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Oxygénothérapie à haut débit

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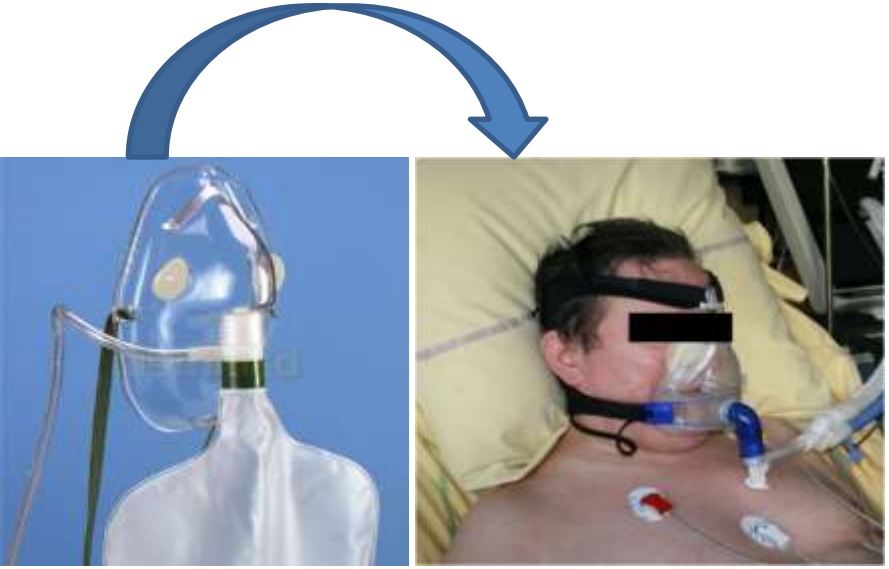
Conflits d’intérêts

Prise en charge de transports/hébergements pour des congrès

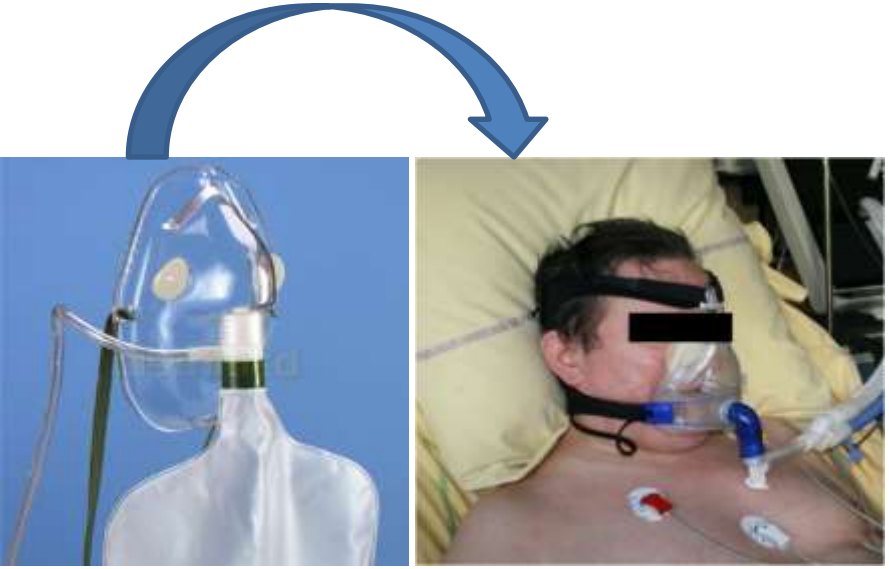
- Covidien
- Fisher & Paykel

Effets bénéfiques de la VNI



1. Humidification
2. PEP (oxygénation-effort)
3. FiO_2 max. 100% (sans fuites)
4. Assistance Respiratoire = AI
5. Effets cardiaques

VNI: Effets délétères ?



