JAVA
CRETEIL

Samedi 1er Décembre 2018
8 h 30 - 17 h 30
Faculté de Médecine de Créteil
8 rue du Général Sarrail, 94000 Créteil ; Métro Ligne 8, Station Créteil L'Échat

ReVA
«You'll never row alone !»

Pré-oxygénation par VNI vs. HFOT pour l'intubation: **Résultats FLORALI 2**

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Conflicts of Interest

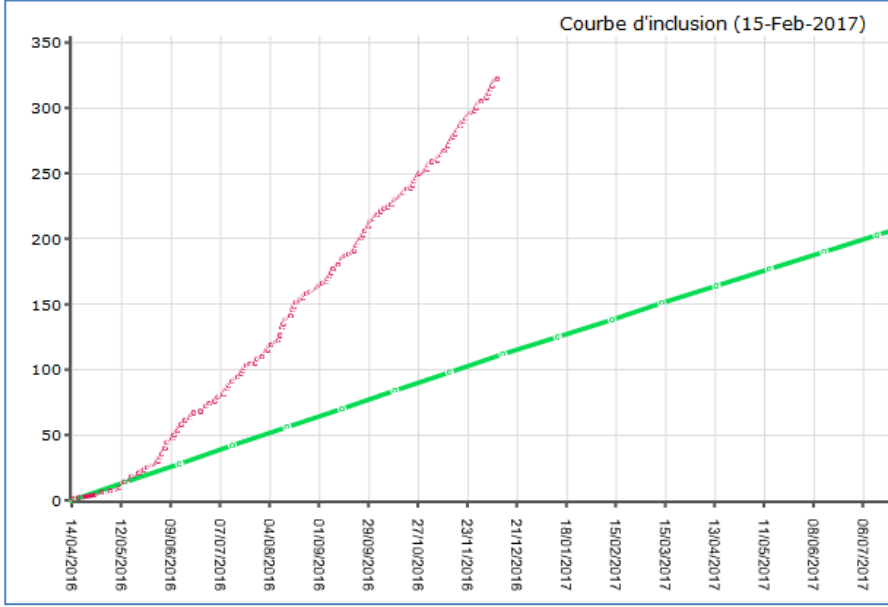
I have received travel expenses coverage to attend scientific meetings (transport & accommodation)
by Covidien, General Electric Healthcare, Maquet - Getinge and Fisher & Paykel

➤ **No income personal fees**

Non-invasive Ventilation versus High-Flow Nasal Cannula Oxygen Therapy with apnoeic oxygenation for Pre-Oxygenation before Intubation of Patients with Acute Hypoxemic Respiratory Failure. A randomised multicentre open label trial.

