

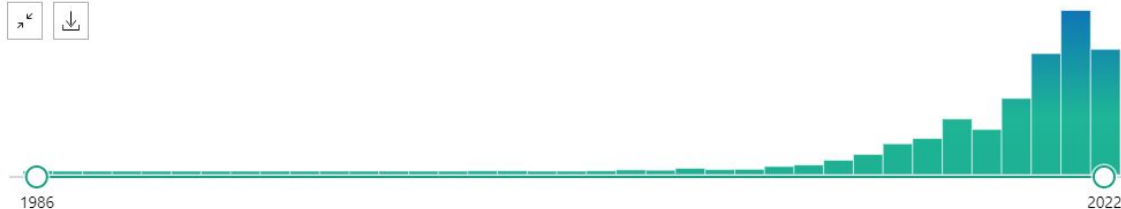


OHD en Réanimation

Dr Sihem BOUHARAOUA
Réanimation URM/IUCT-O

RESULTS BY YEAR

1,936 results



MY NCBI FILTERS

TEXT AVAILABILITY

- Abstract
- Free full text
- Full text

ARTICLE ATTRIBUTE

- Associated data

ARTICLE TYPE

- Books and Documents

High-Flow Nasal Cannula Oxygen Therapy Devices.

1 Nishimura M.

Cite Respir Care. 2019 Jun;64(6):735-742. doi: 10.4187/respcare.06718.

PMID: 31110041 Free article. Review.

Share During the 1990s, noninvasive ventilation was found to be superior to invasive ventilation for exacerbations of COPD, acute cardiogenic pulmonary edema, and acute respiratory failure in patients who were immunocompromised. In the 2000s, less invasive high-flow na ...

High-Flow Nasal Cannula Therapy in COVID-19: Using the ROX Index to Predict Success.

2

Cite Chandel A, Patolia S, Brown AW, Collins AC, Sahjwani D, Khangoora V, Cameron PC, Desai M, Kasarabada A, Kilcullen JK, Nathan SD, King CS.

Respir Care. 2021 Jun;66(6):909-919. doi: 10.4187/respcare.08631. Epub 2020 Dec 16.

PMID: 33328179 Free article.