1. Asynchronies
2. Tolérance difficile
3. Intubation retardée
4. Barotrauma: V_T

Une alternative: l'oxygéne à haut débit

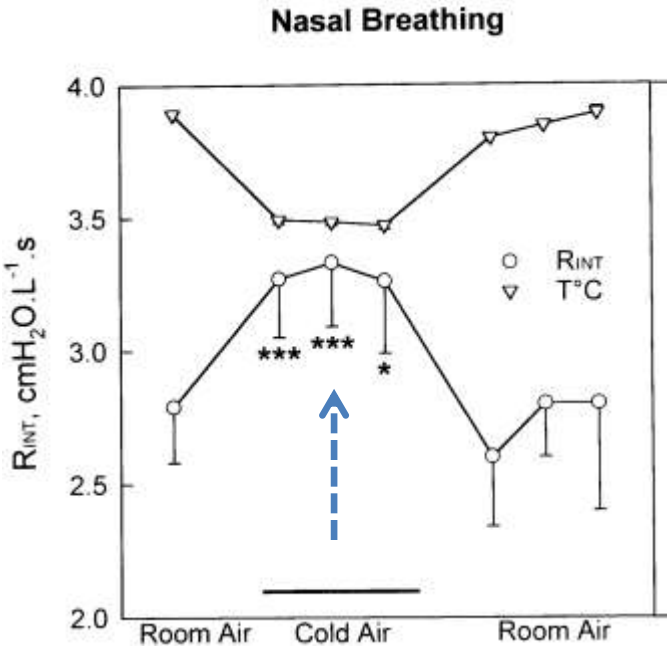
1. **Confort:** via lunettes et humidification
2. **Effet PEP:** Oxygénation - Prévention des atélectasies?
3. **Oxygénation:** Haut Débit = Haute FiO_2
4. **Lavage espace mort:** $PaCO_2$

Augmentation de la PaO_2
Diminution de l'effort et de la fréquence respiratoire

1 **Confort:** via lunettes et humidification

L'air inspiré à l'état physiologique….

- Réchauffé à 37°C
- Humidifié à 100%: 44 mg H_2O/L



Pierre Fontanari et al., JAP 1996

Gaz mural: froid et sec
< 5 mg H_2O/L

Humidificateur chauffant

- Réchauffé à 37°C
- Humidité > 30 mg H_2O/L

Table S5. Assessment of tolerance to the oxygenation strategy at inclusion and 1 hour after inclusion *

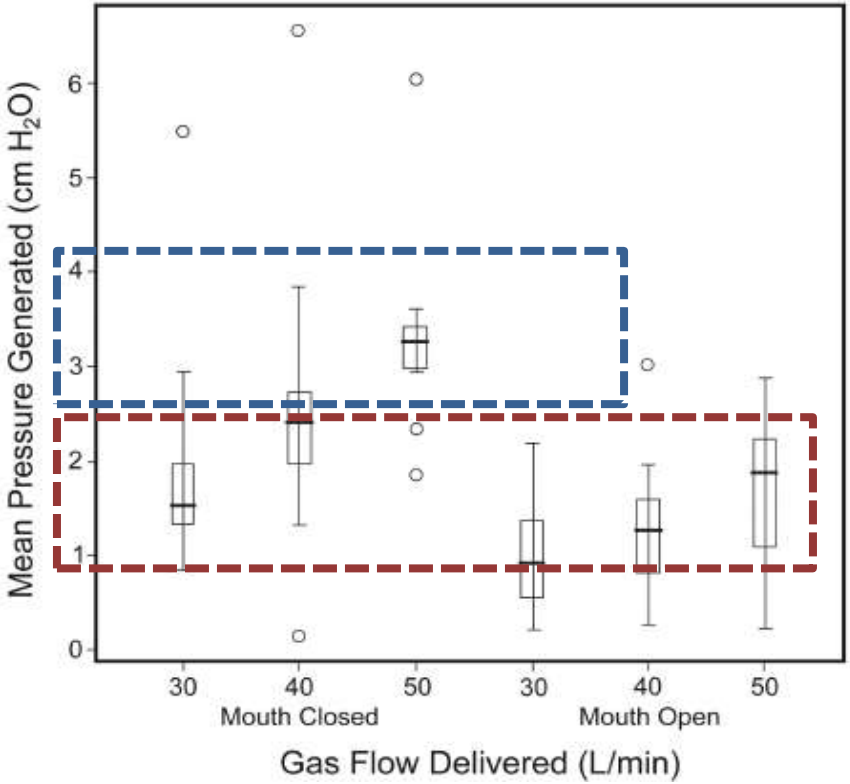
	High-Flow Oxygen group (n=106)	Standard Oxygen group (n=94)	NIV group (n=110)	P Value
Respiratory patient-discomfort at inclusion – mm †	38±31	44±29	46±30	0.20
Respiratory patient-discomfort at H1– mm †	29	40	43	<0.01
Grade of dyspnea at H1‡				<0.001
Marked improvement – no. (%)	76%	42%	58%	
Slight improvement– no. (%)				
No change– no. (%)	18 (20.9)	33 (44.6)	23 (25.3)	
Slight deterioration – no. (%)	3 (3.5)	9 (12.2)	8 (8.8)	
Marked deterioration – no. (%)	0 (0.0)	1 (1.3)	7 (7.7)	
Respiratory rate– breaths/min				
H1	28±7	31±7	31±8	<0.01
H6	27±7	29±8	29±7	0.13

Frat JP, Thille AW et al., New England Journal of Medicine 2015; 372:2185-2196.

