus disease 2019 acute hypoxemic respiratory failure achieved successful hospital discharge without requiring endotracheal intubation, with lower success rates among those with comorbid cardiovascular disease or more severe hypoxemia. The role of high-flow oxygen delivered through nasal cannula and noninvasive positive pressure ventilation in coronavirus disease 2019-related acute hypoxemic respiratory failure warrants further consideration.

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1. **Clinical outcomes of high-flow nasal cannula in COVID-19 associated postextubation respiratory failure. A single-centre case series**  
   Simioli F. Anaesthesiology Intensive Therapy 2021;52(5):373-376.

Background: A high-flow nasal cannula (HFNC) is an alternative device for oxygenation, which improves gas exchange and reduces the work of breathing. Postextubation respiratory failure causes increased morbidity and mortality. HFNC has been widely employed during the COVID-19 pandemic. The purpose of this paper is to report a single-centre experience on the effectiveness and safety of HFNC in weaning COVID-19 patients. <br/>Method(s): Nine patients showed severe acute respiratory failure and interstitial pneumonia due to SARS-CoV-2. After mechanical ventilation (5 Helmet CPAP, 4 invasive mechanical ventilation), they were de-escalated to HFNC. Settings were: 34-37degreeC, flow from 50 to 60 L min<sup>-1</sup>. FiO<sub>2</sub> was set to achieve appropriate SpO<sub>2</sub>. <br/>Result(s): Nine patients (4 females; age 63 +/- 13.27 years; BMI 27.2 +/- 4.27) showed a baseline PaO<sub>2</sub>/FiO<sub>2</sub> of 109 +/- 45 mm Hg. After a long course of ventilation all patients improved (PaO<sub>2</sub>/FiO<sub>2</sub> 336 +/- 72 mm Hg). Immediately after initiation of HFNC (2 hours), PaO<sub>2</sub>/FiO<sub>2</sub> was 254 +/- 69.3 mm Hg. Mean ROX index at two hours was 11.17 (range: 7.38-14.4). It was consistent with low risk of HFNC failure. No difference was observed on lactate. After 48 hours of HFNC oxygen therapy (day 3), mean PaO<sub>2</sub>/FiO<sub>2</sub> increased to 396 +/- 83.5 mm Hg. All patients recovered from respiratory failure after 7 +/- 4.1 days. <br/>Conclusion(s): HFNC might be helpful in weaning COVID-19 respiratory failure. Effectiveness and comfort should be assessed between 2 and 48 hours. Clinical outcomes, oxygenation, and ROX index should be considered, to rule out the need for intubation. Further evidence is required for firm conclusions.<br/>Copyright &#xa9; 2020 Via Medica. All rights reserved.

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[outcomes.pdf this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=98f003fd8e6553e00624898013a1c450)

1. **Helmet CPAP to treat hypoxic pneumonia outside the ICU: an observational study during the COVID-19 outbreak**  
   Coppadoro A. Critical Care 2021;25(1):No page numbers.

Background: Respiratory failure due to COVID-19 pneumonia is associated with high mortality and may overwhelm health care systems, due to the surge of patients requiring advanced respiratory support. Shortage of intensive care unit (ICU) beds required many patients to be treated outside the ICU despite severe gas exchange impairment. Helmet is an effective interface to provide continuous positive airway pressure (CPAP) noninvasively. We report data about the usefulness of helmet CPAP during pandemic, either as treatment, a bridge to intubation or a rescue therapy for patients with care limitations (DNI). <br/>Method(s): In this observational study we collected data regarding patients failing standard oxygen therapy (i.e., non-rebreathing mask) due to COVID-19 pneumonia treated with a free flow helmet CPAP system. Patients' data were recorded before, at initiation of CPAP treatment and once a day, thereafter. CPAP failure was defined as a composite outcome of intubation or death. <br/>Result(s): A total of 306 patients were included; 42% were deemed as DNI. Helmet CPAP treatment was successful in 69% of the full treatment and 28% of the DNI patients (P &lt; 0.001). With helmet CPAP, PaO<sub>2</sub>/FiO<sub>2</sub> ratio doubled from about 100 to 200 mmHg (P &lt; 0.001); respiratory rate decreased from 28 [22-32] to 24 [20-29] breaths per minute, P &lt; 0.001). C-reactive protein, time to oxygen mask failure, age, PaO<sub>2</sub>/FiO<sub>2</sub> during CPAP, number of comorbidities were independently associated with CPAP failure. Helmet CPAP was maintained for 6 [3-9] days, almost continuously during the first two days. None of the full treatment patients died before intubation in the wards. <br/>Conclusion(s): Helmet CPAP treatment is feasible for several days outside the ICU, despite persistent impairment in gas exchange. It was used, without escalating to intubation, in the majority of full treatment patients after standard oxygen therapy failed. DNI patients could benefit from helmet CPAP as rescue therapy to improve survival. Trial Registration: NCT04424992.<br/>Copyright &#xa9; 2021, The Author(s).

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1. **High flow nasal oxygen therapy to avoid invasive mechanical ventilation in SARS-CoV-2 pneumonia: a retrospective study**  
   Bonnet N. Annals of Intensive Care 2021;11(1):No page numbers.

Background: The efficacy of high flow nasal canula oxygen therapy (HFNO) to prevent invasive mechanical ventilation (IMV) is not well established in severe coronavirus disease 2019 (COVID-19). The aim of this study was to compare the risk of IMV between two strategies of oxygenation (conventional oxygenation and HFNO) in critically ill COVID 19 patients. <br/>Method(s): This was a bicenter retrospective study which took place in two intensive care units (ICU) of tertiary hospitals in the Paris region from March 11, to May 3, 2020. We enrolled consecutive patients hospitalized for COVID-19 and acute respiratory failure (ARF) who did not receive IMV at ICU admission. The primary outcome was the rate of IMV after ICU admission. Secondary outcomes were death at day 28 and day 60, length of ICU stay and ventilator-free days at day 28. Data from the HFNO group were compared with those from the standard oxygen therapy (SOT) group using weighted propensity score. <br/>Result(s): Among 138 patients who met the inclusion criteria, 62 (45%) were treated with SOT alone, and 76 (55%) with HFNO. In HFNO group, 39/76 (51%) patients received IMV and 46/62 (74%) in SOT group (OR 0.37 [95% CI, 0.18-0.76] p = 0.007). After weighted propensity score, HFNO was still associated with a lower rate of IMV (OR 0.31 [95% CI, 0.14-0.66] p = 0.002). Length of ICU stay and mortality at day 28 and day 60 did not significantly differ between HFNO and SOT groups after weighted propensity score. Ventilator-free days at days 28 was higher in HNFO group (21 days vs 10 days, p = 0.005). In the HFNO group, predictive factors associated with IMV were SAPS2 score (OR 1.13 [95%CI, 1.06-1.20] p = 0.0002) and ROX index &gt; 4.88 (OR 0.23 [95%CI, 0.008-0.64] p = 0.006). <br/>Conclusion(s): High flow nasal canula oxygen for ARF due to COVID-19 is associated with a lower rate of invasive mechanical ventilation.<br/>Copyright &#xa9; 2021, The Author(s).

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1. **High-Flow Nasal Cannula, a Boon or a Bane for COVID-19 Patients? An Evidence-Based Review.**  
   Singh Abhishek Current anesthesiology reports 2021;:1-6.

Purpose of ReviewThis review instantiates the efficacy and safety of HFNC in the context of COVID-19 pandemic.Recent FindingsGlobally, the healthcare system is facing an unprecedented crisis of resources due to the 2019 novel coronavirus disease (COVID-19) pandemic. Fever, cough, dyspnea, myalgia, fatigue, and pneumonia are the most common symptoms associated with it. The incidence of invasive mechanical ventilation in ICU patients ranges from 29.1 to 89.9%. Supplemental oxygen therapy is the main stay treatment for managing hypoxemic respiratory failure. The high-flow nasal cannula (HFNC) is a novel non-invasive strategy for better oxygenation and ventilation in critically ill patients. In this grim scenario, a reduction in mechanical ventilation by means of HFNC is of prime interest.SummaryHFNC is considered an aerosol-generating intervention with the risk of viral aerosolization with a concern of potential nosocomial transmission of severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2). However, there is no consensus regarding the use of HFNC in novel coronavirus-infected pneumonia (NCIP). HFNC seems to be an effective and safe treatment modality in acute respiratory failure with optimal settings and selection of ideal patients.

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1. **Impact of HFNC application on mortality and intensive care length of stay in acute respiratory failure secondary to COVID-19 pneumonia**  
   Sayan I. Heart and Lung: Journal of Acute and Critical Care 2021;50(3):425-429.

Background: In Covid-19 pneumonia, high mortality rates reported in intubated patients have raised non-invasive methods of respiratory support. <br/>Objective(s): We aimed to evaluate the impact of HFNC application on intubation requirement, intensive care length of stay, and short-term mortality in patients with COVID-19 pneumonia. Material-method: Patients receiving oxygen by reservoir mask or HFNC therapy in our intensive care units due to COVID-19 pneumonia were included in the study. Group H consisted of patients who received HFNC, and Group K consisted of patients who received conventional oxygen therapy (COT). The number of patients intubated, duration of intensive care stay and short-term mortality were recorded. <br/>Result(s): 43 patients were included. The short-term mortality and the number of patients with intubation need was lower in Group H. There was no significant difference between the Groups in the length of intensive care stay. <br/>Conclusion(s): Administration of HFNC in respiratory failure secondary to COVID-19 pneumonia decreases the need for intubation and mortality.<br/>Copyright &#xa9; 2021 Elsevier Inc.

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1. **Indicacion de la oxigenoterapia de alto flujo en pacientes afectos de neumonia por SARS-CoV-2Indication of high-flow oxygen therapy in patients with SARS-CoV-2 pneumonia**  
   Belenguer-Muncharaz A. Medicina Intensiva 2021;:No page numbers.

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1. **Intermittent High-Frequency Percussive Ventilation Therapy in 3 Patients with Severe COVID-19 Pneumonia.**  
   Marchenko Sergey P. The American journal of case reports 2021;22:e928421.

BACKGROUND High-frequency percussive ventilation (HFPV) is a method that combines mechanical ventilation with high-frequency oscillatory ventilation. This report describes 3 cases of patients with severe COVID-19 pneumonia who received intermittent adjunctive treatment with HFPV at a single center without requiring admission to the Intensive Care Unit (ICU). CASE REPORT Case 1 was a 60-year-old woman admitted to the hospital 14 days after the onset of SARS-CoV-2 infection symptoms, and cases 2 and 3 were men aged 65 and 72 years who were admitted to the hospital 10 days after the onset of SARS-CoV-2 infection symptoms. All 3 patients presented with clinical deterioration accompanied by worsening lung lesions on computed tomography (CT) scans after 21 days from the onset of symptoms. SARS-CoV-2 infection was confirmed in all patients by real-time reverse transcription-polymerase chain reaction (RT-PCR) assay from nasal swabs. All 3 patients had impending respiratory failure when non-invasive intermittent HFPV therapy was initiated. After therapy, the patients had significant clinical improvement and visibly decreased lung lesions on followup CT scans performed 4-6 days later. CONCLUSIONS The 3 cases described in this report showed that the use of intermittent adjunctive treatment with HFPV in patients with severe pneumonia due to infection with SARS-CoV-2 improved lung function and may have prevented clinical deterioration. However, recommendations on the use of intermittent HFPV as an adjunctive treatment in COVID-19 pneumonia requires large-scale controlled clinical studies. In the pandemic context, with a shortage of ICU beds, avoiding ICU admission by using adjunctive therapies on the ward is a useful option.

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1. **Oxigenoterapia de alto flujo en el tratamiento de la neumonia por sindrome respiratorio agudo grave por coronavirus tipo 2High flow oxygen therapy in the treatment of SARS-CoV-2 pneumonia**  
   Gonzalez-Castro A. Medicina Intensiva 2021;:No page numbers.

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1. **Pneumoperitoneum in a COVID-19 Patient Due to the Macklin Effect.**  
   Vidrio Duarte Ramon Cureus 2021;13(2):e13200.

A 63-year-old male with coronavirus disease 2019 (COVID-19) pneumonia presented to the emergency department, supplementary oxygen is delivered via nasal cannula, and invasive ventilation was not needed; there was significant pneumoperitoneum on radiologic control. After a meticulous examination of the thoracic tomography, there were some linear air collections adjacent to the bronchovascular sheaths, indicative of the Macklin effect, without abdominal alterations, and the patient remained stable; therefore, we did not perform a surgical procedure, and the pneumoperitoneum reabsorbed spontaneously on radiologic control. The pulmonary origin of pneumoperitoneum is unusual and is associated with mechanical ventilation and alveolar leak; the air leak with subsequent dissection into other anatomical spaces is called the Macklin effect. It is essential to have this mechanism in mind because most of these patients respond well to conservative treatment. When studying primary pneumoperitoneum, the cause should be studied carefully to discard visceral perforation, tracheal or esophageal rupture.

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1. **Pulmonary rehabilitation in COVID-19 patients: A scoping review of current practice and its application during the pandemic**  
   Siddiq M.A.B. Turkish Journal of Physical Medicine and Rehabilitation 2021;66(4):480-494.

The novel coronavirus-2019 (COVID-19) pandemic primarily affects the respiratory system. Elderly individuals with comorbidity are severely affected. Survivors weaned from mechanical ventilation are at a higher risk of developing post-intensive care syndrome (PICS). This scoping review, based on 40 recent publications, highlights pulmonary rehabilitation (PR) in COVID-19. There is a paucity of high-quality research on this topic. However, rehabilitation societies including the Turkish Society of Physical Medicine and Rehabilitation have issued PR recommendations in COVID-19 pneumonia with productive cough can benefit from diaphragmatic breathing, pursed-lip breathing, and resistance-breathing training. Besides, those in mechanical ventilation and post-PICS COVID-19 cases, oxygen therapy, early mobilization, airway clearance, aerobic exercise, gradual-graded limb muscle resistance exercise, nutritional and psychological interventions should be consideration. During PR, careful evaluation of vital signs and exercise-induced symptoms is also required. When in-person PR is not possible, telerehabilitation should be explored. However, the long-term effects of PR in COVID-19 need further evaluation.<br/>Copyright &#xa9; 2020 All right reserved by the Turkish Society of Physical Medicine and Rehabilitation This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes (http://creativecommons.org/licenses/by-nc/4.0/).

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1. **Self-contained system for mitigation of contaminated aerosol sources of SARS-CoV-2 .**  
   Patel Bhavesh Research square 2021;:No page numbers.

Contaminated aerosols and micro droplets are easily generated by infected hosts through sneezing, coughing, speaking and breathing 1-3 and harm humansâ€™ health and the global economy. While most of the efforts are usually targeted towards protecting individuals from getting infected, 4 eliminating transmissions from infection sources is also important to prevent disease transmission. Supportive therapies for Severe Acute Respiratory Syndrome Coronavirus 2 (SARS CoV-2) pneumonia such as oxygen supplementation, nebulizers and non-invasive mechanical ventilation all carry an increased risk for viral transmission via aerosol to healthcare workers. 5-9 In this work, we study the efficacy of five methods for self-containing aerosols emitted from infected subjects undergoing nebulization therapies with a diverse spectrum on oxygen delivery therapies. The work includes five study cases: Case I: Use of a Full-Face Mask with biofilter in bilevel positive airway pressure device (BPAP) therapy, Case II: Use of surgical mask in High Flow Nasal Cannula (HFNC) therapy, Case III: Use of a modified silicone disposable mask in a HFNC therapy, Case IV: Use of a modified silicone disposable mask with a regular nebulizer and normal breathing, Case V: Use of a mitigation box with biofilter in a Non-Invasive Positive Pressure Ventilator (NIPPV). We demonstrate that while cases I, III and IV showed efficacies of 98-100%; cases II and V , which are the most commonly used, resulted with significantly lower efficacies of 10-24% to mitigate the dispersion of nebulization aerosols. Therefore, implementing cases I, III and IV in health care facilities may help battle the contaminations and infections via aerosol transmission during a pandemic.

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1. **Spontaneous pneumothorax in covid-19 patients treated with high-flow nasal cannula outside the ICU: A case series**  
   Nalewajska M. International Journal of Environmental Research and Public Health 2021;18(4):1-11.

The coronavirus disease 2019 (COVID-19) caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has become a global pandemic and a burden to global health at the turn of 2019 and 2020. No targeted treatment for COVID-19 infection has been identified so far, thus supportive treatment, invasive and non-invasive oxygen support, and corticosteroids remain a common therapy. High-flow nasal cannula (HFNC), a non-invasive oxygen support method, has become a prominent treatment option for respiratory failure during the SARS-CoV-2 pandemic. HFNC reduces the anatomic dead space and increases positive end-expiratory pressure (PEEP), al-lowing higher concentrations and higher flow of oxygen. Some studies suggest positive effects of HFNC on mortality and avoidance of intubation. Spontaneous pneumothorax has been observed in patients suffering from SARS-CoV-2 pneumonia. Although the viral infection itself contributes to its development, higher PEEP generated by both HFNC and mechanical ventilation is another risk factor for increased alveoli damage and air-leak. Herein, we present three cases of patients with no previous history of lung diseases who were diagnosed with COVID-19 viral pneumonia. All of them were supported with HFNC, and all of them presented spontaneous pneumothorax.<br/>Copyright &#xa9; 2021 by the authors. Licensee MDPI, Basel, Switzerland.