Dispositifs disponibles

Non humidifié
Non réchauffé
Contrôle FiO2 peu précis

Humidification
Réchauffement
Contrôle FiO2 précis



Sonde nasale

0.5 à 6 l/min



Canule nasale



Masque facial

Max 10 l/min



MHC

Max 15 l/min



OHD

35 à 60 l/min



VNI ou CPAP



Intubation

Insuffisance respiratoire aiguë

Echanges gazeux alvéolaire déficients

Hypoxémie

OHD

Pompe respiratoire déficiente

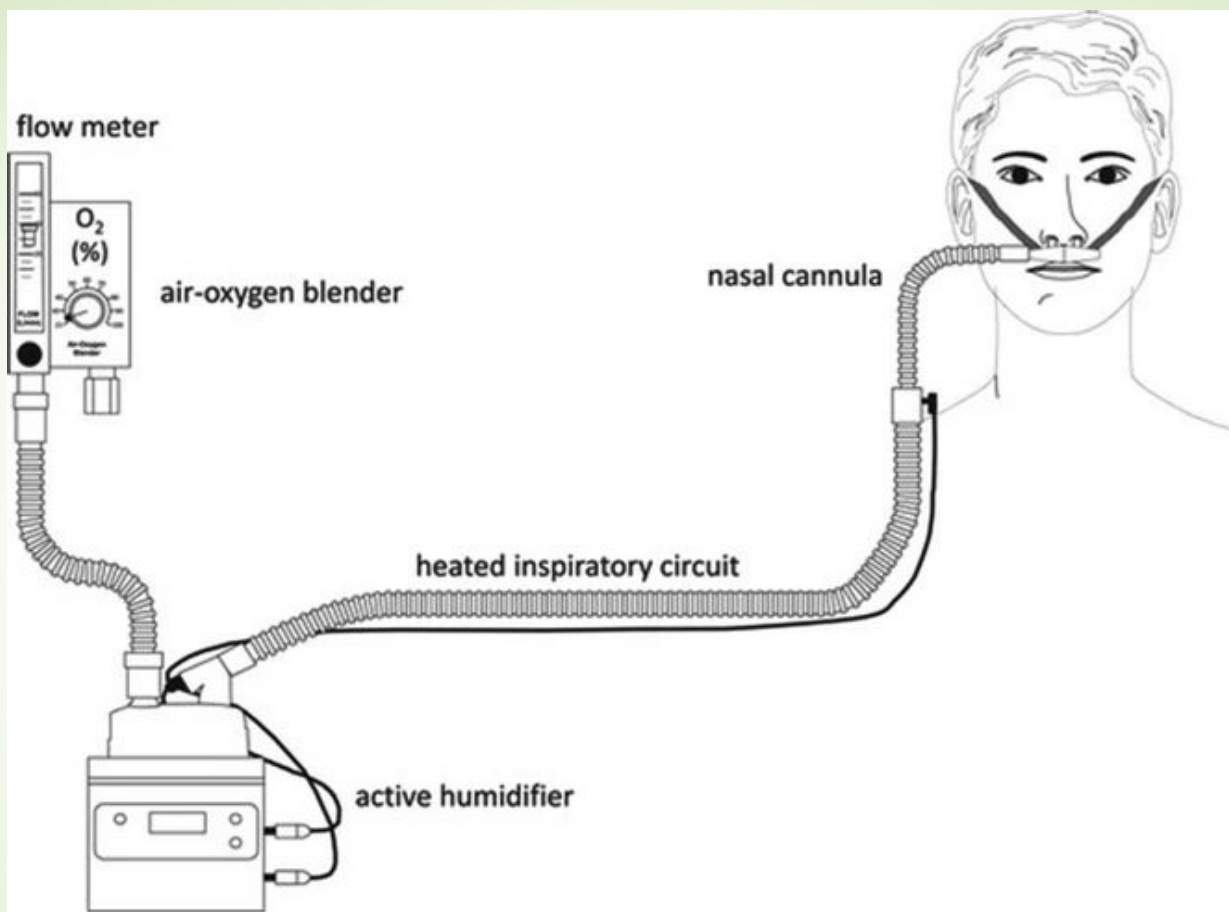
Hypoxémie +
Hypercapnie

VNI
VI

Echanges gazeux et
pompe respiratoire
déficients

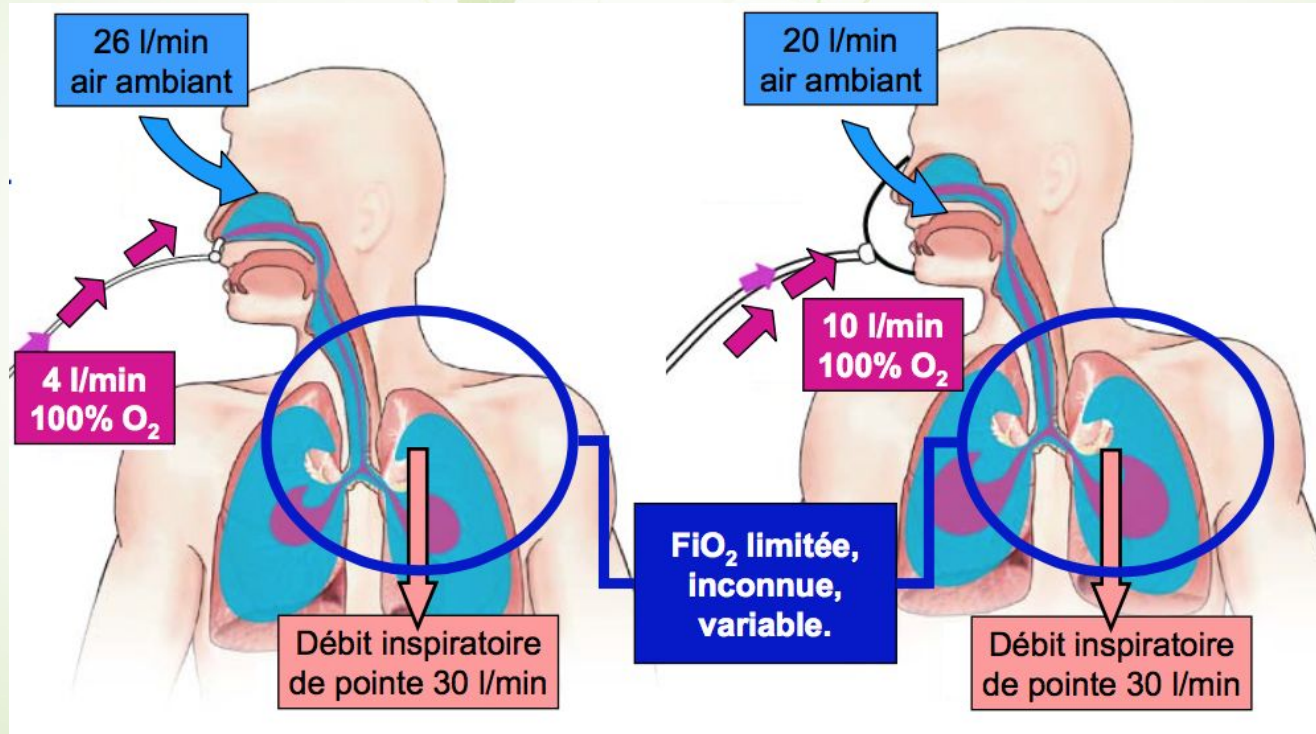
Hypoxémie +
Hypercapnie

VNI
VI

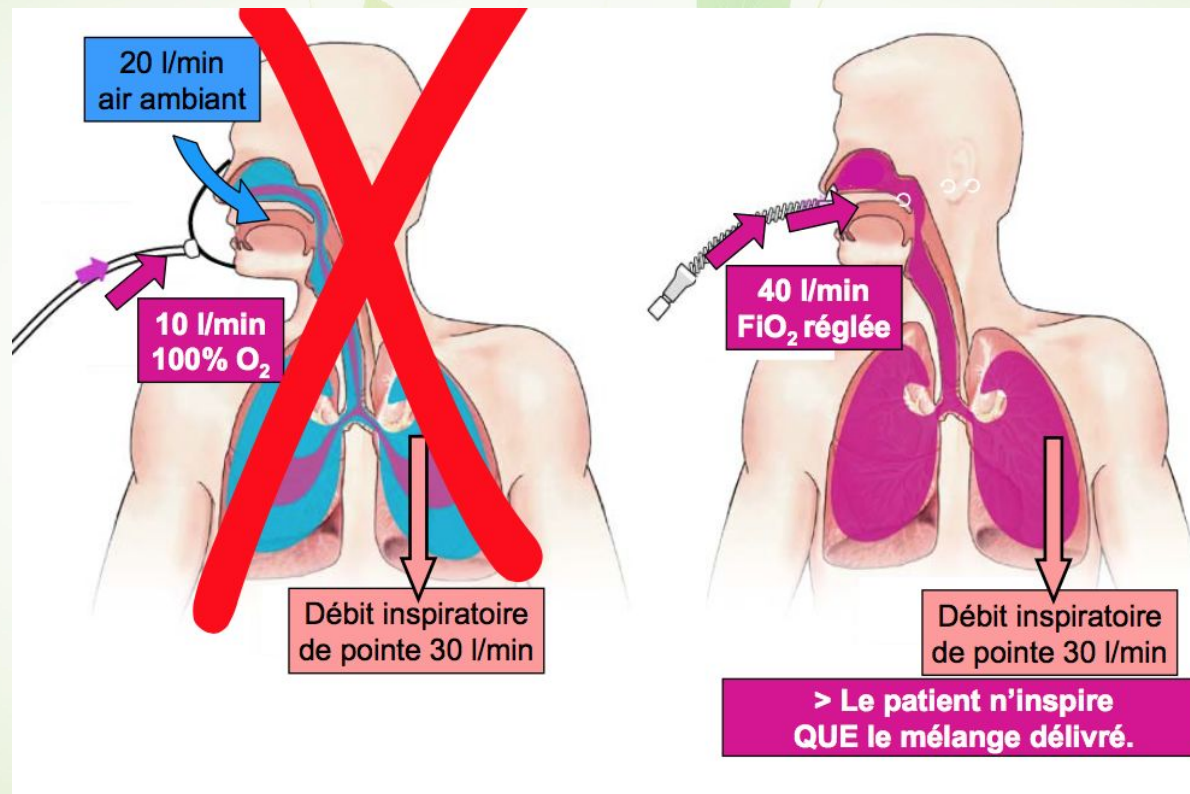


Papazian ICM 2016

IRA et oxygénothérapie



OHD



OHD



Optiflow

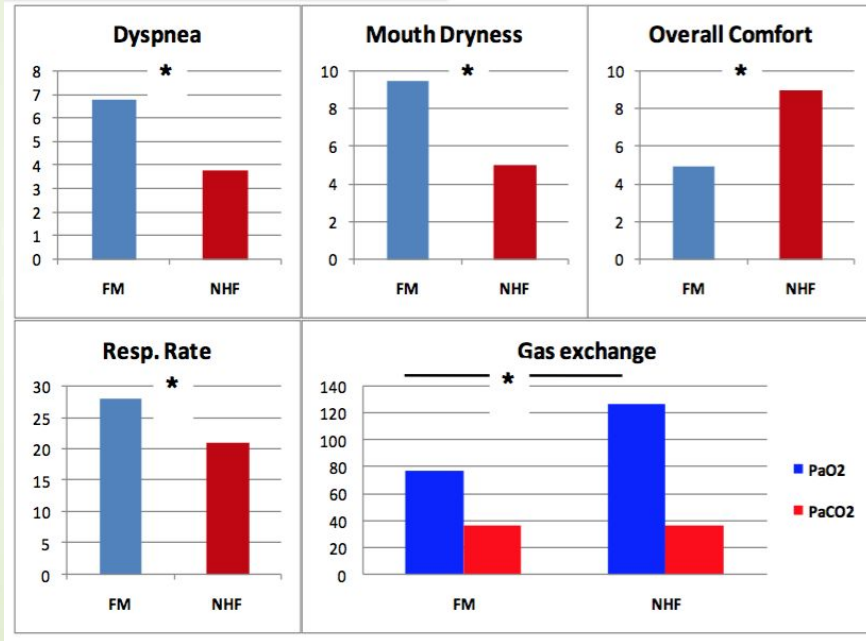


Airvo

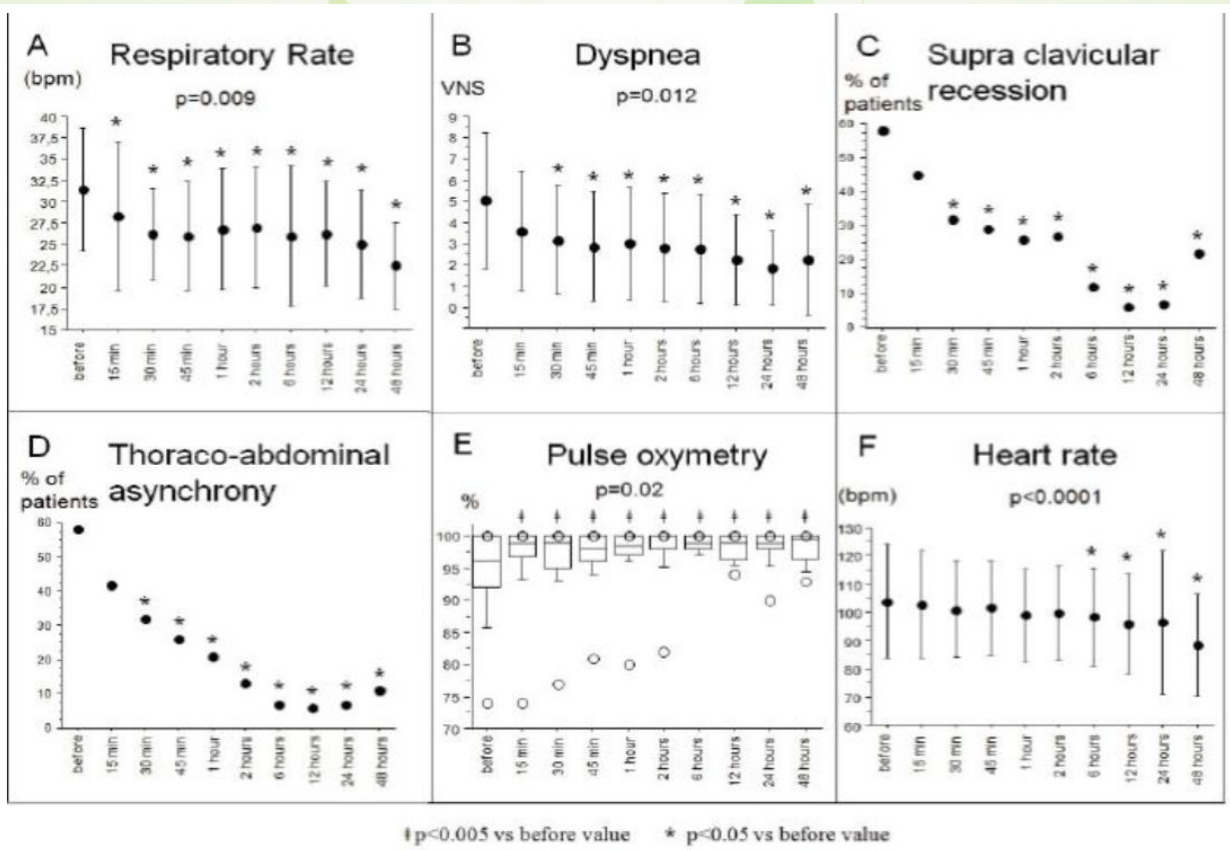


Respi de réa

OHD: amélioration oxygénation et confort



20 patients
SpO2 < 96%
FiO2 > 0.5
Venturi Mask vs OHD / 30 min



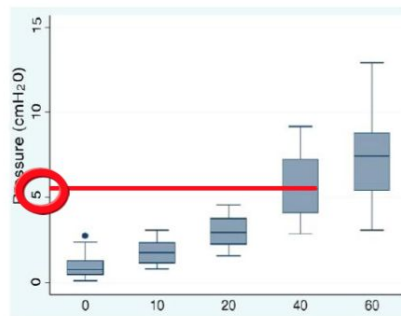
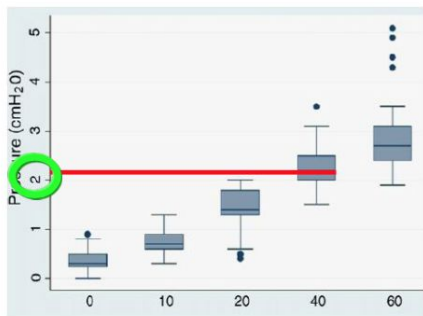
OHD et effet PEP