2 **Effet PEEP:** Oxygénation?

The Effects of Flow on Airway Pressure During Nasal High-Flow Oxygen Therapy

Rachael L Parke RN MHSc, Michelle L Eccleston RN, and Shay P McGuinness MB ChB



Respir Care 2011;56(8):1151–1155.

3 **Oxygénation:** Haut Débit = Haute FiO_2

Quelle FiO_2 avec l'O_2 standard?

Débit inspiratoire

Entre 30 et 40 L/min

>> 15L/min

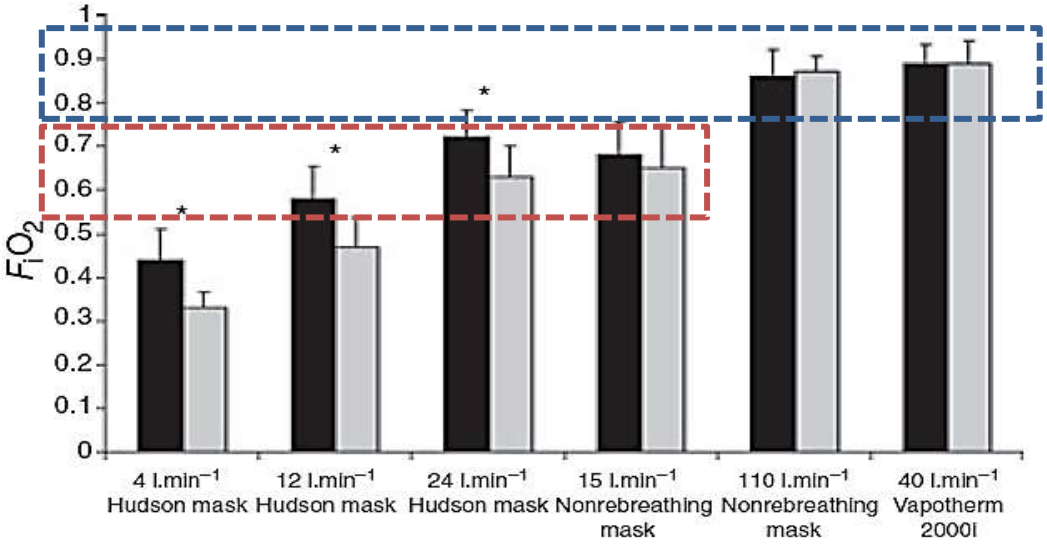
Katz et al., Anesthesiology 1985; 63:598-607.

Quelle FiO_2 avec l'O_2 standard?

Anaesthesia
Journal of the Association of Anaesthetists of Great Britain and Ireland
Anaesthesia, 2008, 63, pages 938-940 doi:10.1111/j.1365-2044.2008.05536.x

Performance of oxygen delivery devices when the breathing pattern of respiratory failure is simulated*

M. A. B. Sim,[1] P. Dean,[2] J. Kinsella,[3] R. Black,[4] R. Carter[5] and M. Hughes[6]



Sous oxygène à haut débit

FiO_2 > 80%

Avec un masque à réserve et un débit à 10-15 L/min

FiO_2 entre 60 et 65%

Table S5. Assessment of tolerance to the oxygenation strategy at inclusion and 1 hour after inclusion *

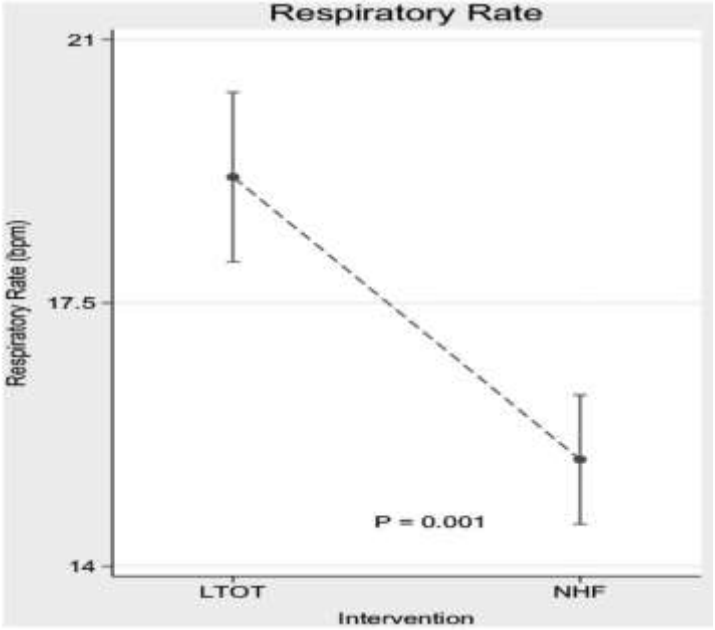
	High-Flow Oxygen group (n=106)	Standard Oxygen group (n=94)	NIV group (n=110)	P Value
PaO_2 – mm Hg	106	91		<0.05
H1			118±72	<0.05
H6	90±35	93±36	111±59	<0.01
FIO_2 §	82 %	66 %		
H1			0.67±0.24	<0.001
H6	0.75±0.22	0.64±0.18	0.63±0.21	<0.001
PaO_2:FIO_2 ratio– mm Hg	133	146 →	183	
H1				<0.001
H6	130±60	161±77	186±85	<0.001
$PaCO_2$ – mmHg				
H1	35±7	35±6	35±7	0.84

