High-Flow Nasal Cannula for severe COVID-19, a multicentre prospective cohort study

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1) In what proportion of severe hypoxic COVID-19 patients on HFNC is invasive mechanical ventilation necessary? 2) In what proportion of severe hypoxic COVID-19 patients with an DNI code on HFNC results in progressive respiratory failure or death?

Ethical review	Positive opinion
Status	Recruitment stopped
Health condition type	-
Study type	Observational non invasive

Summary

ID

NL-OMON19993

Source
NTR

Brief title
HFNC for severe COVID-19

Health condition

COVID-19

Sponsors and support

Primary sponsor: No sponsors
Source(s) of monetary or material Support: Stichting BOF: bevordering onderzoek Franciscus,Indorama Ventures Europe B.V.

Intervention

Outcome measures

Primary outcome

The primary study endpoint is HFNC failure. HFNC failure is defined as: Patients without a DNI policy: Intubation. or Patients with DNI policy: Persistent hypoxemia, defined as SpO2 < 90% despite a maximum FiO2 (>90%) and flow (>50L/min) and/or death because of terminal respiratory failure.

Secondary outcome

Feasibility of HFNC > Proportion of non-ICU admitted HFNC patients requiring ICU admission > Proportion of HFNC patients requiring NIV (CPAP or BiPAP) > Duration of HFNC therapy (ward vs ICU) To identify risk factors associated with treatment failure of HFNC (baseline risk factors or time-dependent/treatment-related risk factors) To determine the long-term consequences of the use of HFNC therapy on physical activity level, persisting symptoms and health-related quality of life in severe COVID-19 patients who were treated with HFNC. Tertiary outcome* To determine the evolution of the ROX index in severe hypoxic COVID-19 patients during HFNC treatment. To compare primary and secondary endpoints between subgroups of patients such as: a. Early HFNC start (defined as: maximum 6L O2/min) vs. late (defined as: more than 6L O2/min). b. Start HFNC with low or high ROX index c. Start HFNC on ward vs. ICU d. Start HFNC with a flow of 40L/min vs. flow > 40L/min e. Centers with HFNC only in ICU vs. Center with HFNC in ward and ICU Longer duration of HFNC therapy is associated with persistent long-term symptoms and poorer long-term outcomes on quality of life and physical performance .

Study description

Background summary

Rationale: the European Society of Intensive Care Medicine recently advised that HFNC may be used in severe COVID-19 patients as an alternative to supply high amount of oxygen and thus may prevent intubation in these patients. Limited experience with the use of HFNC in COVID-19 patients has been reported until now. The retrospective character, the absence of a predefined protocol how to manage HFNC and no clearly defined intubation criteria are important limitations of these studies and underline the need for a prospective study to evaluate the effects of HFNC in COVID-19 patients. Objectives Primary: to investigate what proportion of severe hypoxic COVID-19 patients on HFNC fails on HFNC. Secondary: to investigate the feasibility of HFNC in severe hypoxic COVID-19 patients (in non-ICU setting); To identify risk factors associated with treatment failure of HFNC; to investigate the long-term consequences of the use of HFNC therapy on physical activity level, persisting symptoms and health-related quality of life. Study design A multicentre prospective observational study. All patients with hypoxemic respiratory failure due to severe COVID-19 with an indication for HFNC will be included in the study. Study population All (suspected) COVID-19 patients ≥ 18

years old with isolated severe hypoxic respiratory failure defined as: SpO2 < 92% and/or BF>30/min despite treatment with at least 6 L/min oxygen therapy on nasal cannula. Intervention HFNC treatment on the appointed general wards, the emergency department or on the ICU. Patients will be treated according to the current local guidelines of the hospital, within their standard of care. The indication to start HFNC is: --> Despite the use of > 6L O2/min: SpO2 < 92% and/or breathing frequency >30/min HFNC can be started at flow 40-60 L/min. FiO2 will be adapted on basis of oxygen saturation, aiming for an adequate oxygen saturation and limiting tachypnea. Minimal monitoring will consist of O2 saturation, respiratory rate, ROX-index, blood pressure, HR at regular time points after initiation of HFNC and at least at timepoints 0, 0/5, 1, 2, 4, 6, 12, 24h after start of HFNC and 3 times daily. Data will be collected between the first admission day until day of discharge from hospital. Six or twelve months after admission, patients will be invited to fill in questionnaires on health-related quality of life, physical activity, symptoms, and health care use. Main study endpoints The primary study endpoint is HFNC failure. HFNC failure is defined as invasive mechanical ventilation (full code) and progressive respiratory failure or death (DNI code).

Study objective

1) In what proportion of severe hypoxic COVID-19 patients on HFNC is invasive mechanical ventilation necessary? 2) In what proportion of severe hypoxic COVID-19 patients with an DNI code on HFNC results in progressive respiratory failure or death?