Australian Critical Care (2007) 20, 126–131



High flow nasal oxygen generates positive airway pressure in adult volunteers

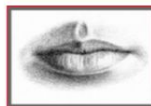
Nicole Groves Bachelor of Nursing, Post-Graduate Diploma in Advanced Clinical Nursing (Critical Care)*, Antony Tobin FRACP FJFICM



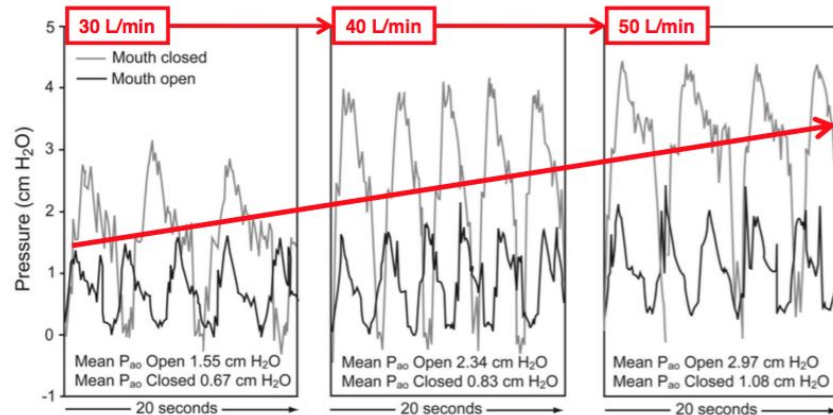
Bouche ouverte



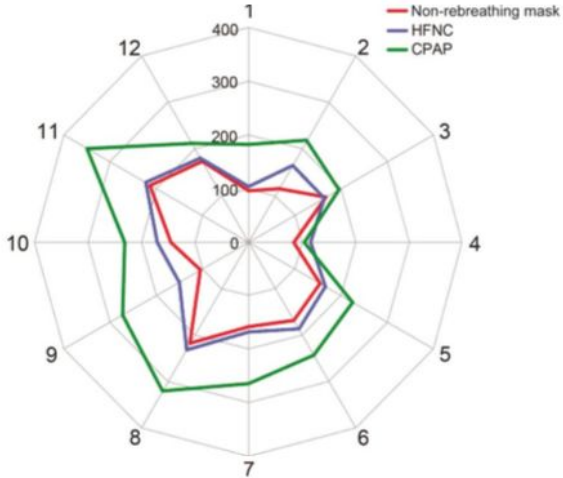
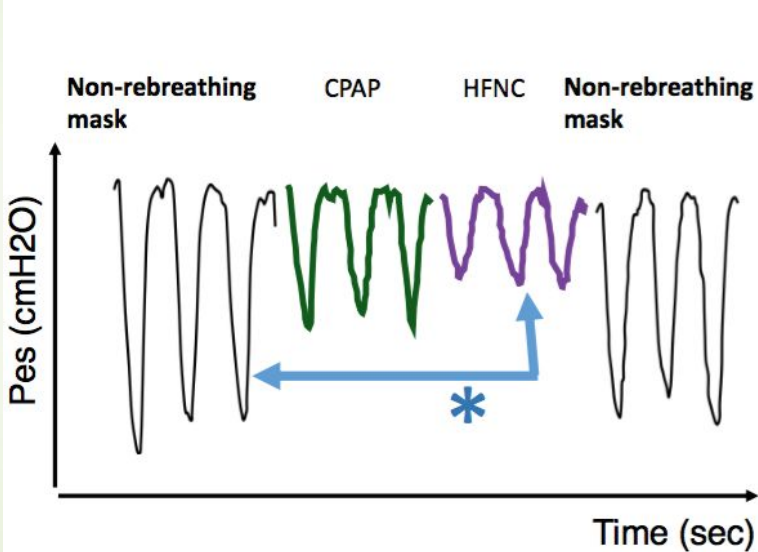
cathéter nasopharyngé



Bouche fermée



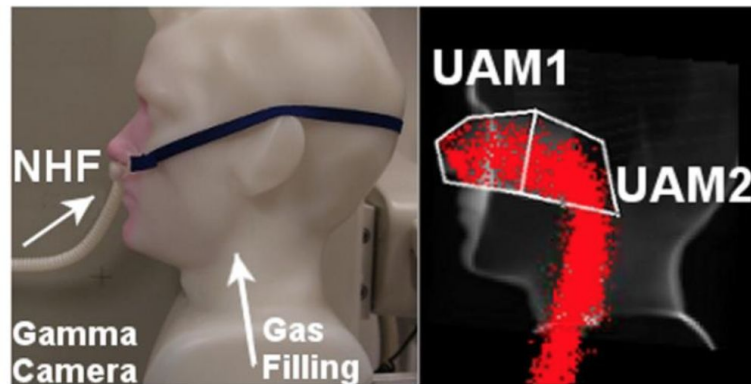
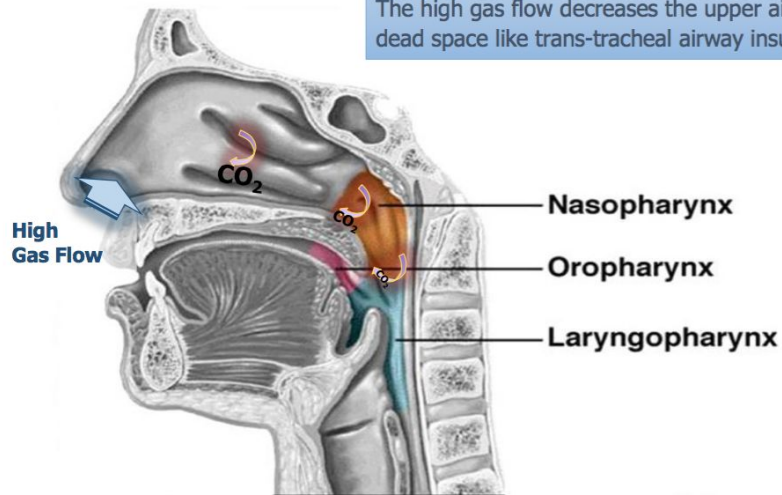
Diminution du travail inspiratoire



Vargas et al. Respir Care 2015

Lavage de l'espace mort

The high gas flow decreases the upper airway dead space like trans-tracheal airway insufflation



Humidification active



Humidité optimale (37° / 44 mg/l : BTPS/ Point de Saturation Isothermique, 100% d'humidité relative)



Rend les hauts débits compatibles avec la physiologie des voies aériennes supérieures
Environ 75% de l'humidité et de la chaleur sont fournis par le naso et l'oropharynx.