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1. **The value of high-flow nasal cannula oxygen therapy in treating novel coronavirus pneumonia**  
   Teng X.-B. European Journal of Clinical Investigation 2021;51(3):No page numbers.

Objective: This study aimed to investigate the value of high-flow nasal cannula (HNFC) oxygen therapy in treating patients with severe novel coronavirus pneumonia (COVID-19). <br/>Method(s): The clinical data of 22 patients with severe COVID-19 were collected. The heart rate (HR), respiratory rate (RR) and oxygenation index (PO<sub>2</sub>/FiO<sub>2</sub>) at 0, 6, 24 and 72 hours after treatment were compared between the HFNC oxygen therapy group and the conventional oxygen therapy (COT) group. In addition, the white blood cell (WBC) count, lymphocyte (L) count, C-reactive protein (CRP) and procalcitonin (PCT) were compared before and at 72 hours after oxygen therapy treatment. <br/>Result(s): The differences at 0 hours between the two groups were not statistically significant. Compared with COT group,in the HFNC oxygen therapy group, HR, RR and PaO<sub>2</sub>/FiO<sub>2</sub> were better at 6 hours after treatment, PaO<sub>2</sub>/FiO<sub>2</sub> was better at 24 and 72 hours. After 72 hours, L and CRP had improved in the HFNC oxygen therapy group compared with the COT group, but the differences in WBC and PCT were not statistically significant. The length of stay in the intensive care unit (ICU) and the total length of hospitalization was shorter in the HFNC oxygen therapy group than in the COT group. <br/>Conclusion(s): Compared with COT, early application of HFNC oxygen therapy in patients with severe COVID-19 can improve oxygenation and RR, and HFNC oxygen therapy can improve the infection indexes of patients and reduce the length of stay in the ICU of patients. Therefore, it has high clinical application value.<br/>Copyright &#xa9; 2020 Stichting European Society for Clinical Investigation Journal Foundation. Published by John Wiley & Sons Ltd

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1. **A Case of Extracorporeal Membrane Oxygenation as a Salvage Therapy for COVID-19-Associated Severe Acute Respiratory Distress Syndrome: Mounting Evidence.**  
   Rajdev Kartikeya Journal of investigative medicine high impact case reports 2020;8:2324709620957778.

Coronavirus disease 2019 (COVID-19) caused by a novel human coronavirus has led to a tsunami of viral illness across the globe, originating from Wuhan, China. Although the value and effectiveness of extracorporeal membrane oxygenation (ECMO) in severe respiratory illness from COVID-19 remains unclear at this time, there is emerging evidence suggesting that it could be utilized as an ultimate treatment in appropriately selected patients not responding to conventional care. We present a case of a 32-year-old COVID-19 positive male with a history of diabetes mellitus who was intubated for severe acute respiratory distress syndrome (ARDS). The patient's hypoxemia failed to improve despite positive pressure ventilation, prone positioning, and use of neuromuscular blockade for ventilator asynchrony. He was evaluated by a multidisciplinary team for considering ECMO for refractory ARDS. He was initiated on venovenous ECMO via dual-site cannulation performed at the bedside. Although his ECMO course was complicated by bleeding, he showed a remarkable improvement in his lung function. ECMO was successfully decannulated after 17 days of initiation. The patient was discharged home after 47 days of hospitalization without any supplemental oxygen and was able to undergo active physical rehabilitation. A multidisciplinary approach is imperative in the initiation and management of ECMO in COVID-19 patients with severe ARDS. While ECMO is labor-intensive, using it in the right phenotype and in specialized centers may lead to positive results. Patients who are young, with fewer comorbidities and single organ dysfunction portray a better prognosis for patients in which ECMO is utilized.

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1. **A Double-Edged Sword: Neurologic Complications and Mortality in Extracorporeal Membrane Oxygenation Therapy for COVID-19-Related Severe Acute Respiratory Distress Syndrome at a Tertiary Care Center.**  
   Masur J. AJNR. American journal of neuroradiology 2020;41(11):2009-2011.

In this clinical case series, we report our experience to date with neurologic complications of extracorporeal membrane oxygenation therapy for COVID-19 Acute Respiratory Distress Syndrome. We have found an unexpectedly increased rate of complications as demonstrated by neuroimaging compared with meta-analysis data in extracorporeal membrane oxygenation therapy for all Acute Respiratory Distress Syndrome etiologies over the past few decades and compared with the most recent baseline data describing the incidence of neurologic complication in all patients with COVID-19. For our 12-patient cohort, there was a rate of intracranial hemorrhage of 41.7%. Representative cases and images of devastating intracranial hemorrhage are presented. We hypothesize that the interplay between hematologic changes inherent to extracorporeal membrane oxygenation and inflammatory and coagulopathic changes that have begun to be elucidated as part of the COVID-19 disease process are responsible. Continued analysis of extracorporeal membrane oxygenation therapy in this disease paradigm is warranted.

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1. **A Simple Approach for Gas Blender on Extracorporeal Membrane Oxygenation in Resource Shortage Context**  
   De Roux Q. ASAIO journal (American Society for Artificial Internal Organs : 1992) 2020;66(10):1076-1078.

With the massive influx of patients during COVID-19 pandemic into intensive care unit, resources have quickly been stretched to the limit, including extracorporeal membrane oxygenation (ECMO). Gas blender attached to ECMO is used to allow precise adjustment of characteristics of fresh gas flow, that is, blood oxygen delivery and carbon dioxide removal. To cope with the gas blender shortage, we describe a back-up system set up in our French tertiary referral ECMO center using air and oxygen flowmeters. A table has been created to facilitate medical prescription but also nurse monitoring. This extraordinary situation forces physicians to adapt medical devices, and that could be useful in future viral pandemics.

1. **Aerosol Generation from the Respiratory Tract with Various Modes of Oxygen Delivery.**  
   Gaeckle Nathaniel T. American journal of respiratory and critical care medicine 2020;202(8):1115-1124.

Rationale: Aerosol generation with modes of oxygen therapy such as high-flow nasal cannula and noninvasive positive-pressure ventilation is a concern for healthcare workers during the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic. The amount of aerosol generation from the respiratory tract with these various oxygen modalities is unknown.Objectives: To measure the size and number concentration of particles and droplets generated from the respiratory tract of humans exposed to various oxygen delivery modalities.Methods: Ten healthy participants with no active pulmonary disease were enrolled. Oxygen modalities tested included nonhumidified nasal cannula, face mask, heated and humidified high-flow nasal cannula, and noninvasive positive-pressure ventilation. Aerosol generation was measured with each oxygen mode while participants performed maneuvers of normal breathing, talking, deep breathing, and coughing. Testing was conducted in a negative-pressure room. Particles with a diameter between 0.37 and 20 μm were measured using an aerodynamic particle spectrometer.Measurements and Main Results: Median particle concentration ranged from 0.041 to 0.168 particles/cm3. Median diameter ranged from 1.01 to 1.53 μm. Cough significantly increased the number of particles measured. Measured aerosol concentration did not significantly increase with the use of either humidified high-flow nasal cannula or noninvasive positive-pressure ventilation. This was the case during normal breathing, talking, deep breathing, and coughing.Conclusions: Oxygen delivery modalities of humidified high-flow nasal cannula and noninvasive positive-pressure ventilation do not increase aerosol generation from the respiratory tract in healthy human participants with no active pulmonary disease measured in a negative-pressure room.

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1. **Association between oxygen saturation/fraction of inhaled oxygen and mortality in patients with COVID-19 associated pneumonia requiring oxygen therapy.**  
   Choi Keum-Ju Tuberculosis and respiratory diseases 2020;:No page numbers.

BackgroundCoronavirus disease 2019 (COVID-19) can manifest from asymptomatic to acute respiratory distress syndrome (ARDS). COVID-19 associated pneumonia develops into ARDS due to rapid progression of hypoxia. Although arterial blood gas analysis (ABGA) should be implemented to confirm this deterioration, it is not easy to obtain such tests in the COVID-19 environment. Therefore, this study was conducted to determine whether oxygen saturation (SpO2) and SpO2/fraction of inhaled oxygen (FiO2) (SF ratio) predicts ARDS and mortality.MethodsThis was a retrospective cohort study that enrolled COVID-19 pneumonia patients requiring oxygen therapy from Feb 2020 to May 2020. Of 100 COVID-19 pneumonia cases, we compared 59 cases of pneumonia requiring oxygen, divided into ARDS and non-ARDS pneumonia requiring oxygen. The factors affecting mortality were investigated.ResultsAt the time of admission, the SpO2, FiO2, and SF ratios of the ARDS group were significantly different from those of the non-ARDS pneumonia requiring oxygen support group (P <0.001, respectively). With respect to predicting occurrence of ARDS, the SF ratio on admission and the SF ratio at exacerbation showed an overall area under the curve of 85.7% and 88.8% (P < 0.001, respectively). Multivariate Cox regression analysis identified the SF ratio at exacerbation (HR, 0.916; 95% CI, 0.846-0.991; P = 0.029) and National Early Warning Score (NEWS) (HR, 1.277; 95% CI, 1.010-1.615; P = 0.041) as significant predictors of mortality.ConclusionsThe SF ratio on admission and the SF ratio at exacerbation can predict occurrence of ARDS. The SF ratio at exacerbation and NEWS has a significant effect on mortality.

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1. **Children in Critical Care Due to Severe Acute Respiratory Syndrome Coronavirus 2 Infection: Experience in a Spanish Hospital.**  
   García-Salido Alberto Pediatric critical care medicine : a journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies 2020;21(8):e576.

OBJECTIVESSpain has been one of the countries most severely affected by the coronavirus disease 2019. This study aims to describe a series of children admitted to a PICU due to coronavirus disease 2019 infection.DESIGNProspective observational study.SETTINGTertiary hospital in Madrid, Spain.PATIENTSChildren admitted to the PICU with severe acute respiratory syndrome coronavirus 2 (severe acute respiratory syndrome coronavirus 2) infection, from March 1, 2020, to April 15, 2020.INTERVENTIONSObservational study.MEASUREMENTS AND MAIN RESULTSEpidemiologic data, previous clinical characteristics, support therapy needed, imaging tests, laboratory observations on admission, and pharmacologic therapy. Eleven children were admitted to the PICU, with suspected coronavirus disease 2019; the polymerase chain reaction test was positive in seven. The median age was 100.7 months (range, 0.5-162). Five were admitted from the emergency department and two from the ward. The Pediatric Sequential Organ Failure Assessment score was 3 (range, 0-9), and Pediatric Risk of Mortality II score was 4 (range, 0-16). All children were previously healthy except one (allogeneic hematopoietic stem cell transplantation). Respiratory symptoms and fever were prevalent. A chest radiograph led to a pneumonia diagnosis. Not all patients presented with lymphopenia on admission. D-Dimer and ferritin were elevated. All patients needed oxygen therapy through a nasal cannula; five patients received high-flow nasal cannula therapy, which was later substituted with noninvasive ventilation in four. Mechanical ventilation was necessary in two patients on the first day of PICU admission. Two children required mechanical ventilation and inotropic support. Tocilizumab was applied in two intubated children. Also, four children received heparin. No patients died.CONCLUSIONSOn the whole, the children were previously healthy and are more than 1 year old. Respiratory symptoms were the leading cause of PICU admission, making respiratory support the principal therapy. Patients requiring mechanical ventilation showed deterioration on the first day of admission. These children seemed to require close monitoring, and multicenter studies are necessary.

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1. **Clinical characteristics and respiratory support of 310 COVID-19 patients, diagnosed at the emergency room: a single-center retrospective study**  
   Di Domenico S.L. Internal and emergency medicine 2020;:No page numbers.

An ongoing outbreak of pneumonia associated with severe acute respiratory coronavirus 2 (SARS-CoV-2) occurred at the end of February 2020 in Lombardy, Italy. We analyzed data from a retrospective, single-center case series of 310 consecutive patients, with confirmed SARS-CoV-2 infection, admitted to the emergency room. We aimed to describe the clinical course, treatment and outcome of a cohort of patients with COVID-19 pneumonia, with special attention to oxygen delivery and ventilator support. Throughout the study period, 310 consecutive patients, with confirmed SARS-CoV-2 infection, attended the Emergency Room (ER), of these, 34 were discharged home directly from the ER. Of the remaining 276 patients, the overall mortality was 30.4%: 7 patients died in the ER and 77 during hospitalization. With respect to oxygen delivery: 22 patients did not need any oxygen support (8.0%), 151 patients were treated with oxygen only (54.7%), and 49 (17.8%) were intubated. 90 patients (32.6%) were treated with CPAP (Continuous Positive Airway Pressure) or NIV (Non Invasive Ventilation); in this group, 27 patients had a Do Not Intubate (DNI) order and were treated with CPAP/NIV as an upper threshold therapy, showing high mortality rate (88.9%). Among the 63 patients treated with CPAP/NIV without DNI, NIV failure occurred in 36 patients (57.1%), with mortality rate of 47.2%. Twenty-seven (27) patients were treated with CPAP/NIV without needing mechanical ventilation and 26 were discharged alive (96.3%). The study documents the poor prognosis of patients with severe respiratory failure, although a considerable minority of patients treated with CPAP/NIV had a positive outcome.

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1. **Clinical Consensus Recommendations Regarding Non-Invasive Respiratory Support in the Adult Patient with Acute Respiratory Failure Secondary to SARS-CoV-2 infection.**  
   Cinesi G.ómez C. Revista espanola de anestesiologia y reanimacion 2020;67(5):261-270.

Coronavirus disease 2019 (COVID-19) is a respiratory tract infection caused by a newly emergent coronavirus, that was first recognized in Wuhan, China, in December 2019. Currently, the World Health Organization (WHO) has defined the infection as a global pandemic and there is a health and social emergency for the management of this new infection. While most people with COVID-19 develop only mild or uncomplicated illness, approximately 14% develop severe disease that requires hospitalization and oxygen support, and 5% require admission to an intensive care unit. In severe cases, COVID-19 can be complicated by the acute respiratory distress syndrome (ARDS), sepsis and septic shock, and multiorgan failure. This consensus document has been prepared on evidence-informed guidelines developed by a multidisciplinary panel of health care providers from four Spanish scientific societies (Spanish Society of Intensive Care Medicine [SEMICYUC], Spanish Society of Pulmonologists [SEPAR], Spanish Society of Emergency [SEMES], Spanish Society of Anesthesiology, Reanimation, and Pain [SEDAR]) with experience in the clinical management of patients with COVID-19 and other viral infections, including SARS, as well as sepsis and ARDS. The document provides clinical recommendations for the noninvasive respiratory support (noninvasive ventilation, high flow oxygen therapy with nasal cannula) in any patient with suspected or confirmed presentation of COVID-19 with acute respiratory failure. This consensus guidance should serve as a foundation for optimized supportive care to ensure the best possible chance for survival and to allow for reliable comparison of investigational therapeutic interventions as part of randomized controlled trials.

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1. **Clinical Course and Outcomes of 3,060 Patients with Coronavirus Disease 2019 in Korea, January-May 2020**  
   Sung H.K. Journal of Korean medical science 2020;35(30):No page numbers.

BACKGROUND: The fatality rate of patients with coronavirus disease 2019 (COVID-19) varies among countries owing to demographics, patient comorbidities, surge capacity of healthcare systems, and the quality of medical care. We assessed the clinical outcomes of patients with COVID-19 during the first wave of the epidemic in Korea. <br/>METHOD(S): Using a modified World Health Organization clinical record form, we obtained clinical data for 3,060 patients with COVID-19 treated at 55 hospitals in Korea. Disease severity scores were defined as: 1) no limitation of daily activities; 2) limitation of daily activities but no need for supplemental oxygen; 3) supplemental oxygen via nasal cannula; 4) supplemental oxygen via facial mask; 5) non-invasive mechanical ventilation; 6) invasive mechanical ventilation; 7) multi-organ failure or extracorporeal membrane oxygenation therapy; and 8) death. Recovery was defined as a severity score of 1 or 2, or discharge and release from isolation. <br/>RESULT(S): The median age of the patients was 43 years of age; 43.6% were male. The median time from illness onset to admission was 5 days. Of the patients with a disease severity score of 3-4 on admission, 65 (71.5%) of the 91 patients recovered, and 7 (7.7%) died due to illness by day 28. Of the patients with disease severity scores of 5-7, 7 (19.5%) of the 36 patients recovered, and 8 (22.2%) died due to illness by day 28. None of the 1,324 patients who were &lt; 50 years of age died; in contrast, the fatality rate due to illness by day 28 was 0.5% (2/375), 0.9% (2/215), 5.8% (6/104), and 14.0% (7/50) for the patients aged 50-59, 60-69, 70-79, and &gt;= 80 years of age, respectively. <br/>CONCLUSION(S): In Korea, almost all patients of &lt; 50 years of age with COVID-19 recovered without supplemental oxygen. In patients of &gt;= 50 years of age, the fatality rate increased with age, reaching 14% in patients of &gt;= 80 years of age.<br/>Copyright &#xa9; 2020 The Korean Academy of Medical Sciences.