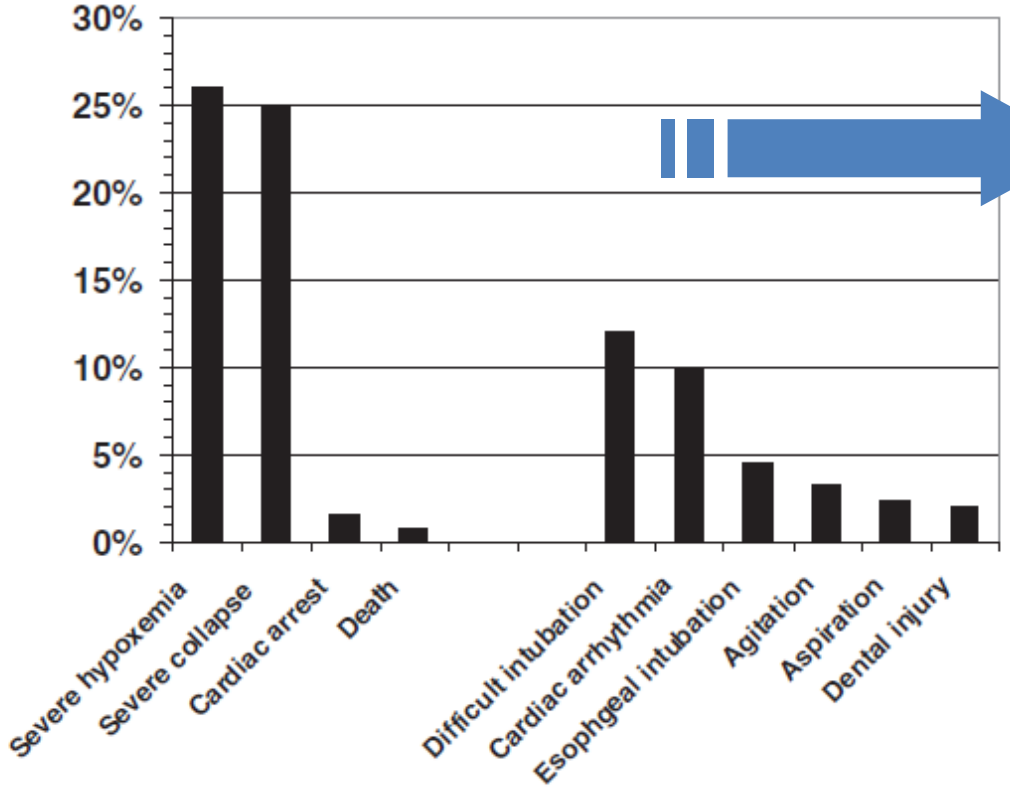
Jean-Pierre Frat, MD[1], Jean-Damien Ricard, PhD[2], Jean-Pierre Quenot, PhD[3, 4], Nicolas Pichon, MD[5], Alexandre Demoule, PhD[6, 7], Jean-Marie Forel, MD[8], Jean-Paul Mira, PhD[9], Rémi Coudroy, MD[1], Guillaume Berquier, MD[2], Benoit Voisin, MD[10], Gwenhaël Colin, MD[11], Bertrand Pons, MD[12], Pierre Eric Danin, MD[13], Jérome Devaquet, MD[14], Gwenael Prat, MD[15], Raphaël Clere-Jehl, MD[16], Franck Petitpas, MD[17], Emmanuel Vivier, MD[18], Keyvan Razazi, MD[19], Mai-Anh Nay, MD[20], Vincent Souday, MD[21], Jean Dellamonica, PhD[22], Laurent Argaud, PhD[23], Stephan Ehrmann, PhD[24], Aude Gibelin, MD[25], Christophe Girault, MD[26], Pascal Andreu, MD[3], Philippe Vignon, PhD[5, 27], Laurence Dangers, MD[6], Stéphanie Ragot, PhD[28], Arnaud W. Thille, PhD[1], for the FLORALI-2 study group, and REVA network.

- 28 centres participants
- 322 inclusions d'avril 2016 à décembre 2016



Rationnel de l’étude

Complications de l'intubation en réanimation



Complication la plus fréquente

Hypoxémie sévère

(SpO_2 < 80%): 26%

Jaber et al., Crit Care Med 2006;34:2355-61

Objectif de la pré-oxygénation

Augmenter la PaO_2

pour retarder l'hypoxémie et sécuriser la procédure d'intubation

Arrêt cardiaque
2 à 3% des intubations

Characteristics	Overall ($n = 1,847$)	Intubation-Related Cardiac Arrest ($n = 49$)	No Intubation-Related Cardiac Arrest ($n = 1,798$)	p
Emergency characteristic of intubation, *n* (%)				0.006
Real emergency	730/1,773 (40)	30/48 (63)	700/1,725 (40)	
Relative emergency	870/1,773 (48)	18/48 (37)	852/1,725 (49)	
Deferred emergency	173/1,773 (10)	0/48 (0)	173/1,725 (10)	
Length between admission and intubation (d), median (25–75% IQR)	1 (0–5)	0 (0–2)	1 (0–5)	0.055
Preoxygenation, *n* (%)	1,781 (96)	88%	1,738 (98)	0.0009

De Jong et al., Crit Care Med 2018

Pré-oxygénation: quelle méthode?

Au ballon avec réserve et au moins 15 L/min d'oxygène
pendant 3 à 5 minutes

Chez les patients hypoxémiques en réanimation
Pré-oxygénation par VNI ? HFOT ?