Vapeur d'eau -> pas de transport de bactéries et virus (vs barboteurs, nébuliseurs, brumisateurs)

IRA et OHD

| Reference | Study design | Population | N patients | Main results |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hypoxemic acute respiratory failure in the ICU | | | | |
| Sztrymf ICM 2011 | Cohort, unselected patients. HFNC 50 L/min vs. face mask oxygen | Hypoxemic ARF | 38 | Improved oxygenation Decreased respiratory rate |
| Sztrymf JCC 2012 | Cohort, unselected patients. HFNC 20-30 L/min vs. face mask oxygen | Hypoxemic ARF | 20 | Improved oxygenation Decrease in respiratory/heart rates, dyspnoea, respiratory distress, and thoraco-abdominal asynchrony |
| Parke Respir Care 2011 | HFNC vs. face mask oxygen | Hypoxemic ARF | 60 | Decreased treatment failure (defined as need for non-invasive ventilation) from 30% to 10%. Fewer desaturation episodes |
| Roca Respir Care 2010 | Cohort study, HFNC 20-30 L/min vs. face mask oxygen | Hypoxemic ARF | 20 | Improved comfort; Improved oxygenation |
| Rello JCC 2012 | Cohort study (post hoc) | Hypoxemic ARF (2009 A/H1N1v outbreak) | 20 | 9/20 (45%) success (no intubation). All 8 patients on vasopressors required intubation within 24 hours. After 6 hours of HFNC, non-responders had lower PaO ₂ /FiO ₂ values |
| Messika Respir Care 2015 | Observational, single-centre study | ARDS | 45 | 40% intubation rate. HFNC failure associated with higher SAPSII, development of additional organ failure, and trends toward lower PaO ₂ /FiO ₂ values and higher respiratory rate |
| Frat NEJM 2015 | Multicentre, open-label RCT with 3 groups: HFNC, usual oxygen therapy (face mask), or non-invasive ventilation. | Hypoxemic ARF, PaO ₂ /FiO ₂ ≤ 300 | 310 | Intubation rate was 38% with HFNC, 47% with standard oxygen, and 50% with non-invasive ventilation. Decreased day-90 mortality with HFNC |
| Nagata Respir Care 2015 | Retrospective before/after study of HFNC | Hypoxemic ARF | 172 | Reduced need for intubation (100% vs 63%, P<0.01) |
| Kang ICM 2015 | Patients intubated after HFNC | Hypoxemic ARF | 175 | In patients intubated early, lower mortality (39.2 vs. 66.7 %), higher extubation success (37.7% vs. 15.6 %) and more ventilator-free days. Early intubation was associated with decreased ICU mortality. |
| Hypoxemic acute respiratory failure in the emergency department | | | | |
| Lenglet Respir Care 2012 | Patients with ARF (>9 L/min oxygen or clinical signs of respiratory distress) | Hypoxemic ARF | 17 | Decreased dyspnoea and respiratory rate and improved oxygenation |
| Rittayamal Respir Care 2015 | RCT of HFNC vs. standard oxygen for 1 h | Hypoxemic ARF | 40 | Decreased dyspnoea and improved comfort |

The NEW ENGLAND
JOURNAL of MEDICINE

ESTABLISHED IN 1812

JUNE 4, 2015

VOL. 372 NO. 23

High-Flow Oxygen through Nasal Cannula in Acute Hypoxemic
Respiratory Failure

OHD+/-VNI vs O2 classique



Diminution IOT à J28?

Inclusion : patients avec une IRA - FR > 25

- P/F < 300 (débit \geq 10 lpm)

- PaCO₂ < 46 mmHg

- Sans pathologie pulmonaire chronique

Exclusion: OAP, neutropénie, vasopresseurs, LATA...

N= 310

O2 Standard

Masque haute
concentration

Débit O₂ \geq 10 lpm
pour SpO₂ \geq 92%

VS

**HFNC
Optiflow®**

Canules nasales

Débit 50L/min

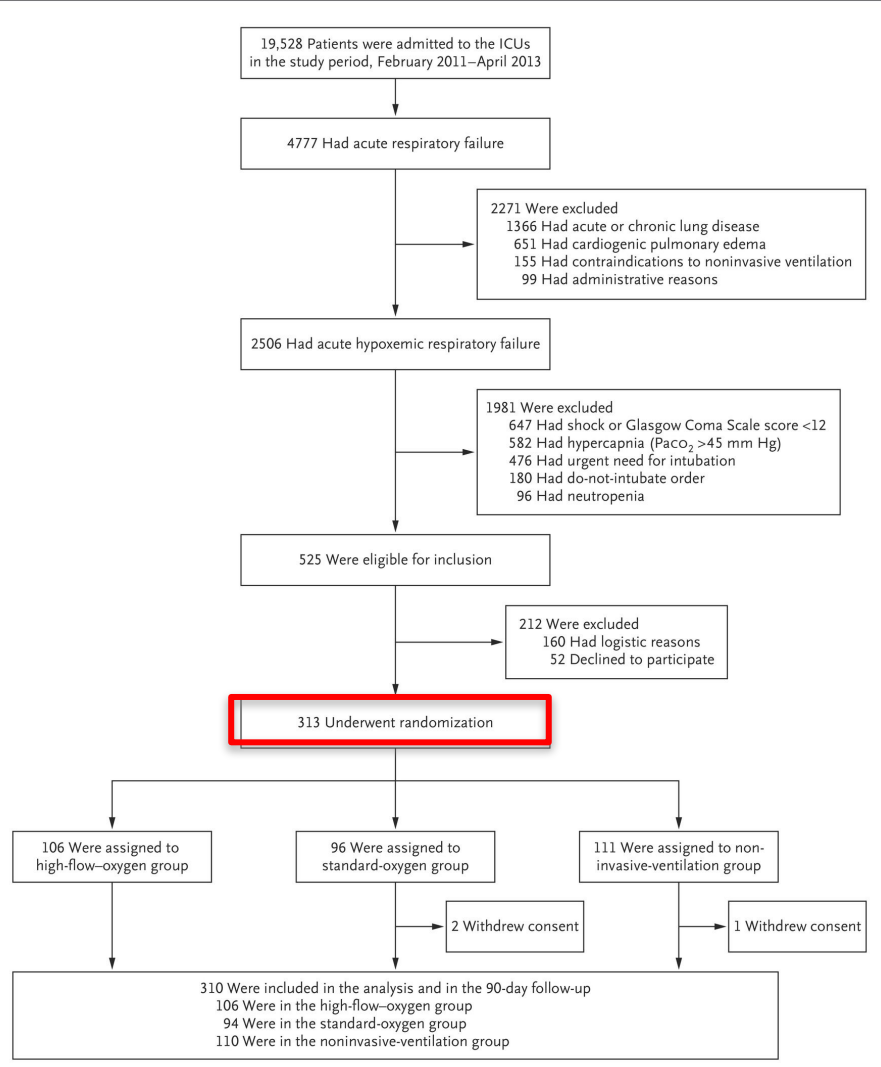
FiO₂ pour SpO₂ \geq 92%
Relais O₂ standard