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1. **Clinical outcome of standardized oxygen therapy nursing strategy in COVID-19**  
   Pan W. Annals of palliative medicine 2020;9(4):2171-2177.

BACKGROUND: Novel coronavirus pneumonia (COVID-19) has become a global pandemic. However, a technical standard for oxygen therapy nursing, as well as how this would improve clinical outcomes and symptoms, is yet to be explored. <br/>METHOD(S): From February 9, 2020, to March 31, 2020, 58 patients of confirmed COVID-19 were admitted to the 20th ward of the Eastern Branch, Renmin Hospital of Wuhan University. Fifteen patients who did not receive oxygen therapy and 13 patients who were transferred from other hospitals were excluded. The rest of the 30 patients that received standardized oxygen therapy in our unit were included in the study. Baseline characteristics, symptoms, and finger pulse oxygen saturation were collected during hospitalization. <br/>RESULT(S): Clinical outcomes of the 30 patients were as follows: 27 patients (90.00%) were cured and discharged; 3 patients (10.00%) who continued to stay in hospital were stabilized with symptoms relieved. The fingertip oxygen saturation was 94.80%+/-3.49% at ICU admission and 97.8%+/-1.27% when transferred out of ICU after standardized oxygen therapy (P&lt;0.005). The symptoms of dyspnea, fatigue, and muscle aches of the patients were improved when transferred out of ICU, compared with their condition when admitted to ICU (P&lt;0.05). <br/>CONCLUSION(S): The standardized oxygen therapy nursing strategy for patients with COVID-19 emphasizes the nursing measurement, which focuses on the patient's oxygenation. It is led by nurses and starts oxygen therapy at an earlier stage. It not only improves the clinical outcomes of critical patients but also effectively reduces the infection risk of medical staff while emphasizing nursing quality management.

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1. **Consensus guidelines for managing the airway in patients with COVID-19: Guidelines from the Difficult Airway Society, the Association of Anaesthetists the Intensive Care Society, the Faculty of Intensive Care Medicine and the Royal College of Anaesthetists.**  
   Cook T. M Anaesthesia 2020;75(6):785-799.

Severe acute respiratory syndrome-corona virus-2, which causes coronavirus disease 2019 (COVID-19), is highly contagious. Airway management of patients with COVID-19 is high risk to staff and patients. We aimed to develop principles for airway management of patients with COVID-19 to encourage safe, accurate and swift performance. This consensus statement has been brought together at short notice to advise on airway management for patients with COVID-19, drawing on published literature and immediately available information from clinicians and experts. Recommendations on the prevention of contamination of healthcare workers, the choice of staff involved in airway management, the training required and the selection of equipment are discussed. The fundamental principles of airway management in these settings are described for: emergency tracheal intubation; predicted or unexpected difficult tracheal intubation; cardiac arrest; anaesthetic care; and tracheal extubation. We provide figures to support clinicians in safe airway management of patients with COVID-19. The advice in this document is designed to be adapted in line with local workplace policies.

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1. **Continuous Positive Airway Pressure (CPAP) face-mask ventilation is an easy and cheap option to manage a massive influx of patients presenting acute respiratory failure during the SARS-CoV-2 outbreak: A retrospective cohort study.**  
   Alviset Sophie PloS one 2020;15(10):e0240645.

INTRODUCTIONBecause of the COVID-19 pandemic, intensive care units (ICU) can be overwhelmed by the number of hypoxemic patients.MATERIAL AND METHODSThis single centre retrospective observational cohort study took place in a French hospital where the number of patients exceeded the ICU capacity despite an increase from 18 to 32 beds. Because of this, 59 (37%) of the 159 patients requiring ICU care were referred to other hospitals. From 27th March to 23rd April, consecutive patients who had respiratory failure or were unable to maintain an SpO2 > 90%, despite receiving 10-15 l/min of oxygen with a non-rebreather mask, were treated by continuous positive airway pressure (CPAP) unless the ICU physician judged that immediate intubation was indicated. We describe the characteristics, clinical course, and outcomes of these patients. The main outcome under study was CPAP discontinuation.RESULTSCPAP was initiated in 49 patients and performed out of ICU in 41 (84%). Median age was 65 years (IQR = 54-71) and 36 (73%) were men. Median respiratory rate before CPAP was 36 (30-40) and median SpO2 was 92% (90-95) under 10 to 15 L/min oxygen flow. Median duration of CPAP was 3 days (IQR = 1-5). Reasons for discontinuation of CPAP were: intubation in 25 (51%), improvement in 16 (33%), poor tolerance in 6 (12%) and death in 2 (4%) patients. A decision not to intubate had been taken for 8 patients, including the 2 who died while on CPAP. Two patients underwent less than one hour CPAP for poor tolerance. In the end, 15 (38%) out of 39 evaluable patients recovered with only CPAP whereas 24 (62%) were intubated.CONCLUSIONSCPAP is feasible in a non-ICU environment in the context of massive influx of patients. In our cohort up to 1/3 of the patients presenting with acute respiratory failure recovered without intubation.

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1. **Continuous positive airway pressure to avoid intubation in SARS-CoV-2 pneumonia: A two-period retrospective case-control study**  
   Oranger M. European Respiratory Journal 2020;56(2):No page numbers.

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1. **COVID-19 and lockdown: living in 'interesting times'.**  
   Webb Rachel Journal of wound care 2020;29(5):243.

1. **COVID-19 challenge for modern medicine.**  
   Dzieciatkowski Tomasz Cardiology journal 2020;27(2):175-183.

Coronaviruses cause disease in animals and people around the world. Human coronaviruses (HCoV) are mainly known to cause infections of the upper and lower respiratory tract but the symptoms may also involve the nervous and digestive systems. Since the beginning of December 2019, there has been an epidemic of SARS-CoV-2, which was originally referred to as 2019-nCoV. The most common symptoms are fever and cough, fatigue, sputum production, dyspnea, myalgia, arthralgia or sore throat, headache, nausea, vomiting or diarrhea (30%). The best prevention is to avoid exposure. In addition, contact per-sons should be subjected to mandatory quarantine. COVID-19 patients should be treated in specialist centers. A significant number of patients with pneumonia require passive oxygen therapy. Non-invasive ventilation and high-flow nasal oxygen therapy can be applied in mild and moderate non-hypercapnia cases. A lung-saving ventilation strategy must be implemented in acute respiratory distress syndrome and mechanically ventilated patients. Extracorporeal membrane oxygenation is a highly specialized method, available only in selected centers and not applicable to a significant number of cases. Specific pharmacological treatment for COVID-19 is not currently available. Modern medicine is gearing up to fight the new coronavirus pandemic. The key is a holistic approach to the patient including, primar-ily, the use of personal protective equipment to reduce the risk of further virus transmission, as well as patient management, which consists in both quarantine and, in the absence of specific pharmacological therapy, symptomatic treatment.

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1. **COVID-19 deaths can be reduced - simply and safely!**  
   Ylikoski Jukka Medical gas research 2020;10(3):139.

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1. **COVID-19, acute respiratory distress syndrome (ARDS), and hyperbaric oxygen therapy (HBOT): what is the link?**  
   De Maio A. Cell stress & chaperones 2020;25(5):717-720.

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1. **CPAP Added to Oxygen Administration Avoid Intubation in Acute Respiratory Distress in COVID-19 Pneumonia. Case Report**  
   Mwenge G.B. SN Comprehensive Clinical Medicine 2020;2(7):882-885.

It was recently described that COVID-19 pneumonia patients had an atypical form of the ARDS syndrome and required gentle ventilation. We report here on benefits of CPAP treatment in a patient with COVID-19 pneumonia. A 63-year-old patient of African origin presented to the emergency room with COVID-19 pneumonia. Fever had started 5 days before her admission. On day 4, rapid clinical deterioration associated to a high respiratory rate and increased oxygen requirements was noted. The patient was working in an intensive care unit and refused to be intubated. Oxygen was administered at a rate of 15 litres per minute via a Boussignac valve, which initially restored normal oxygen saturation, but this treatment was poorly tolerated and the patient withdrew it after 2 h. A CPAP set at a pressure of 8 cm of water (Goodknight) was then introduced with better tolerance, allowing the patient to wear it almost continuously for more than 38 h. The patient also benefited from the administration of methypredinsolone 40 mg. Concerning tolerance, a substantial advantage was noted for CPAP machine compared to the Boussignac valve with in addition, a clear decrease in respiratory rate. We would like to encourage the use of CPAP, better tolerated for extended hours with lower oxygen flows, in patients with COVID-19 pneumonia, where acute respiratory distress all too often leads to patient intubation and the genesis of deleterious lung lesions.<br/>Copyright &#xa9; 2020, Springer Nature Switzerland AG.

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1. **Delivering extracorporeal membrane oxygenation for patients with COVID-19: what, who, when and how?**  
   Zochios V. Anaesthesia 2020;75(8):997-1001.

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1. **Diving and hyperbaric medicine in the SARS-CoV-2 pandemic**  
   Mitchell S.J. Diving and hyperbaric medicine 2020;50(2):90-91.

1. **Effect of flow and cannula size on generated pressure during nasal high flow.**  
   Pinkham Maximilian Critical care (London, England) 2020;24(1):248.

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1. **Environmental contamination in the isolation rooms of COVID-19 patients with severe pneumonia requiring mechanical ventilation or high-flow oxygen therapy.**  
   Ahn J. Y The Journal of hospital infection 2020;106(3):570-576.

BACKGROUNDIdentifying the extent of environmental contamination of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is essential for infection control and prevention. The extent of environmental contamination has not been fully investigated in the context of severe coronavirus disease (COVID-19) patients.AIMTo investigate environmental SARS-CoV-2 contamination in the isolation rooms of severe COVID-19 patients requiring mechanical ventilation or high-flow oxygen therapy.METHODSEnvironmental swab samples and air samples were collected from the isolation rooms of three COVID-19 patients with severe pneumonia. Patients 1 and 2 received mechanical ventilation with a closed suction system, while patient 3 received high-flow oxygen therapy and non-invasive ventilation. Real-time reverse transcription-polymerase chain reaction (rRT-PCR) was used to detect SARS-CoV-2; viral cultures were performed for samples not negative on rRT-PCR.FINDINGSOf the 48 swab samples collected in the rooms of patients 1 and 2, only samples from the outside surfaces of the endotracheal tubes tested positive for SARS-CoV-2 by rRT-PCR. However, in patient 3's room, 13 of the 28 environmental samples (fomites, fixed structures, and ventilation exit on the ceiling) showed positive results. Air samples were negative for SARS-CoV-2. Viable viruses were identified on the surface of the endotracheal tube of patient 1 and seven sites in patient 3's room.CONCLUSIONEnvironmental contamination of SARS-CoV-2 may be a route of viral transmission. However, it might be minimized when patients receive mechanical ventilation with a closed suction system. These findings can provide evidence for guidelines for the safe use of personal protective equipment.

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1. **Evidence based management guideline for the COVID-19 pandemic - Review article.**  
   Nicola Maria International journal of surgery (London, England) 2020;77:206-216.

COVID-19 has now been declared a pandemic. To date, COVID-19 has affected over 2.5 million people worldwide, resulting in over 170,000 reported deaths. Numerous preventative strategies and non-pharmaceutical interventions have been employed to mitigate the spread of disease including careful infection control, the isolation of patients, and social distancing. Management is predominantly focused on the provision of supportive care, with oxygen therapy representing the major treatment intervention. Medical therapy involving corticosteroids and antivirals have also been encouraged as part of critical management schemes. However, there is at present no specific antiviral recommended for the treatment of COVID-19, and no vaccine is currently available. Despite the strategic implementation of these measures, the number of new reported cases continues to rise at a profoundly alarming rate. As new findings emerge, there is an urgent need for up-to-date management guidelines. In response to this call, we review what is currently known regarding the management of COVID-19, and offer an evidence-based review of current practice.

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1. **Evolving oxygenation management reasoning in COVID-19.**  
   Liu Steven Diagnosis (Berlin, Germany) 2020;7(4):381-383.

The initial phase of the SARS-CoV-2 pandemic in the United States saw rapidly-rising patient volumes along with shortages in personnel, equipment, and intensive care unit (ICU) beds across many New York City hospitals. As our hospital wards quickly filled with unstable, hypoxemic patients, our hospitalist group was forced to fundamentally rethink the way we triaged and managed cases of hypoxemic respiratory failure. Here, we describe the oxygenation protocol we developed and implemented in response to changing norms for acuity on inpatient wards. By reflecting on lessons learned, we re-evaluate the applicability of these oxygenation strategies in the evolving pandemic. We hope to impart to other providers the insights we gained with the challenges of management reasoning in COVID-19.

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1. **Extracorporeal membrane oxygenation and COVID-19: The causes of failure.**  
   Ahmadi Zargham Hossein Journal of cardiac surgery 2020;35(10):2838-2843.

INTRODUCTIONVenovenous extracorporeal membrane oxygenation (VV-ECMO) is a therapeutic strategy for the coronavirus disease 2019 (COVID-19) induced acute respiratory distress syndrome (ARDS). There are inconclusive data in this regard and causes of VV-ECMO failure are not yet understood well.CASE SERIESHere, seven patients with COVID-19-induced ARDS who underwent VV-ECMO introduced and causes of VV-ECMO failure discussed. Medical records of seven COVID-19 patients treated with VV-ECMO were retrospectively evaluated to determine the clinical outcomes of VV-ECMO. Oxygenator failure occurred in four patients whom needed to oxygenator replacement. Successful VV-ECMO decannulation was done in three patients, however finally one patient survived.CONCLUSIONSHypercoagulability state and oxygenator failure were the most main etiologies for VV-ECMO failure in our study. All patients with COVID-19 undergoing VV-ECMO should be monitored for such problems and highly specialized healthcare team should monitor the patients during VV-ECMO.

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1. **EXTRACORPOREAL MEMBRANE OXYGENATION AS RESCUE THERAPY FOR COVID-19 INDUCED HYPOXIA: SINGLE-CENTER STUDY**  
   Alnababteh M. Chest 2020;158(4):No page numbers.

SESSION TITLE: Late-breaking Abstract Posters SESSION TYPE: Original Investigation Posters PRESENTED ON: October 18-21, 2020 PURPOSE: To examine COVID-19 patients requiring invasive mechanical ventilation (MV) and/or Extracorporeal Membrane Oxygenation (ECMO) to better understand patient selection for ECMO, clinical management, and short-term outcomes. <br/>METHOD(S): Retrospective study of patients &gt;18-years-old admitted to the hospital with COVID-19 requiring MV. Lung-protective ventilation was used in all patients with initial set PEEP of 8-10 cm H20 for plateau pressure &lt;30 cm H20. ECMO was considered per pre-specified institutional criteria for refractory hypoxemia despite maximum-medical therapy, in qualifying patients. Exclusion criteria for ECMO included age &gt;65 years, multi-system organ failure, and MV &gt;10 d. Data captured included baseline patient characteristics, co-morbidities, pre-ECMO respiratory support, ECMO settings, laboratory results, and COVID-19 therapeutic interventions. <br/>RESULT(S): We analyzed 59 patients who required invasive MV, including 13 who met criteria for ECMO. There were no between-group differences in gender, BMI, or co-morbidities. More ECMO patients received Tocilizumab (p=.003), but steroid use was similar (p=.44). Nine ECMO (69.2%) patients were decannulated. Crude ICU mortality was comparable between the ECMO and MV groups (6/13 [46.15%] vs. 22/46 patients [47.82%]; p=0.92). Higher pre-ECMO D-dimer (9.740 [4.84-20.00] mcg/mL vs. 3.800 [2.19-9.11] mcg/mL; p=0.05), LDH (1158 +/-344.5 units/L vs. 575.9 +/-124.0 units/L; p=0.001), and troponin (0.4315 +/-0.465 ng/mL vs. 0.034 +/-0.043 ng/mL; p=0.04) were associated with mortality. Time on MV was significantly longer in the ECMO group (563.3 [422.1-613.9] h vs. 247.9 [101.8-479] h in MV; p&lt;.001) as well as ICU length of stay (LOS) (576.2 [457.5-652.8] h in ECMO vs. 322.2 [120.6-569.3] h in MV; p=0.01). <br/>CONCLUSION(S): ECMO was associated with prolonged MV and extended ICU LOS. Markers of coagulation, inflammation and cardiac injury were elevated in ECMO patients who did not survive. CLINICAL IMPLICATIONS: ECMO is a potentially effective rescue therapy for COVID-19 associated pneumonia. DISCLOSURES: No relevant relationships by Muhtadi Alnababteh, source=Web Response No relevant relationships by Rajus Chopra, source=Web Response Speaker/Speaker's Bureau relationship with Boehringer Ingelheim Please note: $5001 - $20000 Added 07/01/2020 by Gail Drescher, source=Web Response, value=Consulting fee Technical Editor Resp Care Journal relationship with American Association for Respiratory Care Please note: $1001 - $5000 Added 07/01/2020 by Gail Drescher, source=Web Response, value=Salary No relevant relationships by Muhammad Hashmi, source=Web Response No relevant relationships by Fatima Hayat, source=Web Response No relevant relationships by Akshay Kohli, source=Web Response No relevant relationships by Emil Oweis, source=Web Response No relevant relationships by Karthik Vedantam, source=Web Response No relevant relationships by Akram Zaaqoq, source=Web Response<br/>Copyright &#xa9; 2020 American College of Chest Physicians

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1. **Extracorporeal Membrane Oxygenation for Coronavirus Disease 2019-Induced Acute Respiratory Distress Syndrome: A Multicenter Descriptive Study\***  
   Yang X. Critical Care Medicine 2020;:1289-1295.