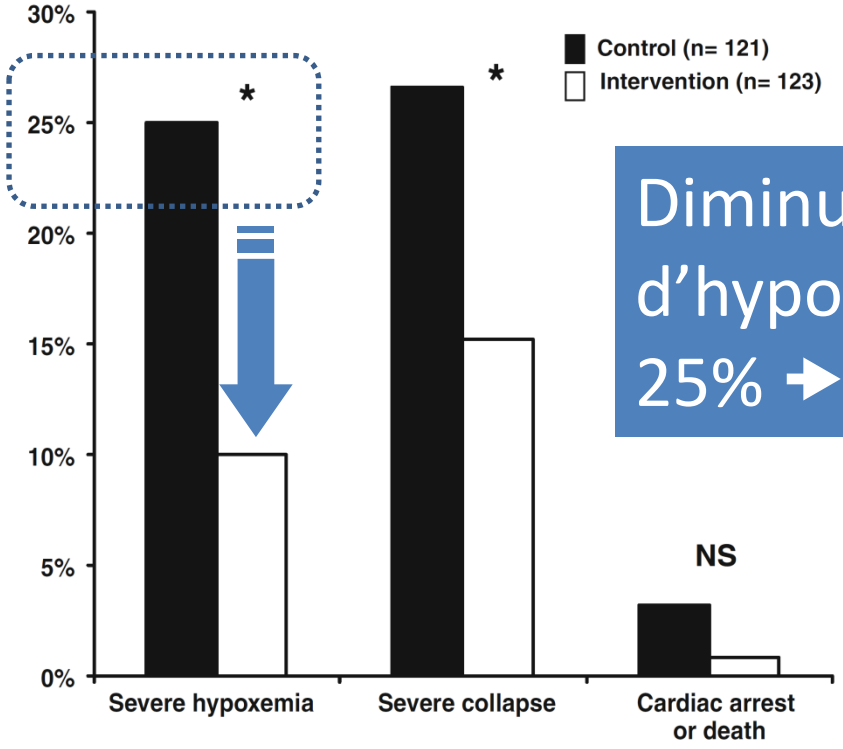
Pré-oxygénation par VNI

Intensive Care Med
DOI 10.1007/s00134-009-1717-8

ORIGINAL

Samir Jaber
Boris Jung
Philippe Corne
Mustapha Sebbane
Laurent Muller
Gerald Chanques
Daniel Verzilli
Olivier Jonquet
Jean-Jacques Eledjam
Jean-Yves Lefrant

An intervention to decrease complications related to endotracheal intubation in the intensive care unit: a prospective, multiple-center study



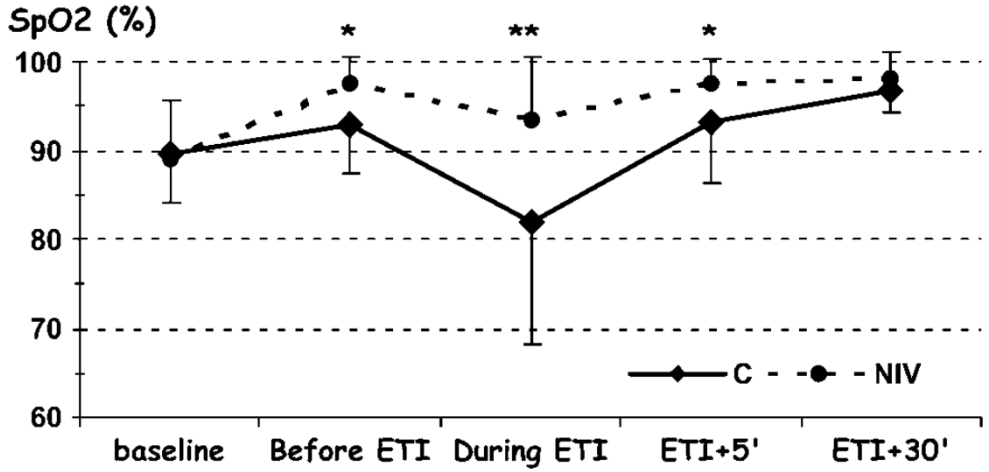
Diminution des épisodes d'hypoxémie sévère (SpO_2 < 80%)
25% ➔ 10%