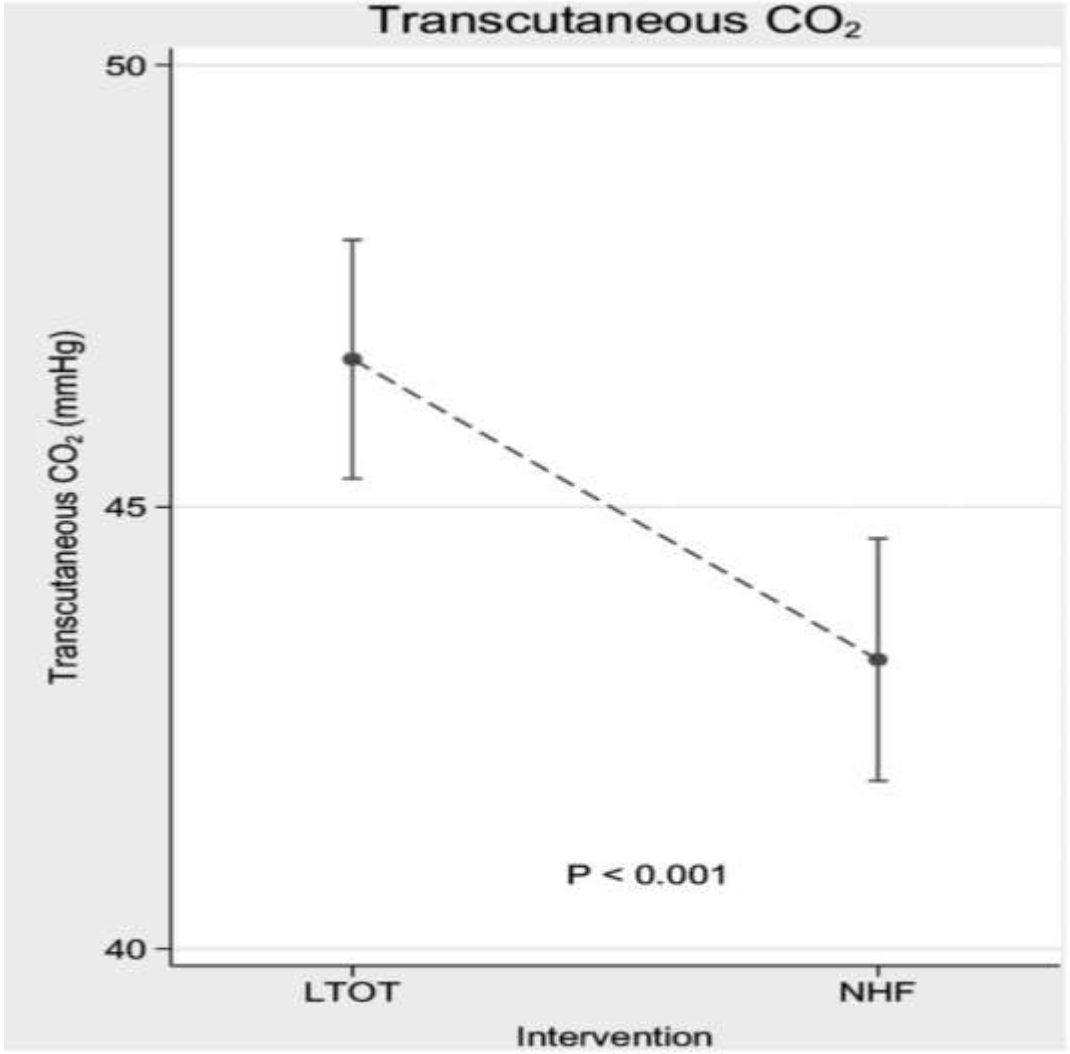
Frat JP, Thille AW et al., New England Journal of Medicine 2015; 372:2185-2196.