VS

**Optiflow®
+ VNI**

AI pour Vte = 7-10 ml/kg
et PEEP = 2-10 cmH₂O
FiO₂ pour SpO₂ \geq 92%

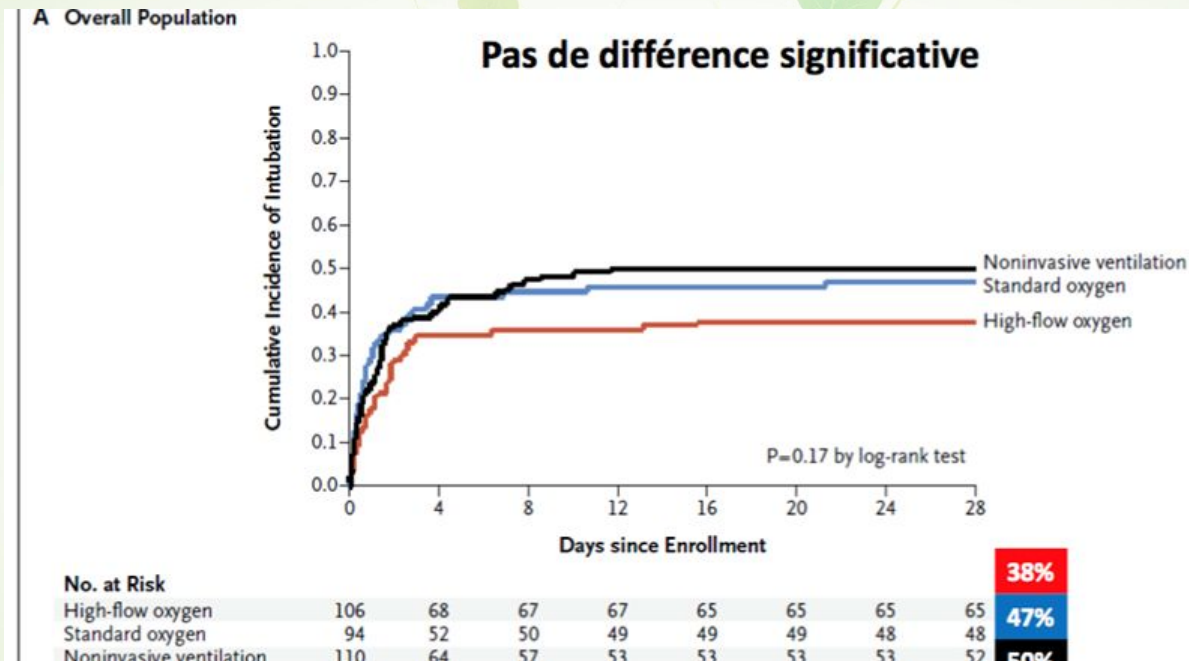
Au moins 8h par jour durant
les deux premiers jours



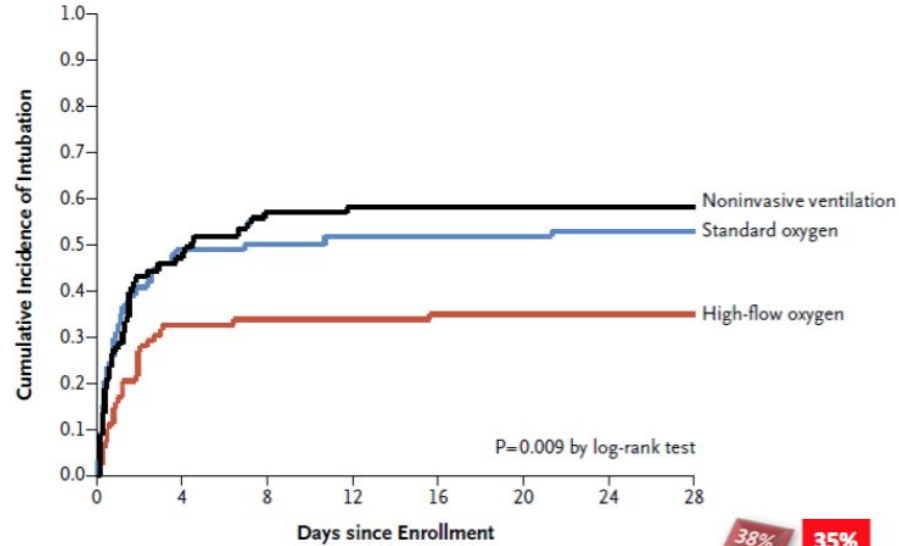
| Characteristic | High-Flow Oxygen (N=106) | Standard Oxygen (N=94) | Noninvasive Ventilation (N=110) |
|------------------------------------------------|-----------------------------|---------------------------|------------------------------------|
| Age — yr | 61±16 | 59±17 | 61±17 |
| Male sex — no. (%) | 75 (71) | 63 (67) | 74 (67) |
| Body-mass index† | 25±5 | 26±5 | 26±6 |
| SAPS II‡ | 25±9 | 24±9 | 27±9 |
| Current or past smoking — no. (%) | 34 (32) | 36 (38) | 40 (36) |
| Reason for acute respiratory failure — no. (%) | | | |
| Community-acquired pneumonia | 71 (67) | 57 (61) | 69 (63) |
| Hospital-acquired pneumonia | 12 (11) | 13 (14) | 12 (11) |
| Extrapulmonary sepsis | 4 (4) | 5 (5) | 7 (6) |
| Aspiration or drowning | 3 (3) | 1 (1) | 2 (2) |
| Pneumonia related to immunosuppression | 6 (6) | 4 (4) | 10 (9) |
| Other | 10 (9) | 14 (15) | 10 (9) |
| Arterial blood gas | | | |
| pH | 7.43±0.05 | 7.44±0.06 | 7.43±0.06 |
| Pao ₂ — mm Hg | 85±31 | 92±32 | 90±36 |
| Fio ₂ § | 0.62±0.19 | 0.63±0.17 | 0.65±0.15 |
| Pao ₂ :Fio ₂ — mm Hg | 157±89 | 161±73 | 149±72 |
| Paco ₂ — mm Hg | 36±6 | 35±5 | 34±6 |



IOT à J28

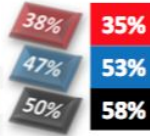


Sous groupe P/F <200



No. at Risk

| | | | | | | | | |
|-------------------------|----|----|----|----|----|----|----|----|
| High-flow oxygen | 83 | 55 | 54 | 54 | 53 | 53 | 53 | 53 |
| Standard oxygen | 74 | 37 | 35 | 34 | 34 | 34 | 33 | 33 |
| Noninvasive ventilation | 81 | 41 | 34 | 32 | 32 | 32 | 32 | 32 |



Mortalité diminuée

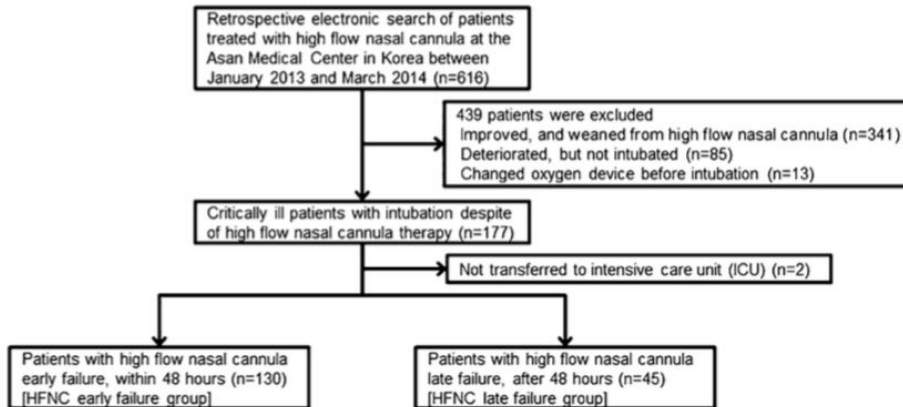
| Outcome | Study Group | | | P Value† | Odds Ratio or Hazard Ratio (95% CI) | |
|------------------------|--------------------------|------------------------|---------------------------------|----------|--------------------------------------|----------------------------------------------|
| | High-Flow Oxygen (N=106) | Standard Oxygen (N=94) | Noninvasive Ventilation (N=110) | | Standard Oxygen vs. High-Flow Oxygen | Noninvasive Ventilation vs. High-Flow Oxygen |
| Death | | | | | | |
| In ICU | | | | | | |
| Unadjusted analysis | | | | 0.047 | 1.85 (0.84–4.09) | 2.55 (1.21–5.35) |
| No. of patients | 12 | 18 | 27 | | | |
| % of patients (95% CI) | 11 (6–19) | 19 (12–28) | 25 (17–33) | | | |
| Adjusted analysis** | — | — | — | — | 2.55 (1.07–6.08) | 2.60 (1.20–5.63) |
| At day 90 | | | | | | |
| Overall population | | | | | | |
| Unadjusted analysis | | | | 0.02 | 2.01 (1.01–3.99) | 2.50 (1.31–4.78) |
| No. of patients | 13 | 22 | 31 | | | |
| % of patients (95% CI) | 12 (7–20) | 23 (16–33) | 28 (21–37) | | | |
| Adjusted analysis** | — | — | — | — | 2.36 (1.18–4.70) | 2.33 (1.22–4.47) |