Objectives: Severe acute respiratory distress syndrome is complicated with coronavirus disease 2019 and extracorporeal membrane oxygenation support may be necessary in severe cases. This study is to summarize the clinical features, extracorporeal membrane oxygenation characteristics, and outcomes of patients with severe acute respiratory syndrome coronavirus 2 pneumonia received extracorporeal membrane oxygenation. <br/>Design(s): Descriptive study from two hospitals. <br/>Setting(s): The ICUs from university hospitals. <br/>Patient(s): Patients with severe acute respiratory syndrome coronavirus 2 pneumonia received mechanical ventilation, including those underwent extracorporeal membrane oxygenation from Zhongnan Hospital of Wuhan University and Wuhan Pulmonary Hospital from January 8, 2020, to March 31, 2020. <br/>Intervention(s): None. <br/>Measurements and Main Results: Clinical records, laboratory results, ventilator parameters, and extracorporeal membrane oxygenation-related data were abstracted from the medical records. One-hundred twenty-nine critically ill patients with severe acute respiratory syndrome coronavirus 2 pneumonia were admitted to ICU of the two referral hospitals. Fifty-nine patients received mechanical ventilation and 21 of them received extracorporeal membrane oxygenation support (fourteen from Zhongnan hospital and seven from Wuhan pulmonary hospital). Compared to mechanical ventilation patients without extracorporeal membrane oxygenation support, there was a tendency of decline in mortality but with no significant difference (no-extracorporeal membrane oxygenation group 24/38 [63.2%] vs extracorporeal membrane oxygenation group 12/21 [57.1%]; p = 0.782). For those patients with extracorporeal membrane oxygenation, 12 patients died and nine survived by April 7, 2020. Among extracorporeal membrane oxygenation patients, the Paco<sup>2</sup>prior to extracorporeal membrane oxygenation was lower (54.40 mm Hg [29.20-57.50 mm Hg] vs 63.20 mm Hg [55.40-72.12 mm Hg]; p = 0.006), and pH prior to extracorporeal membrane oxygenation was higher (7.38 [7.28-7.48] vs 7.23 [7.16-7.33]; p = 0.023) in survivors than nonsurvivors. <br/>Conclusion(s): Extracorporeal membrane oxygenation might be an effective salvage treatment for patients with severe acute respiratory syndrome coronavirus 2 pneumonia associated with severe acute respiratory distress syndrome. Severe Co<sup>2</sup>retention and acidosis prior to extracorporeal membrane oxygenation indicated a poor prognosis.<br/>Copyright &#xa9; 2020 Lippincott Williams and Wilkins. All rights reserved.

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1. **Fracaso de la ventilacion no invasiva tras empleo de oxigenoterapia de alto flujo en pacientes con neumonia por SARS-CoV-2Failure of non-invasive ventilation after use of high-flow oxygen therapy in patients with SARS-Coronavirus-2 pneumonia**  
   Belenguer-Muncharaz A. Medicina Intensiva 2020;:No page numbers.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=d8fefe93a5c2f9966a0ca76144924641)

1. **HBO2 for COVID-19: Clinical trials at clinicaltrials.gov**  
   anonymous Undersea & hyperbaric medicine : journal of the Undersea and Hyperbaric Medical Society, Inc 2020;47(2):299-307.

1. **Helmet CPAP revisited in COVID-19 pneumonia: A case series**  
   Rali A.S. Canadian Journal of Respiratory Therapy 2020;56:32-34.

Introduction: Noninvasive positive pressure ventilation (NIPPV) plays an important role in the management of respiratory failure. However, since the emergence of the COVID-19 pandemic, utilization of traditional face mask NIPPV has been curtailed in part due to risk of aerosolization of respiratory particles and subsequent health care worker exposure. A randomized clinical trial in 2016 reported that an alternative interface, helmet NIPPV, may be more effective than traditional NIPPV at preventing intubation and improving mortality. The helmet NIPPV interface provides positive airway pressure, while also theoretically minimizing aerosolization, making it a feasible modality in management of respiratory failure in COVID-19 patients. Case and outcomes: This report describes a single-center experience of a series of three COVID-19 patients with hypoxemic respiratory failure managed with helmet NIPPV. One patient was able to avoid intubation while a second patient was successfully extubated to NIPPV. Ultimately, the third patient was unable to avoid intubation with helmet NIPPV, although the application of the device was late in the progression of the disease. <br/>Discussion(s): NIPPV is an important modality in the management of respiratory failure and has been shown to reduce the need for immediate endotracheal intubation in select populations. For patients unable to tolerate facemask NIPPV, the helmet provides an alternate interface. In COVID-19 patients, the helmet interface may reduce the risk of virus exposure to health care workers from aerosolization. Based on this experience, we recommend that helmet NIPPV can be considered as a feasible option for the management of patients with COVID-19, whether the goal is to prevent immediate intubation or avoid post-extubation respiratory failure. Randomized studies are needed to definitively validate the use of helmet NIPPV in this population. <br/>Conclusion(s): Helmet NIPPV is a feasible therapy to manage COVID-19 patients.<br/>Copyright &#xa9; 2020 AME Publishing Company. All rights reserved.

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1. **Helmet CPAP treatment in patients with COVID-19 pneumonia: a multicentre cohort study**  
   anonymous European Respiratory Journal 2020;56(4):No page numbers.

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1. **High flow nasal cannula in COVID-19: a literature review.**  
   Gürün Kaya Aslıhan Tuberkuloz ve toraks 2020;68(2):168-174.

In recent years, high flow nasal cannula (HFNC) is a respiratory support system that has become prominent in the treatment of respiratory failure. HFNC provides higher concentration and flow of oxygen, resulting in decreasing anatomic dead space by preventing rebreathing and ensure positive end-expiratory. However, in COVID-19, the usage of HFNC is much controversial due to concerns about the benefits and risk of aerosol-dispersion. Considering the debates about the use of HFNC, we reviewed the literature related to the usage of HFNC in COVID-19. The available reports suggest that HFNC provides high concentrations of oxygen to the patients, who can not reach with conventional devices. HFNC can reduce the requiring of intubation in patients with COVID-19, and it can decrease the length of intensive care unit stay, and complications related to mechanical ventilation. Also HFNC can in achieving apneic oxygenation in patients during airway management. Besides that, the use of high-flow oxygen cannulas can produce aerosols. So, HFNC treatment should be carried out in a negative pressure room; when it is not possible, devices should be undertaken in a single room.

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1. **High flow nasal cannula oxygen therapy in adults with COVID-19 respiratory failure. A case report**  
   Karamouzos V. Monaldi archives for chest disease = Archivio Monaldi per le malattie del torace 2020;90(2):No page numbers.

The novel corona virus (SARS-CoV-2) continuous to spread around the globe causing high mortality, tremendous stress on healthcare systems and an unprecedented disruption of everyday life with unpredictable socioeconomic ramifications. The diseaseis typically affecting the respiratory system and some patients will develop refractory hypoxemic respiratory insufficiency requiring mechanical ventilation. The role of non-invasive ventilation (NIV), high flow nasal cannula (HFNC) or continuous positive airway pressure devices (C-PAP) in the treatment of the 2019 corona virus disease (COVID-19) is not yet clear. We hereby report a case of a 44-year-old COVID-19 positive male patient suffering from hypoxic respiratory failure that was successfully treated with high flow nasal cannula oxygen therapy in a negative pressure intensive care room. Although specific criteria for the use of high flow nasal canula devices COVID-19 are not available at this time, clinicians could use this non-invasive modality as analternative method of respiratory support in selected patients presenting with respiratory failure.

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1. **High flow nasal cannula oxygen therapy in COVID-19 associated severe acute respiratory distress. A single center experience**  
   Simioli F. Minerva Pneumologica 2020;59(2):24-26.

BACKGROUND: High flow nasal cannula (HFNC) showed better oxygenation than standard oxygen therapy delivered through a face mask in acute respiratory failure for all causes. HFNC may offer an alternative in patients with acute hypoxemia and potentially reduce mortality. It was widely applied in China during the COVID-19 emergency. However, no data have been published about settings and protocols. The purpose of this paper was to report a single center experience on effectiveness and safety of HFNC in weaning of COVID-19 associated respiratory failure. <br/>METHOD(S): We retrospectively analyzed patient records from Sub-intensive Care Unit (Cotugno Hospital, Naples, Italy). Four patients (3F; age: 60+/-9.23 years; BMI: 27.5+/-5.2) were de-escalated from ventilation (3 Helmet CPAP, 1 invasive mechanical ventilation) to HFNC oxygen therapy. All patients were admitted for severe acute respiratory failure and pneumonia due to SARS-COV-2 (PaO<sub>2</sub>/Fio<sub>2</sub> at baseline: 104+/-42.3 mmHg) and showed a typical progressive stage at chest imaging. Weaning was initiated following a stable period of ventilation (PaO<sub>2</sub>/Fio<sub>2</sub> in last days of first respiratory support: 377+/-60.2 mmHg). HFNC was set on 34 degreeC, with flow ranging from 50 to 60 L/min and FiO<sub>2</sub> from 40 to 60%. <br/>RESULT(S): Right after initiation of HFNC (day 1), the mean PaO<sub>2</sub>/Fio<sub>2</sub> was 238 mmHg (+/-65), without clinical signs of respiratory distress. No difference was observed on lactate. After 3 days of therapy mean PaO<sub>2</sub>/Fio<sub>2</sub> increased to 377 mmHg (+/-106.3). All patients recovered from respiratory failure (PaO<sub>2</sub>&gt;60 mmHg in room air) after 7 days (+/-3.2). <br/>CONCLUSION(S): HFNC might be helpful in weaning severe respiratory distress. Clinical effectiveness and comfort should be assessed within 3 days. The correct timing should be ruled by PaO<sub>2</sub>/Fio<sub>2</sub> during ventilation and clinical signs of distress. Further evidence is required for firm conclusions.<br/>Copyright &#xa9; 2020 EDIZIONI MINERVA MEDICA

1. **High flow oxygen therapy in the ICU-a secondary care center experience**  
   Passos R. Intensive Care Medicine Experimental 2020;8:No page numbers.

Introduction: High-flow oxygen therapy via nasal canula (HFNC) is a technique that delivers heated and humidified oxygen through short nasal prongs at high flow rates. Its great tolerability and positive results of its use in pneumonia, immunocompromised patients and ventilatory weaning have highlighted it as a first-line option for some of these conditions. Recent data show that it's the only non-invasive ventilatory technique that doesn't increase death space during ventilatory support, allowing for continuous air renewal, minimizing the risk of hypercapnia. HNFC allows to oxygenate critical patients with isolated hypoxemia, preventing intubation alllowing the lung to heal. It is the only device that oxygenates critical patients without compromising communication or feeding. It's benefical effect on the epithelial lining makes it an option even in chronic obstructive respiratory disease. Our study illustrates a 14 months experience in a secondary care center, since HNFC acquisition. The team based their strategies on the local protocol that relied on starting with maximum temperature, O2 Flow and FiO2, and decrease support after 2 hours. <br/>Method(s): We performed a retrospective study with a descriptive analysis of HFNC's application in our Secoundary Care Center Intensive Care Unit (ICU), from February 2019 through June 2020. <br/>Result(s): In 14 months a total of 33 patients were treated with HNFC. The mean age was 63.5 years and 63.6% of the patients were male. The average duration of HNFC was 2 days. The major condition for its use was acute respiratory failure (72.7%). In 18.2% it was used for ventilatory weaning. In 3 cases it was applied in patients with a do-notintubate order. The most common diagnosis was community acquired pneumonia (54.2%). HNFC was successful in 51.5% of the cases, with pneumonia being the most common successful condition (58.8% of the successful cases). In the cases of failure, 25% had COVID-19 pneumonia, and 31.3% presented with associated multiorgan disfunction. 50% needed invasive mechanical ventilation, while 25% proceeded successfully with non-invasive ventilation (NIV) with positive pressure. When HNFC was used for ventilatory weaning, 66.7% had a successful outcome. <br/>Conclusion(s): Literature on HFNC includes an heterogenous group of patients with diverse clinical diagnosis. It is increasingly applied in adults with hypoxemic respiratory failure with diverse etiologies. As observed in our report, diverse studies present pneumonia as the most common cause of respiratory failure in patients selected for HFNC. Some studies assessed the need of intubation after a HFNC trial and found that only 30% required intubation after failure of HFNC. In our study the 'failure rate' was approximately 48.5%. HNFC delayed use in patients with advanced stage disease and multiorgan disfunction might explain these results. The development of studies to determine which group of patients benefit the most from HFNC is imperative. The 25% patients with HFNC failure that progressed successfully to NIV raise the question whether they had a limitation for the technique that was not initially identified by the physician. The possibility of avoiding intubation in patients with severe hypoxemia worths the trial, even in cases with uncertain predicted responsiveness. It is fundamental to watch closely the evolution of these patients because, besides its benefits, HNFC shall not delay intubation when it is needed. 03. AIDS, hematologic-oncologic issues in the ICU &gt; AIDS, hematologic-oncologic issues in the ICU.

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1. **High-flow nasal cannula oxygen therapy to treat patients with hypoxemic acute respiratory failure consequent to SARS-CoV-2 infection.**  
   Vianello Andrea Thorax 2020;75(11):998-1000.

This observational study aims to assess the outcome and safety of O2-therapy by high-flow nasal cannula (HFNC) in 28 consecutive patients with severe hypoxemic acute respiratory failure (hARF) consequent to SARS-CoV-2 infection, unresponsive to conventional O2-therapy. Nineteen patients had a positive response. Nine patients required escalation of treatment to non-invasive ventilation (five subsequently intubated). None of the staff had a positive swab testing during the study period and the following 14 days. Severity of hypoxemia and C reactive protein level were correlated with HFNC failure. These data suggest HFNC to be a safe treatment for less severe patients with SARS-CoV-2 hARF and efficacy will need to be assessed as part of a clinical trial.

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1. **High-flow nasal oxygen: a safe, efficient treatment for COVID-19 patients not in an ICU.**  
   Guy Tiphaine The European respiratory journal 2020;56(5):No page numbers.

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1. **High-Flow, Noninvasive Ventilation and Awake (Nonintubation) Proning in Patients With Coronavirus Disease 2019 With Respiratory Failure.**  
   Raoof Suhail Chest 2020;158(5):1992-2002.

The coronavirus disease 2019 pandemic will be remembered for the rapidity with which it spread, the morbidity and mortality associated with it, and the paucity of evidence-based management guidelines. One of the major concerns of hospitals was to limit spread of infection to health-care workers. Because the virus is spread mainly by respiratory droplets and aerosolized particles, procedures that may potentially disperse viral particles, the so-called "aerosol-generating procedures" were avoided whenever possible. Included in this category were noninvasive ventilation (NIV), high-flow nasal cannula (HFNC), and awake (nonintubated) proning. Accordingly, at many health-care facilities, patients who had increasing oxygen requirements were emergently intubated and mechanically ventilated to avoid exposure to aerosol-generating procedures. With experience, physicians realized that mortality of invasively ventilated patients was high and it was not easy to extubate many of these patients. This raised the concern that HFNC and NIV were being underutilized to avoid intubation and to facilitate extubation. In this article, we attempt to separate fact from fiction and perception from reality pertaining to the aerosol dispersion with NIV, HFNC, and awake proning. We describe precautions that hospitals and health-care providers must take to mitigate risks with these devices. Finally, we take a practical approach in describing how we use the three techniques, including the common indications, contraindications, and practical aspects of application.

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1. **Hyperbaric oxygen as a treatment for COVID-19 infection?**  
   Moon R.D. Undersea & hyperbaric medicine : journal of the Undersea and Hyperbaric Medical Society, Inc 2020;47(2):177-179.

Recently the internet has been abuzz with new ideas to treat COVID-19, including hyperbaric oxygen (HBO2) therapy, undoubtedly driven by the fact that until recently there have been few therapeutic options for this highly contagious and often lethal infection. . . . Refractory hypoxemia is certainly treatable with hyperbaric oxygen due to the obvious effect of increasing inspired oxygen partial pressure (PO2), the major reason for using HBO2 for its established indications. However, the length of time during which patients can safely be administered HBO2 inside a chamber is limited, due to practical issues of confinement and isolation from other necessary medical interventions, but also because of oxygen toxicity.<br/>Copyright&#xa9; Undersea and Hyperbaric Medical Society.

1. **Hyperbaric oxygen therapy for COVID-19 patients with respiratory distress: treated cases versus propensity-matched controls**  
   Gorenstein S.A. Undersea & hyperbaric medicine : journal of the Undersea and Hyperbaric Medical Society, Inc 2020;47(3):405-413.