4 Lavage de l’espace mort

Nasal high flow oxygen therapy in patients with COPD reduces respiratory rate and tissue carbon dioxide while increasing tidal and end-expiratory lung volumes: a randomised crossover trial

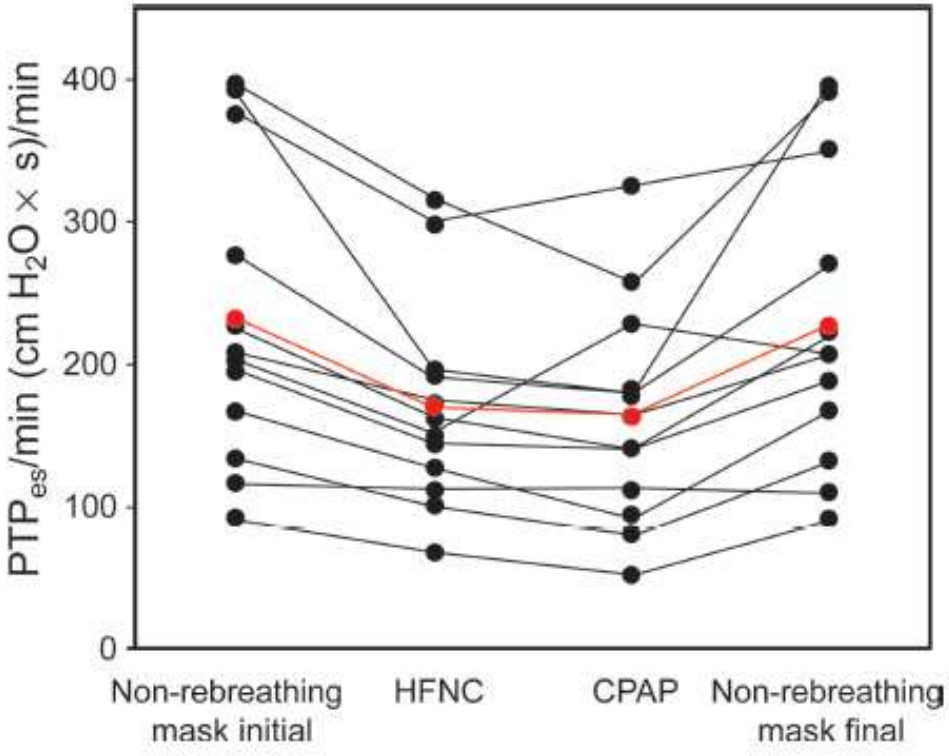
Fraser et al., Thorax 2016





Physiologic Effects of High-Flow Nasal Cannula Oxygen in Critical Care Subjects

Frederic Vargas MD PhD, Mélanie Saint-Leger MD, Alexandre Boyer MD PhD, Nam H Bui MD, and Gilles Hilbert MD PhD



Respir Care 2015;60(10):1369–1376

Quelle évidence pour utiliser l'OHD?

1. **Dans l'IRA hypoxémique - ARDS**
2. **Après l'extubation en réanimation**

1. Dans l’IRA hypoxémique - ARDS

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JUNE 4, 2015 VOL. 372 NO. 23

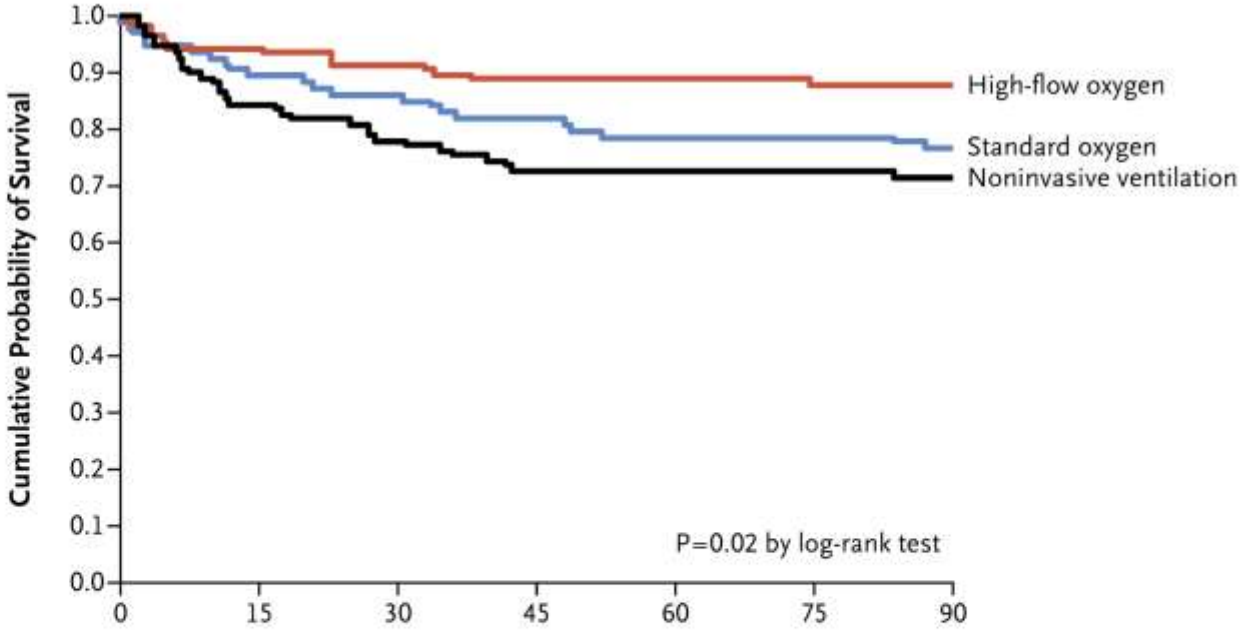
High-Flow Oxygen through Nasal Cannula in Acute Hypoxemic Respiratory Failure