Délai à l'IOT: NS

| Outcome | Study Group | | | P Value† | Odds Ratio or Hazard Ratio (95% CI) | |
|-------------------------------------------------------------|--------------------------|------------------------|---------------------------------|----------|--------------------------------------|----------------------------------------------|
| | High-Flow Oxygen (N=106) | Standard Oxygen (N=94) | Noninvasive Ventilation (N=110) | | Standard Oxygen vs. High-Flow Oxygen | Noninvasive Ventilation vs. High-Flow Oxygen |
| Interval between enrollment and intubation — hr¶ | | | | | | |
| Overall population | | | | 0.27 | — | — |
| Median | 27 | 15 | 27 | | | |
| Interquartile range | 8–46 | 5–39 | 8–53 | | | |
| Patients with PaO ₂ :FiO ₂ ≤200 mm Hg | | | | 0.32 | — | — |
| Median | 26 | 17 | 27 | | | |
| Interquartile range | 11–46 | 5–41 | 7–52 | | | |
| Reason for intubation — no./total no. (%) | | | | | | |
| Respiratory failure | 36/51 (71) | 43/58 (74) | 49/67 (73) | 0.24 | — | — |
| Circulatory failure | 7/51 (14) | 5/58 (9) | 5/67 (7) | 0.46 | — | — |
| Neurologic failure | 8/51 (16) | 10/58 (17) | 13/67 (19) | 0.91 | — | — |
| Ventilator-free days | | | | | | |
| Overall population | 24±8 | 22±10 | 19±12 | 0.02 | — | — |
| Patients with PaO ₂ :FiO ₂ ≤200 mm Hg | 24±8 | 21±10 | 18±12 | <0.001 | — | — |

OHD: attention au retard d'IOT

Etude rétrospective monocentrique



75%

25%

Intensive Care Med (2015) 41:623–632
DOI 10.1007/s00134-015-3693-5

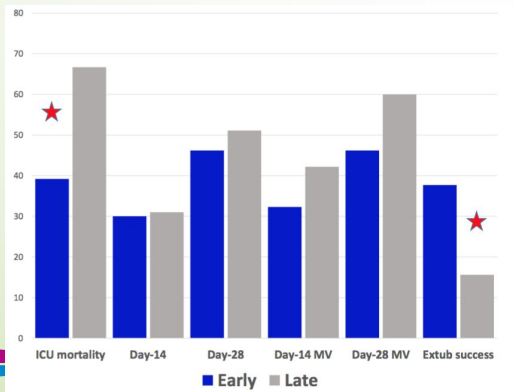
ORIGINAL

Byung Ju Kang
Younsuck Koh
Chae-Man Lim
Jin Won Huh
Seunghee Baek
Myongja Han
Hyun-Suk Seo
Hee Jung Suh
Ga Jin Seo
Eun Young Kim
Sang-Bum Hong

Failure of high-flow nasal cannula therapy may delay intubation and increase mortality

Conséquences...

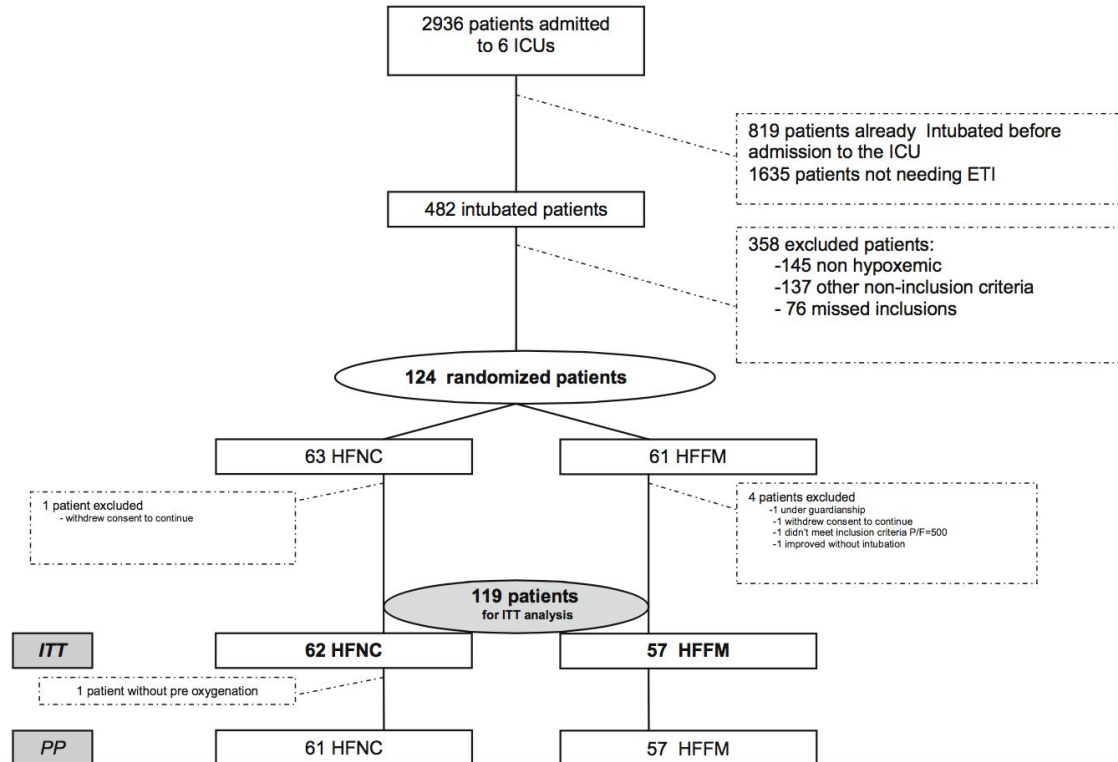
| Characteristics | All patients (n = 175) | Early HFNC failure group (n = 130) | Late HFNC failure group (n = 45) | P value ^a |
|-----------------------------------------------|---------------------------|------------------------------------------|----------------------------------------|----------------------|
| Primary outcome | | | | |
| Overall ICU mortality, n (%) | 81 (46.3) | 51 (39.2) | 30 (66.7) | 0.001 |
| Secondary outcomes | | | | |
| Extubation success, n (%) | 56 (32.0) | 49 (37.7) | 7 (15.6) | 0.006 |
| Ventilator-weaning, n (%) ^c | 85 (48.6) | 72 (55.4) | 13 (28.9) | 0.002 |
| Ventilator-free days to day 28 ^b | 7.3 ± 9.7 | 8.6 ± 10.1 | 3.6 ± 7.5 | 0.001 |
| 14-Day mortality from HFNC application, n (%) | 53 (30.3) | 39 (30.0) | 14 (31.1) | 0.889 |
| 14-Day mortality from intubation, n (%) | 61 (34.9) | 42 (32.3) | 19 (42.2) | 0.229 |
| 28-Day mortality from HFNC application, n (%) | 83 (47.4) | 60 (46.2) | 23 (51.1) | 0.566 |
| 28-Day mortality from intubation, n (%) | 87 (49.7) | 60 (46.2) | 27 (60.0) | 0.109 |
| Length of ICU stay ^b | 12.0 (5.0–22.0) | 11.0 (5.0–19.3) | 16.0 (7.5–28.5) | 0.065 |