Study design

9-12 months

Intervention

HFNC treatment on the appointed general wards, the emergency department or on the ICU. Patients will be treated according to the current local guidelines of the hospital, within their standard of care. The indications for start of HFNC is: Despite the need of at least 6L O2/min: 1. SpO2 < 92% and/or 2. Breathing frequency >30/min HFNC can be adapted on basis of oxygen saturation and respiratory rate, aiming for an adequate oxygen saturation and respiratory rate, for which the target values may vary between different centres. Minimal requirement for monitoring will consist of O2 saturation, respiratory rate, ROX-index (see below), blood pressure, HR at regular time points after initiation of HFNC and at least at time-points 0, 0/5, 1, 2, 4, 6, 12, 24h after start of HFNC and 3 times daily thereafter. After discontinuation of HFNC these parameters will be monitored at least 3 times daily and on clinical indication. Arterial blood gas analysis will be performed at the discretion of the treating physician, but preferably at hospital admission, just before start of HFNC and on indication, for example when there is a clinical deterioration and/or suspected hypercapnia. ROX index = %SpO2/(FiO2*breathing frequency) • SpO2% (0-100%) • FiO2: 0.21-1.0 • Breathing frequency (0-…/min) The FiO2 on conventional oxygen therapy will be estimated as follows: FiO2(%) = 21 + 4 * flow (L/min) [12]. The FiO2 when using HFNC is the set FiO2.The intensive care department may be informed before the start of HFNC on the ER/wards and consultation of the intensive care department is advised in the following conditions: Major

criteria Following conditions during treatment with HFNC, despite FiO2 0.6 (=60%) □ SpO2 <92% or □ ROX index ≤ 4.88 or □ Worsening of ROX index after start of HFNC or □ Persistent high breathing frequency (>30/min for >30 min) and/or PaCO2 <30mmHg or □ Increasing PaCO2 >45mmHg Delirium (p.e. DOS score > 3), without any other reason than hypoxemia. Indication for treatment in ICU other than respiratory failure (e.g. GCS<8; hypotensive: SBP <90 mmHg). The intensive care consultant may assess the patient, and may give advice about the treatment and monitoring of the patient. There are three potential options: 1. HFNC will be continued with higher FiO2 on the COVID-19 ward. 2. The patient will be transferred to the ICU and HFNC will be continued with higher FiO2. 3. The patient will be transferred to the ICU and mechanical ventilation will be started after tracheal intubation. The reason for intubation and start mechanical ventilation will be registered (see endpoints). The following pre-specified criteria for endotracheal intubation and mechanical ventilation are advised, but not mandatory [6]: □ Signs of persisting or worsening respiratory failure, defined by at least two of the following criteria: o A respiratory rate ≥ 30 per minute o Lack of improvement of signs of respiratory- muscle fatigue o Development of copious tracheal secretions o Respiratory acidosis with a pH below 7.35 o SpO2 < 90 mmHg for more than 5 min without technical dysfunction o Intolerance for HFNC □ Persistent hemodynamic instability defined by a SBP below 90 mmHg (MAP < 65 mmHg) for more than 15 minutes or requirement for vasopressor (>0.3□g/kg/min) □ Detoriation of neurologic status defined as a Glasgow come scale < 12 points The final decision is left at the discretion of the attending physician. No trial of non-invasive ventilation is advised after HFNC failure. Suggested protocol for phasing out and when to stop HFNC (appendix 3): The following strategy for phasing out and stopping of HFNC in appendix 3 is advised, but not mandatory. The final decision remains at the discretion of the treating physician. Six or twelve months after admission, patients will be invited to fill in questionnaires on health-related quality of life, physical activity, symptoms, and health care use.

Contacts

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Eligibility criteria

Inclusion criteria

The population included will be hospitalized patients with confirmed COVID-19, ≥ 18 years old with isolated severe hypoxic respiratory failure defined as: SpO2 < 92% and/or BF>30/min despite treatment with at least 6 L/min oxygen therapy on nasal cannula. These patients may be included at the pulmonary departments delivering COVID-19 care, intensive care units or directly on the Emergency department. SARS-CoV-2 negative patients (nasopharyngeal PCR) will be excluded for this analysis, retrospectively. Inclusion criteria In order to be eligible to participate in this study, a subject must meet all of the following inclusion criteria: Age ≥ 18 years Admitted to the hospital Suspect of COVID-19 or nasopharyngeal swab PCR confirmed COVID-19 SpO2 < 92% and/ or breathing frequency >30/min despite at least 6L O2/min on nasal cannula.

Exclusion criteria

A potential subject who meets any of the following criteria will be excluded from participation in this study: Reasons for direct intubation, as per local standard of clinical care. Patient does not accept treatment with HFNC Anatomic abnormalities (recent surgery of the face, nose, or airway) that preclude an appropriate-fitting nasal cannula

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non controlled trial
Masking:	Open (masking not used)
Control:	N/A , unknown

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-12-2020
Enrollment:	600
Type:	Actual

IPD sharing statement

Plan to share IPD: Yes

Ethics review

Positive opinion

Date:	27-11-2020
Application type:	First submission

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
NTR-new	NL9067
Other	MEC-U : MEC-U: W20.283

Study results