Jean-Pierre Frat, M.D., Arnaud W. Thille, M.D., Ph.D., Alain Mercat, M.D., Ph.D., Christophe Girault, M.D., Ph.D., Stéphanie Ragot, Pharm.D., Ph.D., Sébastien Perbet, M.D., Gwénael Prat, M.D., Thierry Boulain, M.D., Elise Morawiec, M.D., Alice Cottereau, M.D., Jérôme Devaquet, M.D., Saad Nseir, M.D., Ph.D., Keyvan Razazi, M.D., Jean-Paul Mira, M.D., Ph.D., Laurent Argaud, M.D., Ph.D., Jean-Charles Chakarian, M.D., Jean-Damien Ricard, M.D., Ph.D., Xavier Wittebole, M.D., Stéphanie Chevalier, M.D., Alexandre Herbland, M.D., Muriel Fartoukh, M.D., Ph.D., Jean-Michel Constantin, M.D., Ph.D., Jean-Marie Tonnelier, M.D., Marc Pierrot, M.D., Armelle Mathonnet, M.D., Gaëtan Béduneau, M.D., Céline Delétage-Métreau, Ph.D., Jean-Christophe M. Richard, M.D., Ph.D., Laurent Brochard, M.D., and René Robert, M.D., Ph.D., for the FLORALI Study Group and the REVA Network*

310 patients en insuffisance respiratoire aigue:

FR >25 /min, $PaO_2/FiO_2 \leq 300$ mm Hg, $PaCO_2 \leq 45$ mm Hg

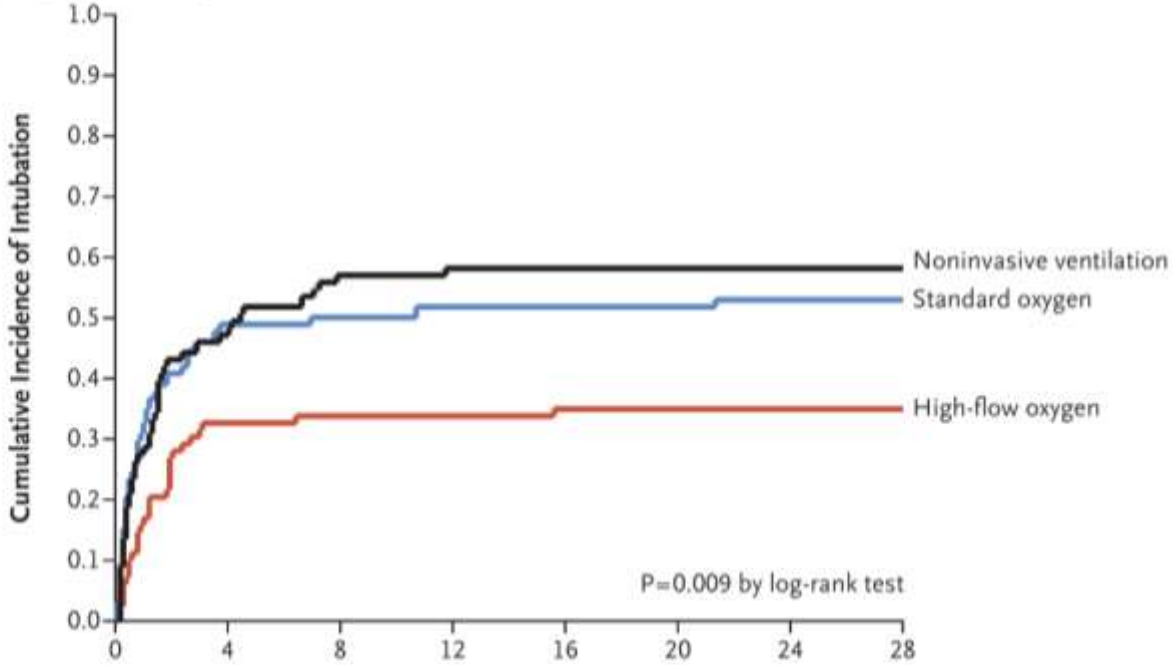
79% avec des infiltrats bilatéraux and 77% avec un $PaO_2/FiO_2 \leq 200$ mm Hg