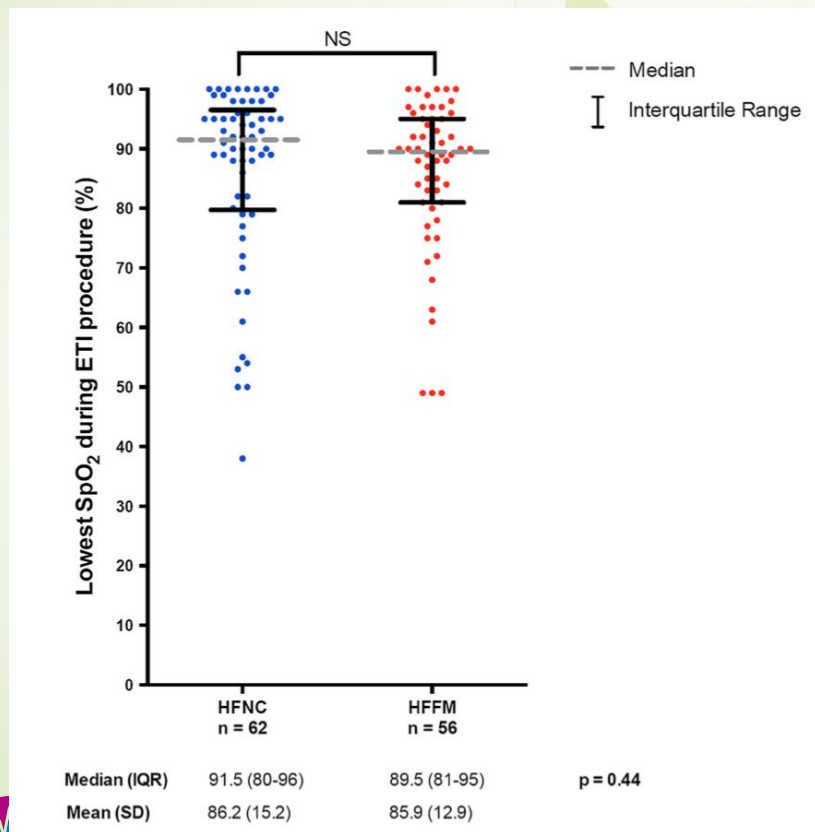
OHD en pré et per-IOT

High-flow nasal cannula oxygen during endotracheal intubation in hypoxemic patients: a randomized controlled clinical trial

Vourc'h M, ICM 2015



SpO2 la plus basse

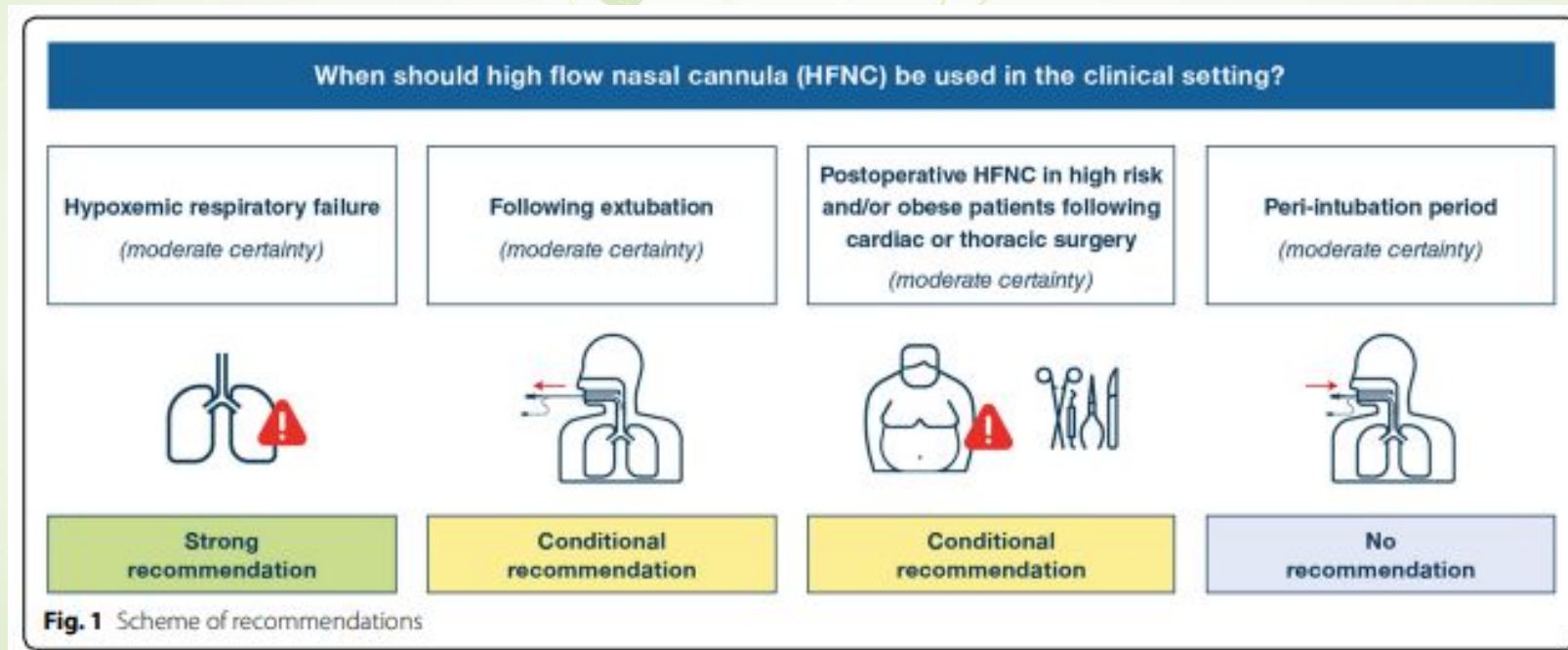


NS

Pas plus de complications

| | High-flow nasal cannulae (<i>n</i> = 62) | High-flow face mask (<i>n</i> = 57) | <i>p</i> ^a |
|--------------------------------------------------------------|-------------------------------------------|--------------------------------------|-----------------------|
| At least one complication, <i>n</i> (%) | 36 (58.1) | 39 (68,4) | 0.24 |
| At least one severe complication ^b , <i>n</i> (%) | 36 (58.1) | 38 (66.6) | 0.33 |
| Desaturation <80 % ^c | 16 (25.8) | 13 (22.8) | 0.70 |
| Cardio-vascular collapse | 24 (38.7) | 30 (52.6) | 0.13 |
| Cardiac arrest | 0 | 1 (1.8) | 0.48 |
| Death | 0 | 0 | |
| Moderate complications ^d , <i>n</i> (%) | | | |
| Cardiac arrhythmia | 0 | 0 | |
| Oesophageal intubation | 0 | 2 (3.5) | 0.23 |
| Agitation | 0 | 1 (1.8) | 0.48 |
| Aspiration | 0 | 0 | |
| Dental injury | 0 | 0 | |

Pour qui?



OHD et COVID-19?

Prediction of outcome of nasal high flow use during COVID-19-related acute hypoxemic respiratory failure

Noémie Zucman¹, Jimmy Mullaert², Damien Roux³, Oriol Roca⁴, Jean-Damien Ricard^{1*} and Contributors