Objective: Given the high mortality and prolonged duration of mechanical ventilation of COVID-19 patients, we evaluated the safety and efficacy of hyperbaric oxygen for COVID-19 patients with respiratory distress. <br/>Method(s): This is a single-center clinical trial of COVID-19 patients at NYU Winthrop Hospital from March 31 to April 28, 2020. Patients in this trial received hyperbaric oxygen therapy at 2.0 atmospheres of pressure in monoplace hyperbaric chambers for 90 minutes daily for a maximum of five total treatments. Controls were identified using propensity score matching among COVID-19 patients admitted during the same time period. Using competing-risks survival regression, we analyzed our primary outcome of inpatient mortality and secondary outcome of mechanical ventilation. <br/>Result(s): We treated 20 COVID-19 patients with hyperbaric oxygen. Ages ranged from 30 to 79 years with an oxygen requirement ranging from 2 to 15 liters on hospital days 0 to 14. Of these 20 patients, two (10%) were intubated and died, and none remain hospitalized. Among 60 propensity-matched controls based on age, sex, body mass index, coronary artery disease, troponin, D-dimer, hospital day, and oxygen requirement, 18 (30%) were intubated, 13 (22%) have died, and three (5%) remain hospitalized (with one still requiring mechanical ventilation). Assuming no further deaths among controls, we estimate that the adjusted subdistribution hazard ratios were 0.37 for inpatient mortality (p=0.14) and 0.26 for mechanical ventilation (p=0.046). <br/>Conclusion(s): Though limited by its study design, our results demonstrate the safety of hyperbaric oxygen among COVID-19 patients and strongly suggests the need for a well-designed, multicenter randomized control trial.<br/>Copyright&#xa9; Undersea and Hyperbaric Medical Society.

1. **Hyperbaric oxygen therapy in preventing mechanical ventilation in COVID-19 patients: a retrospective case series.**  
   Thibodeaux Kerry Journal of wound care 2020;29:S4.

OBJECTIVEA pandemic afflicts the entire world. The highly contagious SARS-CoV-2 virus originated in Wuhan, China in late 2019 and rapidly spread across the entire globe. According to the World Health Organization (WHO), the novel Coronavirus (COVID-19)has infected more than two million people worldwide, causing over 160,000 deaths. Patients with COVID-19 disease present with a wide array of symptoms, ranging from mild flu-like complaints to life threatening pulmonary and cardiac complications. Older people and patients with underlying disease have an increased risk of developing severe acute respiratory syndrome (SARS) requiring mechanical ventilation. Once intubated, mortality increases exponentially. A number of pharmacologic regimens, including hydroxychloroquine-azithromycin, antiviral therapy (eg, remdesevir), and anti-IL-6 agents (e.g., toclizumab), have been highlighted by investigators over the course of the pandemic, based on the therapy's potential to interrupt the viral life-cycle of SARS-CoV-2 or preventing cytokine storm. At present, there have been no conclusive series of reproducible randomised clinical trials demonstrating the efficacy of any one drug or therapy for COVID-19.CASESCOVID-19 positive patients (n=5) at a single institution received hyperbaric oxygen therapy (HBOT) between 13 and 20 April 2020. All the patients had tachypnoea and low oxygen saturation despite receiving high FiO2. HBOT was added to prevent the need for mechanical ventilation. A standard dive profile of 2.0ATA for 90 minutes was employed. Patients received between one and six treatments in one of two dedicated monoplace hyperbaric chambers.RESULTSAll the patients recovered without the need for mechanical ventilation. Following HBOT, oxygen saturation increased, tachypnoea resolved and inflammatory markers fell. At the time of writing, three of the five patients have been discharged from the hospital and two remain in stable condition.CONCLUSIONThis small sample of patients exhibited dramatic improvement with HBOT. Most importantly, HBOT potentially prevented the need for mechanical ventilation. Larger studies are likely to define the role of HBOT in the treatment of this novel disease.

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1. **Hyperbaric oxygen therapy may be effective to improve hypoxemia in patients with severe COVID-2019 pneumonia: two case reports**  
   Guo D. Undersea & hyperbaric medicine : journal of the Undersea and Hyperbaric Medical Society, Inc 2020;47(2):181-187.

Objectives: To determine whether hyperbaric oxygen (HBO2) therapy be effective to improve hypoxemia for severe COVID-19 pneumonia patients. <br/>Method(s): Two male patients ages 57 and 64 years old were treated. Each met at least one of the following criteria: shortness of breath; respiratory rate (RR) &gt;=30 breaths/minute; finger pulse oxygen saturation (SpO2) &lt;=93% at rest; and oxygen index (P/F ratio: PaO2/FiO2 &lt;=300 mmHg). Each case excluded any combination with pneumothorax, pulmonary bullae or other absolute contraindications to HBO2. Patients were treated with 1.5 atmospheres absolute HBO2 with an oxygen concentration of more than 95% for 60 minutes per treatment, once a day for one week. Patients' self-reported symptoms, daily mean SpO2 (SO2), arterial blood gas analysis, D-dimer, lymphocyte, cholinesterase (che) and chest CT were conducted and measured. <br/>Result(s): For both patients, dyspnea and shortness of breath were immediately alleviated after the first HBO2 treatment and remarkably relieved after seven days of HBO2 therapy. The RR also decreased daily. Neither patient became critically ill. The decreasing trend of SO2 and P/F ratio was immediately reversed and increased day by day. The lymphocyte count and ratio corresponding to immune function gradually recovered. D-dimer corresponding to peripheral circulation disorders and serum cholinesterase, reflecting liver function had improved. Follow-up chest CT showed that the pulmonary inflammation had clearly subsided. <br/>Conclusion(s): Our preliminary uncontrolled case reports suggest that HBO2 therapy may promptly improve the progressive hypoxemia of patients with COVID-2019 pneumonia. However, the limited sample size and study design preclude a definitive statement about the potential effectiveness of HBO2 therapy to COVID-2019 pneumonia. It requires evaluation in randomized clinical trials in future.<br/>Copyright&#xa9; Undersea and Hyperbaric Medical Society.

1. **Hyperbaric oxygen treatment of novel coronavirus (COVID-19) respiratory failure**  
   Harch P. Medical Gas Research 2020;10(2):61-62.

Harch Paul 1 Department of Medicine, Section of Emergency and Hyperbaric Medicine, Louisiana State University Health Sciences Center, New Orleans, LA Zhong X, Tao X, Tang Y, Chen R. The outcomes of hyperbaric oxygen therapy to retrieve hypoxemia of severe novel coronavirus pneumonia: first case report. Zhonghua Hanghai Yixue yu Gaoqiya Yixue Zazhi. 2020. doi: 10.3760/cma.j.issn.1009-6906.2020.0001 Zhong XL, Niu XQ, Tao XL, Chen RY, Liang Y, Tang YC. The first case of HBOT in critically ill endotracheal intubation patient with COVID-19. Beijing, China: Novel Coronavirus Pneumonia Research Network Sharing Platform of China Association for Science and Technology. 2020 Jain KK. Textbook of Hyperbaric Medicine. 6th ed. Cham, Switzerland: Springer. 2017 Rogatsky GG, Shifrin EG, Mayevsky A. Acute respiratory distress syndrome in patients after blunt thoracic trauma: the influence of hyperbaric oxygen therapy. Adv Exp Med Biol. 2003;540:77-85 Sellers LM. The fallibility of the forrestian principle. 'semper primus pervenio maxima cum VI' Laryngoscope. 1964;74:613-633.<br/>Copyright &#xa9; 2020 BMJ Publishing Group. All rights reserved.

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1. **Implementation of a non-invasive oxygenation support strategy during the COVID-19 pandemic in an ephemeral Respiratory Intermediate Care Unit.**  
   Guenancia Tsipora N. Anaesthesia, critical care & pain medicine 2020;39(4):459-460.

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1. **Increased physiological dead space in mechanically ventilated COVID-19 patients recovering from severe acute respiratory distress syndrome: a case report.**  
   Xia Jingen BMC infectious diseases 2020;20(1):637.

BACKGROUNDAn ongoing outbreak of coronavirus disease 2019 (COVID-19) is spreading globally. Recently, several articles have mentioned that the early acute respiratory distress syndrome (ARDS) caused by COVID-19 significantly differ from those of ARDS due to other causes. Actually, we newly observed that some mechanically ventilated COVID-19 patients recovering from severe ARDS (more than 14 days after invasive ventilation) often experienced evidently gradual increases in CO2 retention and minute ventilation. However, the underlying mechanics remain unclear.CASE PRESENTATIONTo explain these pathophysiological features and discuss the ventilatory strategy during the late phase of severe ARDS in COVID-19 patients, we first used a metabolic module on a General Electric R860 ventilator (Engstrom Carestation; GE Healthcare, USA) to monitor parameters related to gas metabolism, lung mechanics and physiological dead space in two COVID-19 patients. We found that remarkably decreased ventilatory efficiency (e.g., the ratio of dead space to tidal volume 70-80%, arterial to end-tidal CO2 difference 18-23 mmHg and ventilatory ratio 3-4) and hypermetabolism (oxygen consumption 300-400 ml/min, CO2 elimination 200-300 ml/min) may explain why these patients experienced more severe respiratory distress and CO2 retention in the late phase of ARDS caused by COVID-19.CONCLUSIONDuring the recovery period of ARDS among mechanically-ventilated COVID-19 patients, attention should be paid to the monitoring of physiological dead space and metabolism. Tidal volume (8-9 ml/kg) could be increased appropriately under the limited plateau pressure; however, barotrauma should still be kept in mind.

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1. **Intermittent high dosage oxygen treats COVID-19 infection: the Chinese studies.**  
   James Philip B. Medical gas research 2020;10(2):63.

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1. **Just the Facts: What are the roles of oxygen escalation and noninvasive ventilation in COVID-19?**  
   Long Brit CJEM 2020;22(5):587-590.

A 37-year-old female presents with cough, fever, dyspnea, and myalgias for five days after recent contact with a family member with confirmed 2019 coronavirus disease (COVID-19). Her vital signs include T 38.3° C, HR 108, BP 118/70 mm Hg, RR 26 breaths per minute, and oxygen saturation 67% on room air. She is not in respiratory distress currently and is protecting her airway. Her chest X-ray reveals bilateral airspace opacities. You plan to immediately intervene and address her hypoxia.

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1. **La crisis por COVID-19 hara necesaria canulas de alto flujo, ademas de ventiladores mecanicosHigh-flow cannulas will be required with current COVID-19 crisis, not only mechanical ventilators**  
   Santos E. Gaceta medica de Mexico 2020;156(3):258-259.

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1. **Late Breaking Abstract - Retrospective analysis of CPAP using home NIV machines outwith ICU for COVID-19**  
   Sharma V. European Respiratory Journal 2020;56:No page numbers.

Coronavirus Disease 19 (COVID-19) can present as an Adult Respiratory Distress Syndrome (ARDS)-like pneumonia. Continuous Positive Airway Pressure (CPAP) for ARDS is usually delivered in Intensive Care Units (ICU). Pressure for ICU beds led to Glasgow Royal Infirmary developing a COVID-19 High Dependency Unit (C-HDU) where domiciliary non-invasive ventilators (NIV) (Lumis 150, Resmed) with supplementary oxygen delivered CPAP for respiratory failure due to COVID-19 pneumonia. We review the feasibility and efficacy of delivering CPAP outside the ICU setting. <br/>Method(s): Retrospective analysis of data from patients receiving CPAP in C-HDU (25th March to 8th May 2020) Results: 58 patients received CPAP in total. 46/58 received CPAP only. 18/46 improved and were discharged by day 30. 12/46 died by day 30. 12/46 required mechanical ventilation - of these 6/12 successfully extubated and well at day 30, 3/12 remain in ICU and 3/12 died. 4/46 failed CPAP but survived with simple oxygen therapy. 12/58 did not tolerate CPAP and were switched to nasal high flow oxygen - of these 8/12 are well at day 30. <br/>Conclusion(s): It is feasible to deliver CPAP using domiciliary NIV machines with supplementary oxygen for COVID-19 pneumonia outwith ICU. CPAP has potential to improve patient outcomes, prevent ICU admissions and deliver tangible service efficiencies. C-HDU established a multi-disciplinary approach to patient care, incorporating acute medical and respiratory physicians with respiratory physiology support and developed protocols using an iterative learning approach. Trials for CPAP in COVID-19 pneumonia are ongoing, but our experience supports its role and the practicality of delivering CPAP using domiciliary NIV equipment.

1. **Low-flow nasal cannula oxygen and potential nosocomial spread of COVID-19.**  
   Goldhaber-Fiebert Sara N. British journal of anaesthesia 2020;125(3):e309.

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1. **Management of respiratory failure due to covid-19**  
   Wilcox S.R. BMJ (Clinical research ed.) 2020;369:No page numbers.

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1. **Management of SARS-CoV-2 infection: recommendations of the Polish Association of Epidemiologists and Infectiologists as of March 31, 2020.**  
   Flisiak Robert Polish archives of internal medicine 2020;130(4):352-357.

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1. **Modified oxygen therapy device for prevention of aerosol dispersion in COVID-19 patients.**  
   Kumar Amarjeet Journal of clinical anesthesia 2020;65:109884.

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1. **Neurologically Devastating Intraparenchymal Hemorrhage in COVID-19 Patients on Extracorporeal Membrane Oxygenation: A Case Series.**  
   Heman-Ackah Sabrina M. Neurosurgery 2020;87(2):E147.

BACKGROUND AND IMPORTANCEExtracorporeal membrane oxygenation (ECMO) represents a life-saving therapy in cases of refractory hypoxia and has been utilized in patients suffering from the most severe forms of coronavirus disease 2019 (COVID-19). A strikingly high mortality rate of 94% was described in early reports of patients with COVID-19 transitioned to ECMO. Later case reports and series demonstrating successful recovery from COVID-19 after ECMO have revived interest in this therapeutic modality, including the recent approval of ECMO for COVID-19 patients by the Food and Drug Administration (FDA). Here, we present the first reports of devastating intracranial hemorrhage as a complication of veno-venous (VV) ECMO in two COVID-19 patients.CLINICAL PRESENTATIONWe performed a retrospective analysis of 2 cases of devastating intracranial hemorrhage in patients on VV-ECMO for the treatment of COVID-19. Collected data included clinical history, laboratory results, treatment, and review of all available imaging. Both patients demonstrated activated partial thromboplastin times (aPTT) within an appropriate therapeutic range. No risk factors that clearly predicted likelihood of this complication were identified.CONCLUSIONUnderstanding the complications of ECMO in this cohort and developing therapeutic algorithms to aid in optimal patient selection will be critical in the limited resource setting experienced as a result of global pandemic. We propose the use of head computed tomography (CT) to identify devastating neurological complications as early as possible, aiding in the resource allocation of ECMO machines to the most appropriately selected patients.

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1. **Nocturnal oxygen therapy as an option for early COVID-19.**  
   Shen Chongxing International journal of infectious diseases : IJID : official publication of the International Society for Infectious Diseases 2020;98:176-179.

There is currently no effective antiviral therapy or immune-based treatment for coronavirus disease (COVID-19). The urgent challenge is to prevent the transition of COVID-19 from mild to severe infection. This paper discussed nocturnal oxygen therapy as a new option for people with COVID-19 under home quarantine. It suggested that nocturnal oxygen therapy in the early stages may be helpful in preventing disease progression by inhibiting the rapid replication of the virus and improving the body's antiviral ability.

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1. **Non-invasive ventilation in the treatment of early hypoxemic respiratory failure caused by COVID-19: considering nasal CPAP as the first choice.**  
   Guan Lili Critical care (London, England) 2020;24(1):333.

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1. **Optimal therapeutic strategy using extracorporeal membrane oxygenation in patients with COVID-19.**  
   Imamura Teruhiko Journal of cardiac surgery 2020;35(10):2872-2873.

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1. **Optimising Ventilator Use during the COVID-19 Pandemic.**  
   Sheikh Sadaf Journal of the College of Physicians and Surgeons--Pakistan : JCPSP 2020;30(6):46-47.

Hypoxemia is the most common cause for hospitalization in COVID-19 patients. Acute hypoxemic respiratory failure or acute respiratory distress syndrome (ARDS) is the most common complication in COVID-19 patients. Close monitoring of respiratory decompensation is essential. Supplemental oxygen, high flow nasal canula, non-invasive ventilation and endotracheal intubation are the most commonly suggested methods to improve oxygenation. Early intubation with pre-oxygenation, modified rapid sequence intubation and intubation using a video laryngoscope has been advised as a strategy including lung protective ventilation, prone position ventilation, adequate sedation and extracorporeal membrane oxygenation. Strict personal precautions and challenges related to airway management has been currently studied. The authors summarize here the issues of mechanical ventilation and some strategies to resolve them. Key Words: Mechanical ventilation, COVID-19, Hypoxemia.

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1. **Outcome of non-invasive ventilation in COVID-19 critically ill patients: A Retrospective observational Study.**  
   Mukhtar Ahmed Anaesthesia, critical care & pain medicine 2020;39(5):579-580.

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1. **Oxigenoterapia de alto flujo y posicion de prono con respiracion espontanea en neumonia por SARS-CoV-2High-flow oxygen therapy with spontaneous breathing prono position in SARS-CoV-2 pneumonia**  
   Gonzalez-Castro A. Revista espanola de anestesiologia y reanimacion 2020;67(9):529-530.