90-day Mortality: HFNC 12% vs. O_2 23% vs. NIV 28%, p=0.02

Figure 3. Kaplan–Meier Plot of the Probability of Survival from Randomization to Day 90.

238 patients avec un $PaO_2/FiO_2 \leq 200$ mm Hg (77%)



Intubation: HFNC 35% vs. O_2 53 % vs. VNI 58%, $p<0.01$

Figure 2. Kaplan–Meier Plots of the Cumulative Incidence of Intubation from Randomization to Day 28.

Quel est le problème sous VNI?

AI: 8 ± 3 cm H_2O; PEP 5 ± 1 cm H_2O

Volume courant moyen: 9.2 ± 3.0 ml/kg

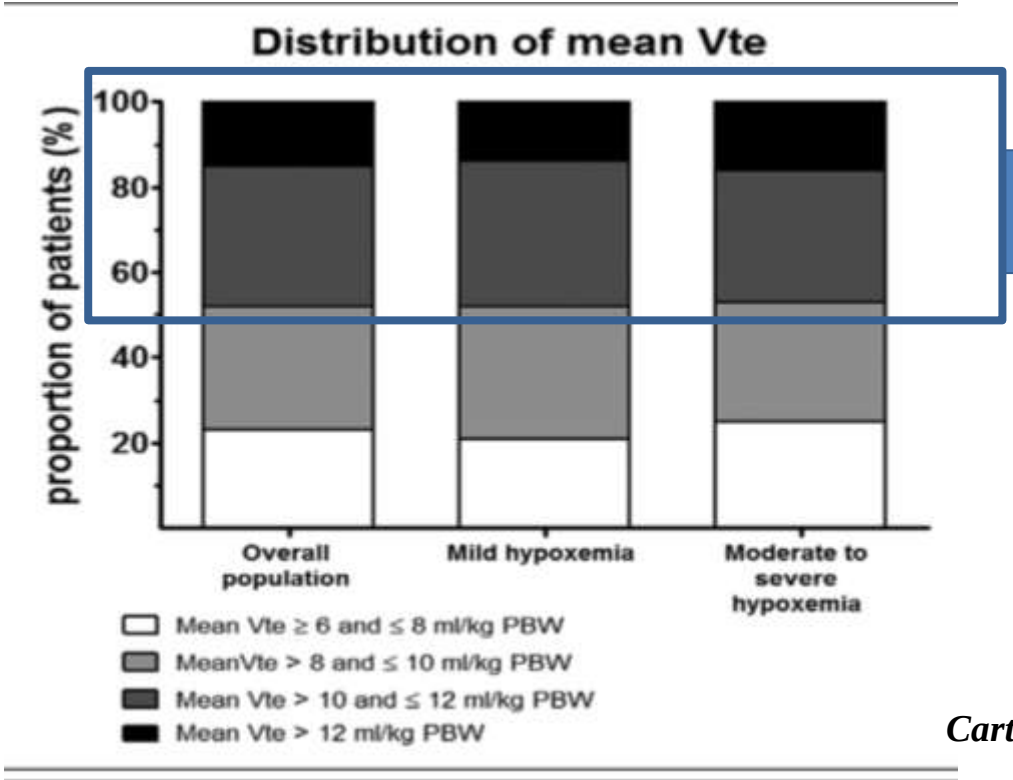
Patients non intubés
V_T 8 ml/kg

Patients intubés
V_T 10 ml/kg

V_T > 9 ml/kg: seul facteur indépendant d'intubation

Failure of Noninvasive Ventilation for De Novo Acute Hypoxemic Respiratory Failure: Role of Tidal Volume

Guillaume Carteaux, MD[1,2,3]; Teresa Millán-Guilarte, MD[4]; Nicolas De Prost, MD, PhD[1,2,3]; Keyvan Razazi, MD[1,2,3]; Shariq Abid, MD, PhD[5]; Arnaud W. Thille, MD, PhD[5]; Frédérique Schortgen, MD, PhD[1,3]; Laurent Brochard, MD[3,6,7]; Christian Brun-Buisson, MD[1,2,8]; Armand Mekontso Dessap, MD, PhD[1,2,3]



> 10 ml/kg

Augmentation du risque d'intubation!