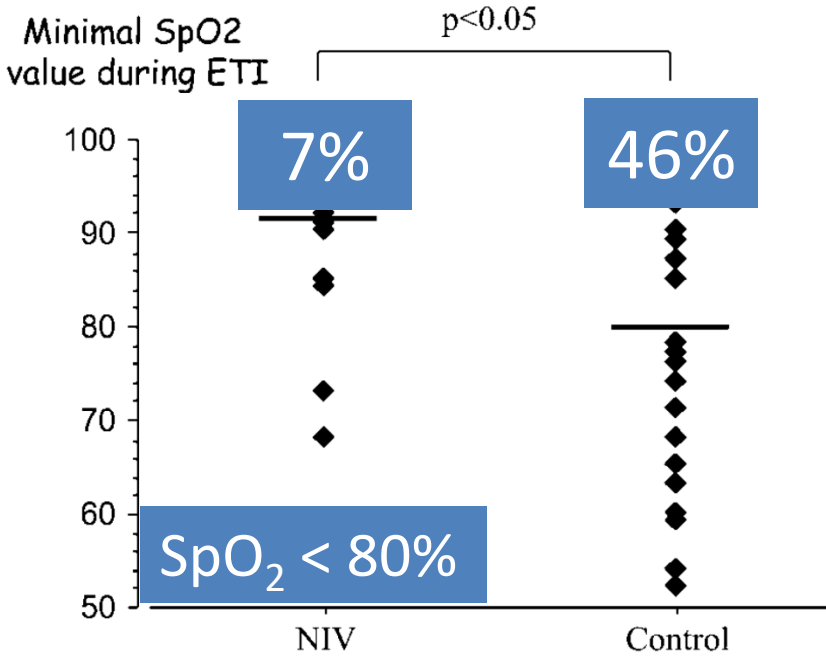
Noninvasive Ventilation Improves Preoxygenation before Intubation of Hypoxic Patients

53 patients

Christophe Baillard, Jean-Philippe Fosse, Mustapha Sebbane, Gérald Chanques, François Vincent, Patricia Courouble, Yves Cohen, Jean-Jacques Eledjam, Frédéric Adnet, and Samir Jaber

Department of Anesthesiology and Intensive Care, and SAMU 93, Avicenne Hospital, Paris 13 University–AP-HP, Bobigny; Intensive Care Unit, Department of Anesthesiology, DAR B University Hospital of Montpellier, and Saint Eloi Hospital, Montpellier University, Montpellier, France





Baillard et al., Am J Respir Crit Care Med 2006; 174:171.

Effect of preoxygenation using non-invasive ventilation before intubation on subsequent organ failures in hypoxaemic patients: a randomised clinical trial

C. Baillard[1,*], G. Prat[2], B. Jung[3], E. Futier[4], J. Y. Lefrant[5], F. Vincent[6], A. Hamdi[7], E. Vicaut[8] and S. Jaber[3]

Table 3 Characteristics of patients during and after intubation. Data are presented as *n* (%) or median (interquartile). NIV, non-invasive ventilation

Variables	Preoxygenation NIV *n*=99	Preoxygenation face mask *n*=102	*P*
Patients with at least one adverse event during preoxygenation or intubation	21 (21.4%)	29 (28.7%)	0.24
SpO_2<80%	18%	28%	0.10
Arrhythmia with haemodynamic failure Regurgitation			
Myocardial ischaemia	3 (3.1%)	1 (1%)	
Preoxygenation failure[‡]	0 (0%)	5 (5.3%)	
Total number of adverse events	23	38	

Baillard et al., British Journal of Anaesthesia 2018; 120:361.

Pré-oxygénation par HFOT

Use of High-Flow Nasal Cannula Oxygen Therapy to Prevent Desaturation During Tracheal Intubation of Intensive Care Patients With Mild-to-Moderate Hypoxemia*

Romain Miguel-Montanes, MD[1]; David Hajage, MD[2]; Jonathan Messika, MD[1,3,4]; Fabrice Bertrand, MD[1]; Stéphane Gaudry, MD[1,3,4]; Cédric Rafat, MD[1]; Vincent Labbé, MD[1]; Nicolas Dufour, MD[1,3,4]; Sylvain Jean-Baptiste, MD[1]; Alexandre Bedet, MD[1]; Didier Dreyfuss, MD[1,3,4]; Jean-Damien Ricard, MD, PhD[1,3,4]

TABLE 2. Oxygenation Variables, Adverse Events During and After Intubation, and ICU Mortality