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1. **Oxygen provision to fight COVID-19 in sub-Saharan Africa.**  
   Stein Felix BMJ global health 2020;5(6):No page numbers.

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1. **Oxygen therapy via high flow nasal cannula in severe respiratory failure caused by Sars-Cov-2 infection: a real-life observational study.**  
   Procopio Giada Therapeutic advances in respiratory disease 2020;14:1753466620963016.

The worldwide spread of coronavirus disease 2019 (COVID-19), caused by the new severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was declared a pandemic by the World Health Organization (WHO) in March 2020. According to clinical studies carried out in China and Italy, most patients experience mild or moderate symptoms; about a fifth of subjects develop a severe and critical disease, and may suffer from interstitial pneumonia, possibly associated with acute respiratory distress syndrome (ARDS) and death.In patients who develop respiratory failure, timely conventional oxygen therapy through nasal catheter plays a crucial role, but it can be used only in mild forms. Continuous positive airway pressure (CPAP) support or non-invasive mechanical ventilation (NIV) are uncomfortable, and require significant man-machine cooperation. Herein we describe our experience of five patients with COVID-19, who were treated with high-flow nasal cannula (HFNC) after failure of CPAP or NIV, and discuss the role of HFNC in COVID-19 patients. Our findings suggest that HFNC can be used successfully in selected patients with COVID-19-related ARDS.The reviews of this paper are available via the supplemental material section.

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1. **Partially ionized medical oxygen as a supplementary treatment for COVID-19.**  
   Perečinský Slavomír Wiener klinische Wochenschrift 2020;132(21-22):697-698.

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1. **Physiotherapy Care of Patients with Coronavirus Disease 2019 (COVID-19) - A Brazilian Experience**  
   Onoue M.A. Clinics (Sao Paulo, Brazil) 2020;75:No page numbers.

Some patients with coronavirus disease (COVID-19) present with severe acute respiratory syndrome, which causes multiple organ dysfunction, besides dysfunction of the respiratory system, that requires invasive procedures. On the basis of the opinions of front-line experts and a review of the relevant literature on several topics, we proposed clinical practice recommendations on the following aspects for physiotherapists facing challenges in treating patients and containing virus spread: 1. personal protective equipment, 2. conventional chest physiotherapy, 3. exercise and early mobilization, 4. oxygen therapy, 5. nebulizer treatment, 6. non-invasive ventilation and high-flow nasal oxygen, 7. endotracheal intubation, 8. protective mechanical ventilation, 9. management of mechanical ventilation in severe and refractory cases of hypoxemia, 10. prone positioning, 11. cuff pressure, 12. tube and nasotracheal suction, 13. humidifier use for ventilated patients, 14. methods of weaning ventilated patients and extubation, and 15. equipment and hand hygiene. These recommendations can serve as clinical practice guidelines for physiotherapists. This article details the development of guidelines on these aspects for physiotherapy of patients with COVID-19.

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1. **Position Paper for the State-of-the-Art Application of Respiratory Support in Patients with COVID-19.**  
   Pfeifer Michael Respiration; international review of thoracic diseases 2020;99(6):521-542.

Against the background of the pandemic caused by infection with the SARS-CoV-2 virus, the German Respiratory Society has appointed experts to develop therapy strategies for COVID-19 patients with acute respiratory failure (ARF). Here we present key position statements including observations about the pathophysiology of (ARF). In terms of the pathophysiology of pulmonary infection with SARS-CoV-2, COVID-19 can be divided into 3 phases. Pulmonary damage in advanced COVID-19 often differs from the known changes in acute respiratory distress syndrome (ARDS). Two types (type L and type H) are differentiated, corresponding to early- and late-stage lung damage. This differentiation should be taken into consideration in the respiratory support of ARF. The assessment of the extent of ARF should be based on arterial or capillary blood gas analysis under room air conditions, and it needs to include the calculation of oxygen supply (measured from the variables of oxygen saturation, hemoglobin level, the corrected values of Hüfner's factor, and cardiac output). Aerosols can cause transmission of infectious, virus-laden particles. Open systems or vented systems can increase the release of respirable particles. Procedures in which the invasive ventilation system must be opened and endotracheal intubation carried out are associated with an increased risk of infection. Personal protective equipment (PPE) should have top priority because fear of contagion should not be a primary reason for intubation. Based on the current knowledge, inhalation therapy, nasal high-flow therapy (NHF), continuous positive airway pressure (CPAP), or noninvasive ventilation (NIV) can be performed without an increased risk of infection to staff if PPE is provided. A significant proportion of patients with ARF present with relevant hypoxemia, which often cannot be fully corrected, even with a high inspired oxygen fraction (FiO2) under NHF. In this situation, the oxygen therapy can be escalated to CPAP or NIV when the criteria for endotracheal intubation are not met. In ARF, NIV should be carried out in an intensive care unit or a comparable setting by experienced staff. Under CPAP/NIV, a patient can deteriorate rapidly. For this reason, continuous monitoring and readiness for intubation are to be ensured at all times. If the ARF progresses under CPAP/NIV, intubation should be implemented without delay in patients who do not have a "do not intubate" order.

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1. **Predicting the response to high flow nasal cannula as first-line respiratory support in the patients with pneumonia covid-19 and acute respiratory failure**  
   De Alba Aparicio M. Intensive Care Medicine Experimental 2020;8:No page numbers.

Introduction: Experience from the use of high-flow nasal oxygen (HFO) in acute hypoxemic respiratory failure (AHRF) (1), indicates that this method of respiratory support may reduce the invasive mechanical ventilation requirement of patients with COVID-19, depending on the degree of V/Q matching, and may be an appropriate therapy when conventional oxygen therapy does not provide sufficient respiratory support. However, its application is controversial, particularly for the risk of aerosolization. <br/>Objective(s): To describe the characteristics and identify prognostic factors in response to the application of HFO as first line of respiratory support of patients Covid-19 with AHFR. <br/>Method(s): Analysis of prospectively collected data of 41 patients with pneumonia Covid-19, confirmed by RT-PCR assay, admitted to our polyvalent ICU of terciary hospital (34 bed), from 22 March to 5 May 2020. Patients with moderate AHRF (PaO2/FiO2 100-200 at admission) were included. Excluded patients were &lt; 18, immediate mechanical ventilation (MV) criteria, hypercapnia or given HFO as a tool to weaning from MV. The HFO was applied using Philips V60 ventilator and Fisher & Paykel MR850 device, flow 40-60 L/min, FiO2 for SpO2 &gt;= 92%. We compared baseline characteristics, physiological, prognosis parameters, and Rox index in the first 12 h, as ratio of SpO2/FiO2 to respiratory rate (2), according to success or failure HFO. For statistical analysis we used U-Mann-Whitney or Fisher test as appropriate. Prognosis of success of HFO was calculated as sensitivity and specificity, relative risk (RR) (95% CI) and ROC curves for ROX index. The literature determines the cut-off point at 12 h at 4,88. <br/>Result(s): Among 41 patients with AHRF Covid-19 admitted to the ICU, 20 (48.78%) were intubated on admission. Altogether 21 (51.22%) patients were eligible for HFO, 15 (71.43%), were defined as success which was regarded as no escalation to non-invasive ventilation, MV, ECMO or death within 28 days after commencement of HFO. Characteristics patients are shown in Table 1, the two group were well matched, only SOFA scores shown significant difference in failure HFO. Overall ICU mortality: 11 (26.83%), MV vs HFO: 8 (19.5%) vs 3 (7.3%) (p = 0.015). Parameters related to outcome see Table 2. ROC analysis for ROX index showed an AUC of 0.889 (95% CI 0.697-0.988). A cutoff &gt;= 5.57 was associated with the best index for success, sensivity of 0.93 (95% CI 0.75-0.91), and specificity of 0.83 (95% CI 0.41-0.98), PPV of 0.94 and NPV 0.83. RR 6 (95% CI 1.47-24.42). <br/>Conclusion(s): In our sample of Covid-19 patients, the Rox index at 12 h allowed us to predict with accuracy the response to HFO with a cut value of 5.57, similar to the cut value describe in the literature for other causes of moderate AHRF. SOFA index value could be helpful in selecting the patients who could benefit from HFO. Careful selection of patients to whom HFO is applied as first-line treatment is necessary, since those who fail and delay intubation have high mortality and higher stay in ICU. Data need to be confirmed in wider population.

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1. **Proactive COVID-19 Infection Prevention Measures in a Hyperbaric Oxygen Therapy Center**  
   Lo J.-J. Medicina (Kaunas, Lithuania) 2020;56(6):No page numbers.

Since the outbreak of coronavirus disease 2019 (COVID-19) in Wuhan, China in December 2019 and its subsequent global spread, Taiwan has been combatting this pandemic. COVID-19 is caused by a novel coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). As SARS-CoV-2 can be transmitted through droplets and aerosols, we cannot ignore the risk of transmission during hyperbaric oxygen therapy (HBOT). Our hyperbaric oxygen therapy center prioritizes preventing the spread of COVID-19 and maintaining operation for the patients during the pandemic. The aim of this article is to share the protocol that we have adopted in our hyperbaric oxygen therapy center to help prevent the spread of COVID-19.

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1. **Prolonged treatment of COVID-19 pneumonia with high-flow nasal oxygen: A story of oxygen and resilience**  
   Audley G.G. South African Medical Journal 2020;110(12):1168-1171.

The COVID-19 pandemic has placed significant strain on the oxygen delivery infrastructure of health facilities in resource-constrained health systems. In this case report, we describe a patient with severe COVID-19 pneumonia who was managed with high-flow nasal oxygen for 40 days, with an eventual successful outcome. We discuss the oxygen delivery infrastructure needed to offer this intervention, as well as the psychosocial impact on those undergoing treatment.<br/>Copyright &#xa9; 2020 South African Medical Association. All rights reserved.

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1. **Recomendaciones de consenso respecto al soporte respiratorio no invasivo en el paciente adulto con insuficiencia respiratoria aguda secundaria a infeccion por SARS-CoV-2Clinical consensus recommendations regarding non-invasive respiratory support in the adult patient with acute respiratory failure secondary to SARS-CoV-2 infection**  
   Cinesi Gomez C. Medicina intensiva 2020;44(7):429-438.

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1. **Recommendations for extracorporeal membrane oxygenation (ECMO) in COVID-19 patients : Consensus paper of the Medical University of Vienna.**  
   Wiedemann Dominik Wiener klinische Wochenschrift 2020;132(21-22):671-676.

The pandemic from the SARS-CoV‑2 virus is currently challenging healthcare systems all over the world. Maintaining appropriate staffing and resources in healthcare facilities is essential to guarantee a safe working environment for healthcare personnel and safe patient care. Extracorporeal membrane oxygenation (ECMO) represents a valuable therapeutic option in patients with severe heart or lung failure. Although only a limited proportion of COVID-19 patients develop respiratory or circulatory failure that is refractory to conventional treatment, it is of utmost importance to clearly define criteria for the use of ECMO in this steadily growing patient population. The ECMO working group of the Medical University of Vienna has established the following recommendations for ECMO support in COVID-19 patients.

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1. **Recommendations for the management of critically ill adult patients with COVID-19.**  
   Ñamendys-Silva Silvio A. Gaceta medica de Mexico 2020;156(3):246-248.

Except for pregnant women, the management of critically ill patients with COVID-19 during the pandemic includes the standard procedures that are used for any patient that requires to be attended to at the intensive care unit, as well as limited administration of crystalloid solutions, orotracheal intubation, invasive mechanical ventilation in the event of patient clinical deterioration, and muscle relaxants continuous infusion only if necessary. Non-invasive mechanical ventilation and high-flow oxygen therapy are not recommended due to the generation of aerosol (associated with risk of viral spread among health personnel), and neither is extracorporeal membrane oxygenation or the use of steroids. So far, there is no specific antiviral treatment for patients with COVID-19, and neither are there results of controlled trials supporting the use of any.

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1. **RECOVERY- Respiratory Support: Respiratory Strategies for patients with suspected or proven COVID-19 respiratory failure; Continuous Positive Airway Pressure, High-flow Nasal Oxygen, and standard care: A structured summary of a study protocol for a randomised controlled trial.**  
   Perkins Gavin D. Trials 2020;21(1):687.

OBJECTIVEThe trial objective is to determine if Continuous Positive Airway Pressure (CPAP) or High-Flow Nasal Oxygen (HFNO) is clinically effective compared to standard oxygen therapy in patients with confirmed or suspected COVID-19.TRIAL DESIGNAdaptive (group-sequential), parallel group, pragmatic, superiority randomised controlled, open-label, multi-centre, effectiveness trial.PARTICIPANTSThe trial is being conducted across approximately 60 hospitals across England, Wales, Scotland, and Northern Ireland. Inpatients at participating hospitals are eligible to participate if they have respiratory failure with suspected or proven COVID-19, and meet all of the inclusion criteria and none of the exclusion criteria.INCLUSION CRITERIA1) Adults ≥ 18 years; 2) Admitted to hospital with suspected or proven COVID-19; 3) Receiving oxygen with fraction of inspired oxygen (FiO2) ≥0.4 and peripheral oxygen saturation (SpO2) ≤94%; and 4) Plan for escalation to tracheal intubation if needed.EXCLUSION CRITERIA1) Planned tracheal intubation and mechanical ventilation imminent within 1 hour; 2) Known or clinically apparent pregnancy; 3) Any absolute contraindication to CPAP or HFNO; 4) Decision not to intubate due to ceiling of treatment or withdrawal of treatment anticipated; and 5) Equipment for both CPAP and HFNO not available.INTERVENTION AND COMPARATORIntervention one: Continuous positive airway pressure delivered by any device. Set-up and therapy titration is not protocolised and is delivered in accordance with clinical discretion. Intervention two: High-flow nasal oxygen delivered by any device. Set-up and therapy titration is not protocolised and is delivered in accordance with clinical discretion. Comparator group: Standard care- oxygen delivered by face mask or nasal cannula (excluding the use of continuous positive airway pressure or high-flow nasal oxygen). Set-up and therapy titration is not protocolised and is delivered in accordance with clinical discretion. Intervention delivery continues up to the point of death, tracheal intubation, or clinical determination that there is no ongoing need (palliation or improvement).MAIN OUTCOMESThe primary outcome is a composite outcome comprising tracheal intubation or mortality within 30 days following randomisation. Secondary outcomes include tracheal intubation rate, time to tracheal intubation, duration of invasive ventilation, mortality rate, time to mortality, length of hospital stay, and length of critical care stay.RANDOMISATIONParticipants are randomised in a 1:1:1 ratio to receive either continuous positive airway pressure, high-flow nasal oxygen or standard care. Due to the challenging environment of study delivery, a specific intervention may not always be available at the hospital site. The study uses two integrated randomisation systems to allow, where required, the site to randomise between all three interventions, between CPAP and standard care, and between HFNO and standard care. System integration ensures maintenance of balance between interventions. Randomisation is performed using a telephone-based interactive voice response system to maintain allocation concealment. The randomisation sequence was computer-generated using the minimisation method. Participant randomisation is stratified by site, gender (M/F), and age (<50, >=50 years).BLINDING (MASKING)The nature of the trial interventions precludes blinding of the researcher, patient and clinical team. Primary and secondary outcomes are all objective outcomes, thereby minimising the risk of detection bias.NUMBERS TO BE RANDOMISED (SAMPLE SIZE)4002 participants (1334 to be randomized to each of the three study arms) TRIAL STATUS: Current protocol: Version 4.0, 29th May 2020. Recruitment began on April 6, 2020 and is anticipated to be complete by April 5, 2021. The trial has been awarded Urgent Public Health status by the National Institute of Health Research on 13th April 2020.TRIAL REGISTRATIONISRCTN, ISRCTN16912075. Registered 6th April 2020, http://www.isrctn.com/ISRCTN16912075 FULL PROTOCOL: The full protocol (version 4.0, 29th May 2020) is attached as an additional file, accessible from the Trials website (Additional file 1). In the interest in expediting dissemination of this material, the familiar formatting has been eliminated; this Letter serves as a summary of the key elements of the full protocol. The study protocol has been reported in accordance with the Standard Protocol Items: Recommendations for Clinical Interventional Trials (SPIRIT) guidelines (Additional file 2).

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1. **Respiratory management in severe acute respiratory syndrome coronavirus 2 infection.**  
   Price Susanna European heart journal. Acute cardiovascular care 2020;9(3):229-238.

The severe acute respiratory syndrome coronavirus 2 pandemic is to date affecting more than a million of patients and is challenging healthcare professionals around the world. Coronavirus disease 2019 may present with a wide range of clinical spectrum and severity, including severe interstitial pneumonia with high prevalence of hypoxic respiratory failure requiring intensive care admission. There has been increasing sharing experience regarding the patient's clinical features over the last weeks which has underlined the need for general guidance on treatment strategies. We summarise the evidence existing in the literature of oxygen and positive pressure treatments in patients at different stages of respiratory failure and over the course of the disease, including environment and ethical issues related to the ongoing coronavirus disease 2019 infection.

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1. **Retrospective analysis of high flow nasal therapy in COVID-19-related moderate-to-severe hypoxaemic respiratory failure.**  
   Patel Maulin BMJ open respiratory research 2020;7(1):No page numbers.