Carteaux et al., Crit Care Med 2016; 44:282-290.

En Post-Extubation (préventif)

Research

JAMA. 2016;315(13):1354-1361.

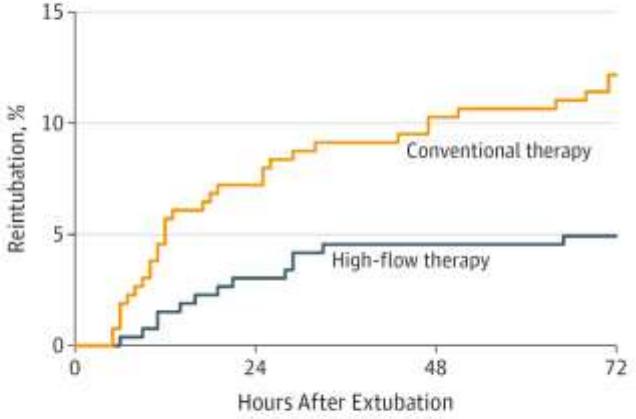
Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Effect of Postextubation High-Flow Nasal Cannula vs Conventional Oxygen Therapy on Reintubation in Low-Risk Patients

A Randomized Clinical Trial

Gonzalo Hernández, MD, PhD; Concepción Vaquero, MD; Paloma González, MD; Carles Subira, MD; Fernando Frutos-Vivar, MD; Gemma Rialp, MD; Cesar Laborda, MD; Laura Colinas, MD; Rafael Cuena, MD; Rafael Fernández, MD, PhD

Figure 2. Kaplan-Meier Analysis of Time From Extubation to Reintubation



No. at risk				
Conventional therapy	263	244	236	231
High-flow therapy	264	256	252	251

527 patients à faible risque de réintubation

Taux de réintubation:

O_2 12% vs. HFNC 5%,

p=0.004

JAMA. 2016;316(15):1565-1574.

Research

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

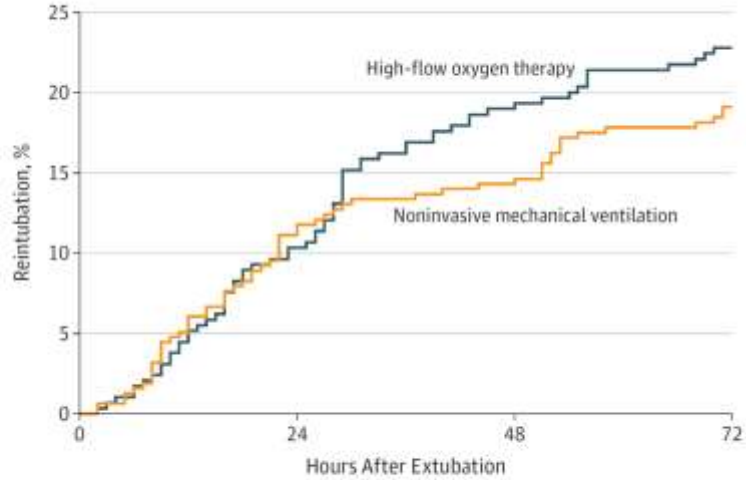
Effect of Postextubation High-Flow Nasal Cannula vs Noninvasive Ventilation on Reintubation and Postextubation Respiratory Failure in High-Risk Patients

A Randomized Clinical Trial

Gonzalo Hernández, MD, PhD; Concepción Vaquero, MD; Laura Colinas, MD; Rafael Cuena, MD; Paloma González, MD; Alfonso Canabal, MD, PhD; Susana Sanchez, MD; María Luisa Rodriguez, MD; Ana Villasclaras, MD; Rafael Fernández, MD, PhD

604 patients à haut risque de réintubation

Figure 2. Kaplan-Meier Analysis of Time From Extubation to Reintubation



No. at risk				
High-flow oxygen therapy	290	260	234	223
Noninvasive mechanical ventilation	314	279	269	253

Reintubation:
VNI 19% vs. HFNC 23%,
p=NS

Conclusions

L'oxygène à haut débit semble efficace

En cas d'insuffisance respiratoire aigue hypoxémique:
diminution de mortalité

En post-extubation:
diminution du taux de réintubation