Etude rétrospective monocentrique
116 patients Covid + OHD en réa

Mortalité 17%

**OHD à H4 associée à
diminution du
risque d'IOT**

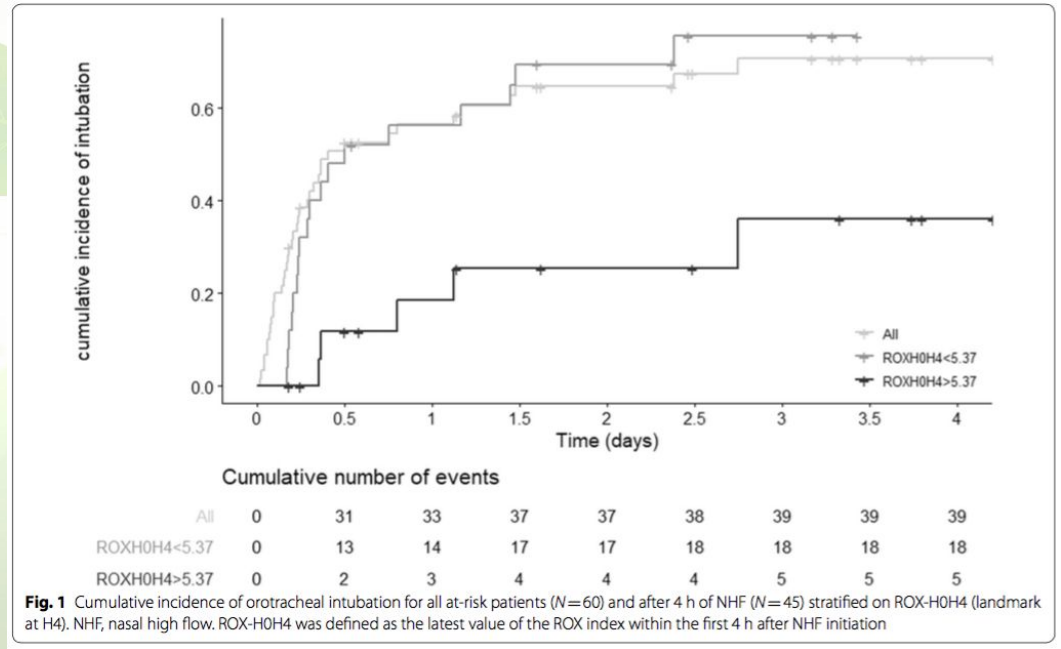
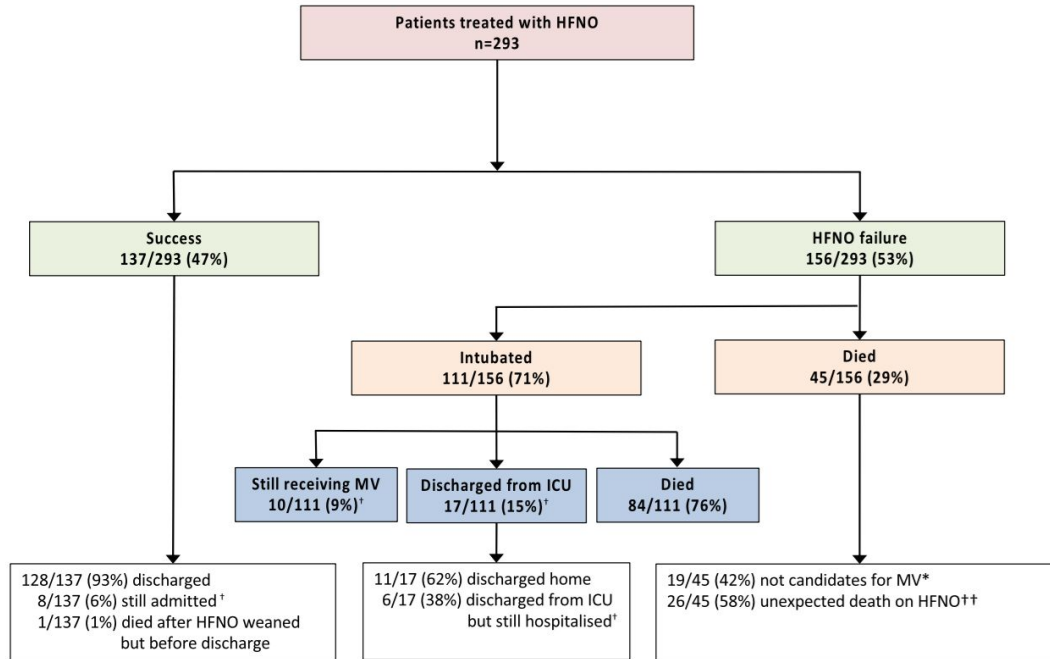


Fig. 1 Cumulative incidence of orotracheal intubation for all at-risk patients (N=60) and after 4 h of NHF (N=45) stratified on ROX-H0H4 (landmark at H4). NHF, nasal high flow. ROX-H0H4 was defined as the latest value of the ROX index within the first 4 h after NHF initiation

The utility of high-flow nasal oxygen for severe COVID-19 pneumonia in a resource-constrained setting: A multi-centre prospective observational study

Gregory L. Calligaro^{a,b,1,*}, Usha Lalla^{c,1}, Gordon Audley^d, Phindile Gina^a, Malcolm G. Miller^b, Marc Mendelson^e, Siphon Dlamini^e, Sean Wasserman^{e,f}, Graeme Meintjes^{f,g}, Jonathan Peter^h, Dion Levinⁱ, Joel A. Dave^j, Ntobeko Ntusi^g, Stuart Meier^{a,1}, Francesca Little^k, Desiree L. Moodley^c, Elizabeth H. Louw^c, Andre Nortje^c, Arifa Parker^l, Jantjie J. Taljaard^l, Brian W. Allwood^c, Keertan Dheda^{a,b,m,1}, Coenraad F.N. Koegelenberg^{c,1}



S02/FiO2

Corticoïdes



Protocole

Pour qui ?



Pneumopathie à COVID 19 avec hypoxie pure (sans hypercapnie), en l'absence d'indication à une ventilation mécanique en urgence



Hypoxie avec SpO2 < 93% malgré oxygénothérapie aux lunettes (max 6L)
Si respiration bouche ouverte en permanence : intérêt du masque à haute concentration



Attention au retard d'IOT

Pour qui ne pas débiter OHD?

- Si indication d'une ventilation mécanique en urgence, posée par le Réanimateur
- Troubles de la vigilance
- Hypercapnie, $\text{PaCO}_2 > 45 \text{ mmHg}$ et/ou $\text{FR} > 35 \text{ cycles /min}$
- Défaut de la mécanique ventilatoire : myasthénie...
- Impossibilité anatomique : obstruction nasale...
- Absence de coopération du patient

Comment débuter l'OHD?

Matériel de type Airvo2

Mise en place d'un **humidificateur** des voies aériennes, à **vérifier fréquemment**

Canules nasales Optiflow (M, L)



| Température de l'air expulsé | Débit d'air | FiO2 |
|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Idéalement 37 ° Mais souvent mal toléré, baisser jusqu'à 32° si nécessaire | Débuter à 40L/min | FiO2 QSP SpO2 ≥ 93 % Débuter à FiO2 > 90% lors de la mise en place du dispositif/réglage du débit. Une fois l'installation optimale baisse de la FiO2 jusqu'à QSP cible. |
| Réglage sur écran digital, pour déverrouiller : appui 3 sec sur les 2 flèches verticales | Réglage sur écran digital | Réglage sur manomètre d'arrivée d'O2 avec contrôle de la FiO2 sur écran digital /!\ Réglage sensible /!\ |
| Mise en route idéalement 10 minutes avant de relier le dispositif au patient, temps de chauffe. | Le débit : prescrit par médecin. Si nécessité d'augmenter la FiO2 à > 60% : monter le débit à 60L si bonne tolérance. Puis laisser le débit fixe. La diminution sera initiée seulement lors de la décision de sevrage | C'est le réglage principal, à adapter en fonction de la SpO2, régulièrement. Faire des modifications de 10% (+ ou -) : adaptation par IDE ou médecin. Si nécessité FiO2 > 60% : appel INDISPENSABLE du Réanimateur |

Réévaluation dans l'heure de la mise en place : l'efficacité de l'OHD doit être constatée ++

SpO₂ ≥ 93%, cinétique FiO₂

FR < 30

Disparition des signes de détresse respiratoire

- *Difficultés à parler*
- *Tirage intercostal, sus claviculaire*
- *Balancement thoraco-abdominale*

Absence de troubles de la vigilance, d'encéphalopathie



Sinon...

- Si objectif non atteints ou avec une $FiO_2 > 60\%$: appel **INDISPENSABLE** du Médecin.
- Réévaluation pluri-quotidienne de l'indication d'OHD et des paramètres clinico-biologiques avec le MDG.

Modalité de sevrage

Baisse progressive de la FiO2

- Avec des variations de 10% de FiO2
- Palier de décroissance de FiO2 maintenu plusieurs heures

Si **FiO2 < 40%** : baisse progressive du débit par paliers de 10L/min jusqu'à 40 L/min toutes les 2 heures environ.

Si **FiO2 < 40% et débit \leq 40L/min stable dans le temps** : Envisager épreuve de sevrage avec relai aux lunettes O2 standard ou masque à 6l (si patient bouche ouverte)

Le relais à l'O2 standard peut se faire de manière intermittente ou continue



Réévaluation +++



Merci