Invasive mechanical has been associated with high mortality in COVID-19. Alternative therapy of high flow nasal therapy (HFNT) has been greatly debated around the world for use in COVID-19 pandemic due to concern for increased healthcare worker transmission.This was a retrospective analysis of consecutive patients admitted to Temple University Hospital in Philadelphia, Pennsylvania, from 10 March 2020 to 24 April 2020 with moderate-to-severe respiratory failure treated with HFNT. Primary outcome was prevention of intubation. Of the 445 patients with COVID-19, 104 met our inclusion criteria. The average age was 60.66 (+13.50) years, 49 (47.12 %) were female, 53 (50.96%) were African-American, 23 (22.12%) Hispanic. Forty-three patients (43.43%) were smokers. Saturation to fraction ratio and chest X-ray scores had a statistically significant improvement from day 1 to day 7. 67 of 104 (64.42%) were able to avoid invasive mechanical ventilation in our cohort. Incidence of hospital-associated/ventilator-associated pneumonia was 2.9%. Overall, mortality was 14.44% (n=15) in our cohort with 13 (34.4%) in the progressed to intubation group and 2 (2.9%) in the non-intubation group. Mortality and incidence of pneumonia was statistically higher in the progressed to intubation group. CONCLUSION: HFNT use is associated with a reduction in the rate of invasive mechanical ventilation and overall mortality in patients with COVID-19 infection.

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1. **Risk factors for non-invasive/invasive ventilatory support in patients with COVID-19 pneumonia: A retrospective study within a multidisciplinary approach**  
   Suardi L.R. International Journal of Infectious Diseases 2020;100:258-263.

Objectives: To investigate risk factors for non-invasive/invasive ventilatory support (NI/I-VS) in patients with coronavirus disease 2019 (COVID-19). <br/>Method(s): All consecutive patients admitted to the Infectious Diseases Unit and Intensive Care Unit (ICU) of Santa Maria Annunziata Hospital (Florence, Italy), from February 25 to April 25, 2020, with a confirmed COVID-19 diagnosis were enrolled in this retrospective cohort study. NI/I-VS was defined as the need for continuous positive airway pressure (CPAP) or bilevel positive airway pressure (BPAP) (non-invasive ventilation) or mechanical ventilation, not including low-flow systems of oxygen therapy such as the Venturi mask or nasal cannula. <br/>Result(s): Ninety-seven patients were enrolled; 61.9% (60/97) were male and the median patient age was 64 years. The in-hospital mortality was 9.3%. Thirty-five of the 97 patients (36%) required ICU admission and 94.8% (92/97) were prescribed oxygen therapy: 10.8% (10/92) by nasal cannula, 44.5% (41/92) by Venturi mask, 31.5% (29/92) by CPAP, 2.2% (2/92) by BPAP, and 10.8% (10/92) by mechanical ventilation following intubation. On univariate analysis, patients with a body mass index &gt;30, type II diabetes mellitus, and those presenting with dyspnoea, asthenia, SOFA score &gt;=2 points, PaO<sub>2</sub>/FiO<sub>2</sub>&lt;300, temperature &gt;38 degreeC, increased levels of lactate dehydrogenase (LDH), alanine aminotransferase, and C-reactive protein, and a D-dimer &gt;1000 ng/mL at admission more frequently underwent NI/I-VS. Multivariate logistic regression analysis confirmed temperature &gt;38 degreeC (odds ratio (OR) 21.2, 95% confidential interval (95% CI) 3.5-124.5, p = 0.001), LDH &gt;250 U/l (OR 15.2, 95% CI 1.8-128.8, p = 0.012), and D-dimer &gt;1000 ng/mL (OR 4.5, 95% CI 1.2-17.3, p = 0.027) as significantly associated with the requirement for NI/I-VS. A non-significant trend (p = 0.051) was described for PaO<sub>2</sub>/FiO<sub>2</sub>&lt;300. <br/>Conclusion(s): Temperature &gt;38 degreeC, LDH &gt; 250 U/l, and D-dimer &gt;1000 ng/mL were found to be independent risk factors for NI/I-VS in COVID-19 patients. In order to quickly identify patients likely at risk of developing a critical illness, inflammatory markers should be assessed upon hospital admission.<br/>Copyright &#xa9; 2020 The Authors

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1. **Room to Breathe: The Impact of Oxygen Rationing on Health Outcomes in SARS-CoV2**  
   Goyal D.K. Frontiers in Medicine 2020;7:No page numbers.

As the primary surge of coronavirus disease 2019 (COVID-19) wanes in many countries, it is important to reconsider best practice. More cases, probably the majority of cases, are yet to come. Hopefully, during this next phase, we will have more time, more resources, and more experience from which to affect better outcomes. Here, we examine the compromised oxygen strategy that many nations followed. We explore the evidence related to such strategies and discuss the potential mortality impact of delaying oxygen treatment in COVID-19 pneumonia.<br/>&#xa9; Copyright &#xa9; 2021 Goyal, Mansab and Bhatti.

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1. **Severe COVID-19 pneumonia in a 30-year-old woman in the 36th week of pregnancy treated with postpartum extracorporeal membrane oxygenation**  
   Takayama W. American Journal of Case Reports 2020;21:No page numbers-7.

Patient: Female, 30-year-old Final Diagnosis: Severe COVID-19 pneumonia Symptoms: Dyspena Medication: - Clinical Procedure: Extracorporeal membrane oxygenation Specialty: Critical Care Medicine \* Infectious Diseases Objective: Background: Case Report: <br/>Conclusion(s): Unusual clinical course There are few reports of coronavirus disease 2019 (COVID-19) in pregnant women. Although coagulation dys-function was reported to affect the severity of COVID-19, the association between pregnancy, which is usually accompanied by changes in coagulation function, and the worsening of COVID-19 is unknown. We present a case of a 30-year-old woman in the 36<sup>th</sup> week of pregnancy who was diagnosed with severe COVID-19 pneumonia and required postpartum extracorporeal membrane oxygenation (ECMO) therapy. A 30-year-old, 36-weeks pregnant woman presented to our hospital and was diagnosed with severe COVID-19 pneumonia soon after she had undergone a cesarean section. Her respiratory failure could not be managed by conventional therapeutic approaches. Therefore, ECMO was administered on day 7. Controlling coagulation function to maintain ECMO therapy was challenging. Nafamostat mesylate and cryoprecipitate were administered to treat the hypercoagulative status and severe hypofibrinogenemia, respectively. Since coagulopathy and her respiratory state improved, the ECMO therapy was terminated on day 15. We report a case of severe COVID-19 pneumonia in a pregnant woman urgently treated with ECMO in the postpartum period. Thus, this case highlights the importance of close monitoring and appropriate medical care for pregnant women with severe COVID-19 pneumonia.<br/>Copyright &#xa9; Am J Case Rep,.

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1. **Successful COVID-19 rescue therapy by extra-corporeal membrane oxygenation (ECMO) for respiratory failure: A case report**  
   Firstenberg M.S. Patient Safety in Surgery 2020;14(1):No page numbers.

Background: The value of extracorporeal membrane oxygenation (ECMO) for patients suffering from novel coronavirus disease 2019 (COVID-19) as a rescue therapy for respiratory failure remains controversial and associated with high mortality rates of 50 to 82% in early reports from Wuhan, China. We hypothesized that patient outcomes would be improved at our tertiary cardiothoracic surgery referral center with a protocolized team-approach for ECMO treatment of patients with severe COVID-19 disease. Case presentation: A 51-year-old healthy female developed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) bilateral pneumonia while vacationing in Colorado with her family. She was transferred to our facility for a higher level of care. Her respiratory status continued to deteriorate despite maximized critical care, including prone positioning ventilation and nitric oxide inhalation therapy. Veno-venous ECMO was initiated on hospital day 7 in conjunction with a 10-day course of compassionate use antiviral treatment with remdesivir. The patient's condition improved significantly and she was decannulated from ECMO on hospital day 17 (ECMO day 11). She was successfully extubated and eventually discharged to rehabilitation on hospital day 28. <br/>Conclusion(s): This case report demonstrates a positive outcome in a young patient with COVID-19 treated by the judicious application of ECMO in conjunction with compassionate use antiviral treatment (remdesivir). Future prospective multi-center studies are needed to validate these findings in a larger cohort of patients.<br/>Copyright &#xa9; 2020 The Author(s).

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1. **Successful recovery from critical COVID-19 pneumonia with extracorporeal membrane oxygenation: A case report**  
   Ikuyama Y. Respiratory Medicine Case Reports 2020;30:No page numbers.

A public health emergency of current international concern is the outbreak of a severe respiratory illness, that is, coronavirus disease (COVID-19). The disease initially started in Wuhan, China, and it rapidly spread to most regions of the world. Herein, we report a case of critical COVID-19 pneumonia treated with extracorporeal membrane oxygenation from symptom onset day 19 (SOD#19) to SOD#30. We describe the patient's clinical course, from mild symptoms at the time of illness onset to symptoms of severe pneumonia as the illness progressed. We provide important information regarding our clinical experience for further understanding of management discrepancies, as treatment with extracorporeal membrane oxygenation or pharmacotherapy (e.g., antivirals, immunomodulators, and glucocorticoids) is often dependent on the severity of symptoms.<br/>Copyright &#xa9; 2020 The Authors

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1. **Successful Use of Veno-Venous Extracorporeal Membrane Oxygenation in a Patient With Severe COVID-19 Pneumonia.**  
   Mallick Taha Cureus 2020;12(12):e11938.

Lung damage in coronavirus disease 2019 (COVID-19) pneumonia may be so severe that management with lung-protective ventilation, neuromuscular blockade, and proning cannot sustain life. Extracorporeal membrane oxygenation (ECMO) may allow patients with acute respiratory distress syndrome (ARDS) to undergo a period of lung recovery before being transitioned back to mechanical ventilation. A successful outcome requires both timely initiation of ECMO before development of irreversible organ injury from severe ARDS and selection of patients with adequate physiologic reserve. We present a 40-year-old healthy male patient with severe COVID-19 pneumonia not responsive to more conservative options for ARDS management. Veno-venous extracorporeal membrane oxygenation (VV-ECMO) rescue therapy was instituted and after 34 days he was successfully decannulated and eventually discharged from the hospital in good condition. Despite needing ECMO for longer than what is reported in most case reports and series involving patients with COVID-19 pneumonia, our patient made a complete recovery. He was also followed up in an outpatient setting and seen to be doing well. With appropriate patient selection and timely initiation of ECMO, many patients stand to benefit from this treatment. Ensuring that therapy be delivered to these patients when the need arises requires meticulous planning and provision of the appropriate resources. In addition, inflammatory markers may serve as a further guide to decision-making in patients already on ECMO as has already been indicated in the literature.

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1. **The experience of high-flow nasal cannula in hospitalized patients with 2019 novel coronavirus-infected pneumonia in two hospitals of Chongqing, China**  
   Wang K. Annals of Intensive Care 2020;10(1):No page numbers.

Background: The outbreak of a novel coronavirus (2019-nCoV)-infected pneumonia (NCIP) is currently ongoing in China. Most of the critically ill patients received high-flow nasal cannula (HFNC) oxygen therapy. However, the experience of HFNC in this population is lacking. <br/>Method(s): We retrospectively screened 318 confirmed patients with NCIP in two hospitals of Chongqing, China, from January 1st to March 4th, 2020. Among them, 27 (8.4%) patients experienced severe acute respiratory failure including 17 patients (63%) treated with HFNC as first-line therapy, 9 patients (33%) treated with noninvasive ventilation (NIV) and one patient (4%) treated with invasive ventilation. HFNC failure was defined by the need of NIV or intubation as rescue therapy. <br/>Result(s): Of the 17 HFNC patients, 7 (41%) experienced HFNC failure. The HFNC failure rate was 0% (0/6) in patients with PaO<sub>2</sub>/FiO<sub>2</sub>&gt; 200 mm Hg vs. 63% (7/11) in those with PaO<sub>2</sub>/FiO<sub>2</sub>&lt;= 200 mm Hg (p = 0.04). Compared with baseline data, the respiratory rate significantly decreased after 1-2 h of HFNC in successful group [median 26 (IQR: 25-29) vs. 23 (22-25), p = 0.03]. However, it did not in the unsuccessful group. After initiation of NIV as rescue therapy among the 7 patients with HFNC failure, PaO<sub>2</sub>/FiO<sub>2</sub> significantly improved after 1-2 h of NIV [median 172 (150-208) mmHg vs. 114 (IQR: 79-130) under HFNC, p = 0.04]. However, two out of seven (29%) patients with NIV as rescue therapy ultimately received intubation. Among the 27 patients with severe acute respiratory failure, four patients were eventually intubated (15%). <br/>Conclusion(s): Our study indicated that HFNC was the most common ventilation support for patients with NCIP. Patients with lower PaO<sub>2</sub>/FiO<sub>2</sub> were more likely to experience HFNC failure.<br/>Copyright &#xa9; 2020, The Author(s).

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1. **The impact of high-flow nasal cannula (HFNC) on coughing distance: implications on its use during the novel coronavirus disease outbreak.**  
   Loh Ne-Hooi Will Canadian journal of anaesthesia = Journal canadien d'anesthesie 2020;67(7):893-894.

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1. **The Italian coronavirus disease 2019 outbreak: recommendations from clinical practice.**  
   Sorbello M. Anaesthesia 2020;75(6):724-732.

Novel coronavirus 2019 is a single-stranded, ribonucleic acid virus that has led to an international pandemic of coronavirus disease 2019. Clinical data from the Chinese outbreak have been reported, but experiences and recommendations from clinical practice during the Italian outbreak have not. We report the impact of the coronavirus disease 2019 outbreak on regional and national healthcare infrastructure. We also report on recommendations based on clinical experiences of managing patients throughout Italy. In particular, we describe key elements of clinical management, including: safe oxygen therapy; airway management; personal protective equipment; and non-technical aspects of caring for patients diagnosed with coronavirus disease 2019. Only through planning, training and team working will clinicians and healthcare systems be best placed to deal with the many complex implications of this new pandemic.

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1. **The use of high-flow nasal oxygen in COVID-19.**  
   Lyons C. Anaesthesia 2020;75(7):843-847.

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1. **The utility of high-flow nasal cannula oxygen therapy in the management of respiratory failure secondary to COVID-19 pneumonia**  
   Lalla U. South African Medical Journal 2020;110(6):432.

1. **The utility of high-flow nasal oxygen for severe COVID-19 pneumonia in a resource-constrained setting: A multi-centre prospective observational study**  
   Calligaro G.L. EClinicalMedicine 2020;28:No page numbers.

Background: The utility of heated and humidified high-flow nasal oxygen (HFNO) for severe COVID-19-related hypoxaemic respiratory failure (HRF), particularly in settings with limited access to intensive care unit (ICU) resources, remains unclear, and predictors of outcome have been poorly studied. <br/>Method(s): We included consecutive patients with COVID-19-related HRF treated with HFNO at two tertiary hospitals in Cape Town, South Africa. The primary outcome was the proportion of patients who were successfully weaned from HFNO, whilst failure comprised intubation or death on HFNO. <br/>Finding(s): The median (IQR) arterial oxygen partial pressure to fraction inspired oxygen ratio (P<sub>a</sub>O2/FiO<sub>2</sub>) was 68 (54-92) in 293 enroled patients. Of these, 137/293 (47%) of patients [P<sub>a</sub>O2/FiO<sub>2</sub> 76 (63-93)] were successfully weaned from HFNO. The median duration of HFNO was 6 (3-9) in those successfully treated versus 2 (1-5) days in those who failed (p&lt;0.001). A higher ratio of oxygen saturation/FiO2 to respiratory rate within 6 h (ROX-6 score) after HFNO commencement was associated with HFNO success (ROX-6; AHR 0.43, 0.31-0.60), as was use of steroids (AHR 0.35, 95%CI 0.19-0.64). A ROX-6 score of &gt;=3.7 was 80% predictive of successful weaning whilst ROX-6 &lt;= 2.2 was 74% predictive of failure. In total, 139 patents (52%) survived to hospital discharge, whilst mortality amongst HFNO failures with outcomes was 129/140 (92%). <br/>Interpretation(s): In a resource-constrained setting, HFNO for severe COVID-19 HRF is feasible and more almost half of those who receive it can be successfully weaned without the need for mechanical ventilation.<br/>Copyright &#xa9; 2020 The Author(s)

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1. **Therapeutic effect of high-flow nasal cannula on severe COVID-19 patients in a makeshift intensive-care unit: A case report**  
   Lu X. Medicine 2020;99(21):No page numbers.

