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

Gepubliceerd: 27-11-2020 Laatst bijgewerkt: 08-05-2023

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?

Ethische beoordeling	Positief advies
Status	Werving gestopt
Type aandoening	-
Onderzoekstype	Observationeel onderzoek, zonder invasieve metingen

Samenvatting

ID

NL-OMON19993

Bron
Nationaal Trial Register

Verkorte titel
HFNC for severe COVID-19

Aandoening

COVID-19

Ondersteuning

Primaire sponsor: No sponsors
Overige ondersteuning: Stichting BOF: bevordering onderzoek Franciscus,Indorama Ventures Europe B.V.

Onderzoeksproduct en/of interventie

Uitkomstmaten

Primaire uitkomstmaten

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.

Toelichting onderzoek

Achtergrond van het onderzoek

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).

Doel van het onderzoek

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?

Onderzoeksopzet

9-12 months

Onderzoeksproduct en/of interventie

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 (>0.3g/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.

Contactpersonen

Publiek

Franciscus Gasthuis & Vlietland
Yasemin Türk

0104616161

Wetenschappelijk

Franciscus Gasthuis & Vlietland
Yasemin Türk

0104616161

Deelname eisen

Belangrijkste voorwaarden om deel te mogen nemen (Inclusiecriteria)

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.

Belangrijkste redenen om niet deel te kunnen nemen (Exclusiecriteria)

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

Onderzoeksopzet

Opzet

Type:	Observationeel onderzoek, zonder invasieve metingen
Onderzoeksmodel:	Anders
Toewijzing:	N.v.t. / één studie arm
Blindering:	Open / niet geblindeerd
Controle:	N.v.t. / onbekend

Deelname

Nederland

Status:	Werving gestopt
(Verwachte) startdatum:	01-12-2020
Aantal proefpersonen:	600
Type:	Werkelijke startdatum

Voornemen beschikbaar stellen Individuele Patiënten Data (IPD)

Wordt de data na het onderzoek gedeeld: Ja

Ethische beoordeling

Positief advies

Datum:	27-11-2020
Soort:	Eerste indiening

Registraties

Opgevolgd door onderstaande (mogelijk meer actuele) registratie

Geen registraties gevonden.

Andere (mogelijk minder actuele) registraties in dit register

Geen registraties gevonden.

In overige registers

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

Resultaten