INTRODUCTION: Several intensive-care units (ICUs) in Wuhan are nonstandard wards that were repurposed from general wards. Considering the shortage of medical resources and the need to prevent nosocomic infection, the respiratory-treatment strategy in these nonstandard ICUs is different from those in general wards and standard ICUs. High-flow nasal cannula (HFNC) plays an important role in nonstandard ICUs and is beneficial to the patients therein. PATIENT CONCERNS: In this study, we analyzed four cases of HFNC-treated patients with severe coronavirus disease 2019 (COVID-19) in a makeshift ICU and summarized our experience. DIAGNOSES: Four patients diagnosed with COVID-19 according to World Health Organization (WHO) interim guidance were admitted to the makeshift ICU. INTERVENTIONS: All patients had oxygen treatment with HFNC, as well as regular treatment of antivirals and traditional Chinese medicine. <br/>OUTCOME(S): Two patients survived after treatment, while the other two died from acute respiratory distress syndrome (ARDS) and heart failure, respectively. <br/>CONCLUSION(S): Patients with severe and critical COVID-19 often have poor prognoses after mechanical ventilation, exhibiting corresponding complications such as ventilator-associated pneumonia and deep-vein thrombosis, which significantly prolongs length of stay in the ICU. HFNC could prevent intubation in some patients, thereby avoiding the above complications; however, this needs confirmation in further clinical studies. This treatment reduced difficulty and workloads for healthcare professionals, had good tolerability for patients, might not significantly increase the risk of infection for healthcare professionals, and do not require additional preventive measures against nosocomic infection. HFNC treatment has its advantages in providing oxygen therapy in COVID-19, but healthcare professionals should still pay close attention to changes in patients' oxygenation rates and respiratory frequency.

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1. **Timing of invasive mechanic ventilation in critically ill patients with coronavirus disease 2019.**  
   Zhang Qian The journal of trauma and acute care surgery 2020;89(6):1092-1098.

BACKGROUNDInvasive mechanical ventilation (IMV) is a lifesaving strategy for critically ill patients with coronavirus disease 2019 (COVID-19). We aim to report the case series of critical patients receiving IMV in Wuhan and to discuss the timing of IMV in these patients.METHODSData of 657 patients admitted to emergency intensive care unit of Zhongnan Hospital and isolated isolation wards of Wuhan Union Hospital from January 1 to March 10, 2020, were retrospectively reviewed. All medical records of 40 COVID-19 patients who required IMV were collected at different time points, including baseline (at admission), before receiving IMV, and before death or hospital discharge.RESULTSAmong 40 COVID-19 patients with IMV, 31 died, and 9 survived and was discharged. The median age was 70 years (interquartile range [IQR], 62-76 years), and nonsurvivors were older than survivors. The median period from the noninvasive mechanic ventilation (NIV) or high-flow nasal cannula oxygen therapy (HFNC) to intubation was 7 hours (IQR, 2-42 hours) in IMV survivors and 54 hours (IQR, 28-143 hours) in IMV nonsurvivors. We observed that, when the time interval from NIV/HFNC to intubation was less than 50 hours (about 2 calendar days), together with Acute Physiology and Chronic Health Evaluation II (APACHE II) score of less than 10 or pneumonia severity index (PSI) score of less than 100, mortality can be reduced to 60% or less. Prolonged interval from NIV/HFNC to intubation and high levels of APACHE II and PSI before intubation were associated with higher mortality in critically ill patients. Multiple organ damage was common among these nonsurvivors in the course of treatment.CONCLUSIONEarly initial intubation after NIV/HFNC might have a beneficial effect in reducing mortality for critically ill patients meeting IMV indication. Considering APACHE II and PSI scores might help physicians in decision making about timing of intubation for curbing subsequent mortality.LEVEL OF EVIDENCETherapeutic, level V.

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1. **Treatment of acute respiratory failure in the course of COVID-19. Practical hints from the expert panel of the Assembly of Intensive Care and Rehabilitation of the Polish Respiratory Society**  
   Czajkowska-Malinowska M. Advances in respiratory medicine 2020;88(3):245-266.

In 2019, a pandemic began due to infection with a novel coronavirus, SARS-CoV-2. In many cases, this coronavirus leads to the development of the COVID-19 disease. Lung damage in the course of this disease often leads to acute hypoxic respiratory failure and may eventually lead to acute respiratory distress syndrome (ARDS). Respiratory failure as a result of COVID-19 can develop very quickly and a small percent of those infected will die because of it. There is currently no treatment for COVID-19, therefore the key therapeutic intervention centers around the symptomatic treatment of respiratory failure. The main therapeutic goal is to main-tain gas exchange, mainly oxygenation, at an appropriate level and prevent the intensification of changes in the lung parenchyma. Depending on the severity of hypoxemia different techniques can be used to improve oxygenation. Medical staff dealing with COVID-19 patients should be familiar with both, methods used to treat respiratory failure and the epidemiological risks arising from their use. In some patients, conventional (passive) oxygen therapy alone is sufficient. In patients with worsening respiratory failure high flow nasal oxygen therapy (HFNOT) may be effective. The continuous positive airway pressure (CPAP) and non-invasive ventilation (NIV) methods can be used to a limited extent. With further disease progression, invasive ventilation must be used and in special situations, extracorporeal membrane oxygenation (ECMO) can also be administered. The authors of this article set themselves the goal of presenting the most current knowledge about the epidemiology and patho-physiology of respiratory failure in COVID-19, as well as the methods of its treatment. Given the dynamics of the developing pandemic, this is not an easy task as new scientific data is presented almost every day. However, we believe the knowledge contained in this study will help doctors care for patients with COVID-19. The main target audience of this study is not so much pneumonologists or intensivists who have extensive experience in the application of the techniques discussed here, but rather doctors of other specializations who must master new skills in order to help patients during the time of a pandemic.

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1. **UHMS Position Statement: Hyperbaric Oxygen (HBO2) for COVID-19 Patients**  
   anonymous Undersea & hyperbaric medicine : journal of the Undersea and Hyperbaric Medical Society, Inc 2020;47(2):297-298.

There have been numerous recent inquiries regarding use of hyperbaric oxygen (HBO2) for patients with COVID-19. Questions have been raised pertinent to two possible mechanisms for HBO2 in this clinical context. The UHMS Hyperbaric Oxygen Therapy Committee, UHMS Executive Committee, with collaborative input from multiple senior UHMS members and researchers have drafted this position statement.<br/>Copyright&#xa9; Undersea and Hyperbaric Medical Society.

1. **Veno-venous extracorporeal membrane oxygenation and prone ventilation for therapeutic management of COVID-19**  
   Kasai T. Acute Medicine and Surgery 2020;7(1):No page numbers.

Background: The efficacy and safety of the combined use of veno-venous extracorporeal membrane oxygenation (ECMO) and prone ventilation are currently not known for coronavirus disease 2019 (COVID-19). Case presentation: We report two cases in which the combination of veno-venous ECMO and prone ventilation for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pneumonia were successfully carried out. Both patients had developed severe respiratory failure due to SARS-CoV-2 pneumonia, thus requiring veno-venous ECMO. Prone ventilation was also administered safely. <br/>Conclusion(s): Oxygenation and lung compliance gradually improved during prone ventilation, and both patients were successfully extubated. For patients with severe SARS-CoV-2 pneumonia who require veno-venous ECMO, the use of prone ventilation could be beneficial, and should be considered.<br/>Copyright &#xa9; 2020 The Authors. Acute Medicine & Surgery published by John Wiley & Sons Australia, Ltd on behalf of Japanese Association for Acute Medicine

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1. **Veno-venous extracorporeal membrane oxygenation for severe pneumonia: COVID-19 case in Japan**  
   Taniguchi H. Acute Medicine and Surgery 2020;7(1):No page numbers.

Background: Veno-venous extracorporeal membrane oxygenation (VV-ECMO) is one of the ultimate treatments for acute respiratory failure. However, the effectiveness of ECMO in patients with novel coronavirus disease (COVID-19) is unknown. Case Presentation: A 72-year-old woman who was a passenger of a cruise ship tested positive for the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) while in quarantine on board using throat swab. Three days after admission, her condition deteriorated, and she was subsequently intubated. On day 6, VV-ECMO was introduced. Lopinavir/ritonavir was given; continuous renal replacement therapy was also introduced. On day 10, her chest radiography and lung compliance improved. She was weaned off ECMO on day 12. <br/>Conclusion(s): Treatment of severe pneumonia in COVID-19 by ECMO should recognize lung plasticity considering time to ECMO introduction and interstitial biomarkers. In Japan, centralization of ECMO patients has not been sufficient. Thus, we suggest nationwide centralization and further research to respond to the crisis caused by COVID-19.<br/>Copyright &#xa9; 2020 The Authors. Acute Medicine & Surgery published by John Wiley & Sons Australia, Ltd on behalf of Japanese Association for Acute Medicine

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1. **Venous Thromboembolism Events Following Venovenous Extracorporeal Membrane Oxygenation for Severe Acute Respiratory Syndrome Coronavirus 2 Based on CT Scans.**  
   Parzy Gabriel Critical care medicine 2020;48(10):e971.

OBJECTIVESThe main objective of the study was to determine the prevalence of venous thromboembolism events in patients infected with severe acute respiratory syndrome coronavirus 2 requiring venovenous extracorporeal membrane oxygenation. The secondary objective was to compare venous thromboembolism events and coagulation variables in patients requiring venovenous extracorporeal membrane oxygenation according to the pathogen.DESIGNRetrospective observational analysis at a single center.SETTINGTertiary referral university teaching hospital.PATIENTSPatients with severe acute respiratory syndrome coronavirus 2-related severe acute respiratory distress syndrome requiring venovenous extracorporeal membrane oxygenation therapy with an injected CT scan performed after extracorporeal membrane oxygenation retrieval.INTERVENTIONSNone.MEASUREMENTS AND MAIN RESULTSWe included 13 severe acute respiratory syndrome coronavirus 2 patients requiring venovenous extracorporeal membrane oxygenation. All of these patients experienced venous thromboembolism: 10 patients (76.9%) had isolated cannula-associated deep vein thrombosis, two patients (15.4%) had isolated pulmonary embolism, and one patient (7.7%) had both cannula-associated deep vein thrombosis and pulmonary embolism. Eleven patients (84.6%) had cannula-associated deep vein thrombosis. A jugular associated cannula-associated deep vein thrombosis was identified in seven patients (53.8%), a femoral associated cannula-associated deep vein thrombosis was identified in 10 patients (76.9%), and six patients (46.2%) had both femoral and jugular cannula-associated deep vein thrombosis. A pulmonary embolism was found in three patients (23.1%). No patient had central venous catheter-related deep vein thrombosis. One patient had thrombotic occlusion of the centrifugal pump, and one had oxygenator thrombosis requiring circuit replacement. Three patients (23.1%) had significant bleeding. Three patients (23.1%) had laboratory-confirmed heparin-induced thrombocytopenia, and all of them developed cannula-associated deep vein thrombosis. These three patients had femoral cannula-associated deep vein thrombosis, and two had an oxygenator or pump thrombosis. The mean activated partial thromboplastin time ratio was higher in the severe acute respiratory syndrome coronavirus 2 group than in the influenza group and the community-acquired pneumonia group (1.91 vs 1.48 vs 1.53; p = 0.001), which was also found in regard to the percentage of patients with an activated partial thromboplastin time ratio greater than 1.8 (47.8% vs 20% vs 20.9%; p = 0.003) and the mean prothrombin ratio (86.3 vs 61.6 vs 67.1; p = 0.003). There was no difference in baseline characteristics or venous thromboembolism events.CONCLUSIONSWe report a 100% occurrence of venous thromboembolism in critically ill patients supported by venovenous extracorporeal membrane oxygenation for severe acute respiratory syndrome coronavirus 2-related acute respiratory distress syndrome using CT scan imaging despite a high target and close monitoring of anticoagulation.

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1. **Ventilators are not the answer in Africa**  
   Madzimbamuto F.D. African journal of primary health care & family medicine 2020;12(1):No page numbers.

The treatment of severely ill coronavirus disease 2019 (COVID-19) patients has brought the worldwide shortage of oxygen and ventilator-related resources to public attention. Ventilators are considered as the vital equipment needed to manage these patients, who account for 3% - 5% of patients with Covid-19. Most patients need oxygen and supportive therapy. In Africa, the shortage of oxygen is even more severe and needs equipment that is simpler to use than a ventilator. Different models of generating oxygen locally at hospitals, including at provincial and district levels, are required. In some countries, hospitals have established small oxygen production plants to supply themselves and neighbouring hospitals. Oxygen concentrators have also been explored but require dependable power supply and are influenced by local factors such as ambient temperature and humidity. By attaching a reservoir tank, the effect of short power outages or high demands can be smoothed over. The local and regional energy unleashed in the citizens to respond to the COVID-19 pandemic should now be directed towards developing appropriate infrastructure for oxygen and critical care. This infrastructure is education and technology intensive, requiring investment in these areas.

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1. **Ventilatory support for hypoxaemic intensive care patients with COVID-19.**  
   Gundem Trine Tidsskrift for den Norske laegeforening : tidsskrift for praktisk medicin, ny raekke 2020;140(11):No page numbers.

BACKGROUNDCOVID-19 pneumonia can result in severe hypoxaemic respiratory failure that requires intensive medical care. We wished to describe COVID-19 intensive care patients who were treated with and without invasive ventilatory support.MATERIAL AND METHODThe material was retrieved from the local quality register and comprises data on patients with COVID-19 admitted to the intensive care department at Oslo University Hospital Ullevål from 5 March-28 May 2020. The patients were categorised in three groups on the basis of the treatment they received for respiratory failure (oxygen alone, supplemental non-invasive ventilation (NIV), and intubation/ventilator) and described using descriptive statistics.RESULTSOf 165 hospitalised COVID-19 patients, a total of 26 (16 %) were treated in our intensive care department. Four of them had do-not-resuscitate-orders and were excluded. The 22 patients included in this study had an average age of 56 years (range 25 to 78 years); 17 (77 %) were men. Eleven patients received ventilator treatment, seven oxygen by mask, and four supplemental NIV. In the ventilator group, as of 28 May 2020 two had died, and the remainder had been discharged alive from the intensive care department, with one remaining hospitalised on a ward. All patients treated with oxygen and NIV were alive and had been discharged from hospital.INTERPRETATIONFor many patients with COVID-19 respiratory failure and need for intensive care, increased oxygen and NIV are sufficient, but the need for intubation must be continuously assessed. More than 90 % of actively treated intensive care patients survived.

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1. **High-flow nasal cannula oxygen therapy in infants with acute lower respiratory tract infection. An experience in hospitals of the City of Buenos Aires.**  
   Monteverde Ezequiel Archivos argentinos de pediatria 2019;117(5):286-293.

INTRODUCTIONDuring the winter, infants with acute lower respiratory tract infection (ALRTI) overburden health resources. In the Autonomous City of Buenos Aires, 35 000 children are seen at the hospitals every year; 8-10 % of them are admitted to the general hospitalization ward and 5-12 % of these, to the intensive care unit (ICU). In 2017, the Department of Maternal and Child Health of the Autonomous City of Buenos Aires included high flow nasal cannula (HNFC) oxygen therapy in the ALRTI protocol in the general ward of 3 hospitals. The objective of this study was to describe its outcomes and explore the potential factors related to therapeutic failure.METHODSProspective, descriptive study with infants < 18 months old hospitalized due to ALRTI in 3 hospitals (Durand, Elizalde, Gutiérrez) between June and September 2017. All children unable to comply with low-flow therapeutic targets received HNFC oxygen therapy; admission to the ICU was considered a failure.RESULTSOut of 522 patients hospitalized due to ALRTI, 39.7% required HNFC oxygen therapy. No significant baseline differences were observed between patients receiving HNFC and conventional oxygen therapy. Failure was observed in only 8.7% of patients with HNFC oxygen therapy. The decrease in respiratory rate was significantly greater and longer in patients with support success versus those with failure (p < 0.01). No complications were recorded.CONCLUSIONSThe implementation of HNFC oxygen therapy under a protocol in the general wards was a safe measure. Patients with therapeutic failure showed a smaller reduction in respiratory rate during treatment.

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1. **Human coronavirus in young children hospitalized for acute respiratory illness and asymptomatic controls**  
   Prill M.M. Pediatric Infectious Disease Journal 2012;31(3):235-240.

BACKGROUND: Human coronaviruses (HCoVs) have been detected in children with upper and lower respiratory symptoms, but little is known about their relationship with severe respiratory illness. <br/>OBJECTIVE(S): To compare the prevalence of HCoV species among children hospitalized for acute respiratory illness and/or fever (ARI/fever) with that among asymptomatic controls and to assess the severity of outcomes among hospitalized children with HCoV infection compared with other respiratory viruses. <br/>METHOD(S): From December 2003 to April 2004 and October 2004 to April 2005, we conducted prospective, population-based surveillance of children &lt;5 years of age hospitalized for ARI/fever in 3 US counties. Asymptomatic outpatient controls were enrolled concurrently. Nasal/throat swabs were tested for HCoV species HKU1, NL63, 229E, and OC43 by real-time reverse-transcription polymerase chain reaction. Specimens from hospitalized children were also tested for other common respiratory viruses. Demographic and medical data were collected by parent/guardian interview and medical chart review. <br/>RESULT(S): Overall, HCoV was detected in 113 (7.6%) of 1481 hospitalized children (83 [5.7%] after excluding 30 cases coinfected with other viruses) and 53 (7.1%) of 742 controls. The prevalence of HCoV or individual species was not significantly higher among hospitalized children than controls. Hospitalized children testing positive for HCoV alone tended to be less ill than those infected with other viruses, whereas those coinfected with HCoV and other viruses were clinically similar to those infected with other viruses alone. <br/>CONCLUSION(S): In this study of children hospitalized for ARI/fever, HCoV infection was not associated with hospitalization or with increased severity of illness. Copyright &#xa9; 2012 by Lippincott Williams & Wilkins.

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