Variable	Nonrebreathing Bag Reservoir Facemask *n* = 50	High-Flow Nasal Cannula Oxygen *n* = 51	*p*
Spo_2 after preoxygenation, %, median (IQR)	100 (98–100)	100 (100–100)	0.01[a]
Lowest Spo_2, median (IQR)	94 %	100 %	< 0.0001[b]
Spo_2 < 80%, *n* (%)	14 %	2 %	0.03[a]

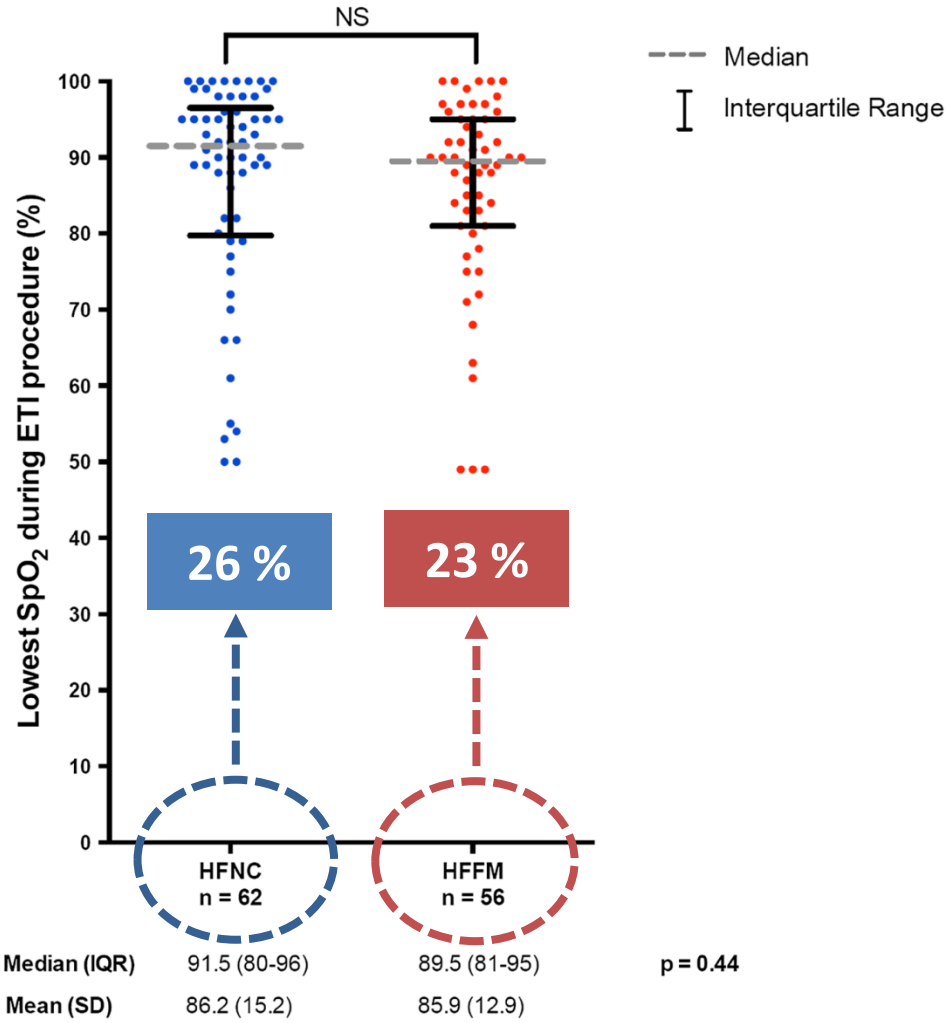
Critical Care Medicine 2015

Intensive Care Med (2015) 41:1538–1548
DOI 10.1007/s00134-015-3796-z

SEVEN-DAY PROFILE PUBLICATION

Mickaël Vourc'h
Pierre Asfar
Christelle Volteau
Konstantinos Bachoumas
Noëmie Clavieras
Pierre-Yves Egreteau
Karim Asehnoune
Alain Mercat
Jean Reignier
Samir Jaber
Gwenaël Prat
Antoine Roquilly
Noëlle Brule
Daniel Villers
Cédric Bretonniere
Christophe Guitton

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



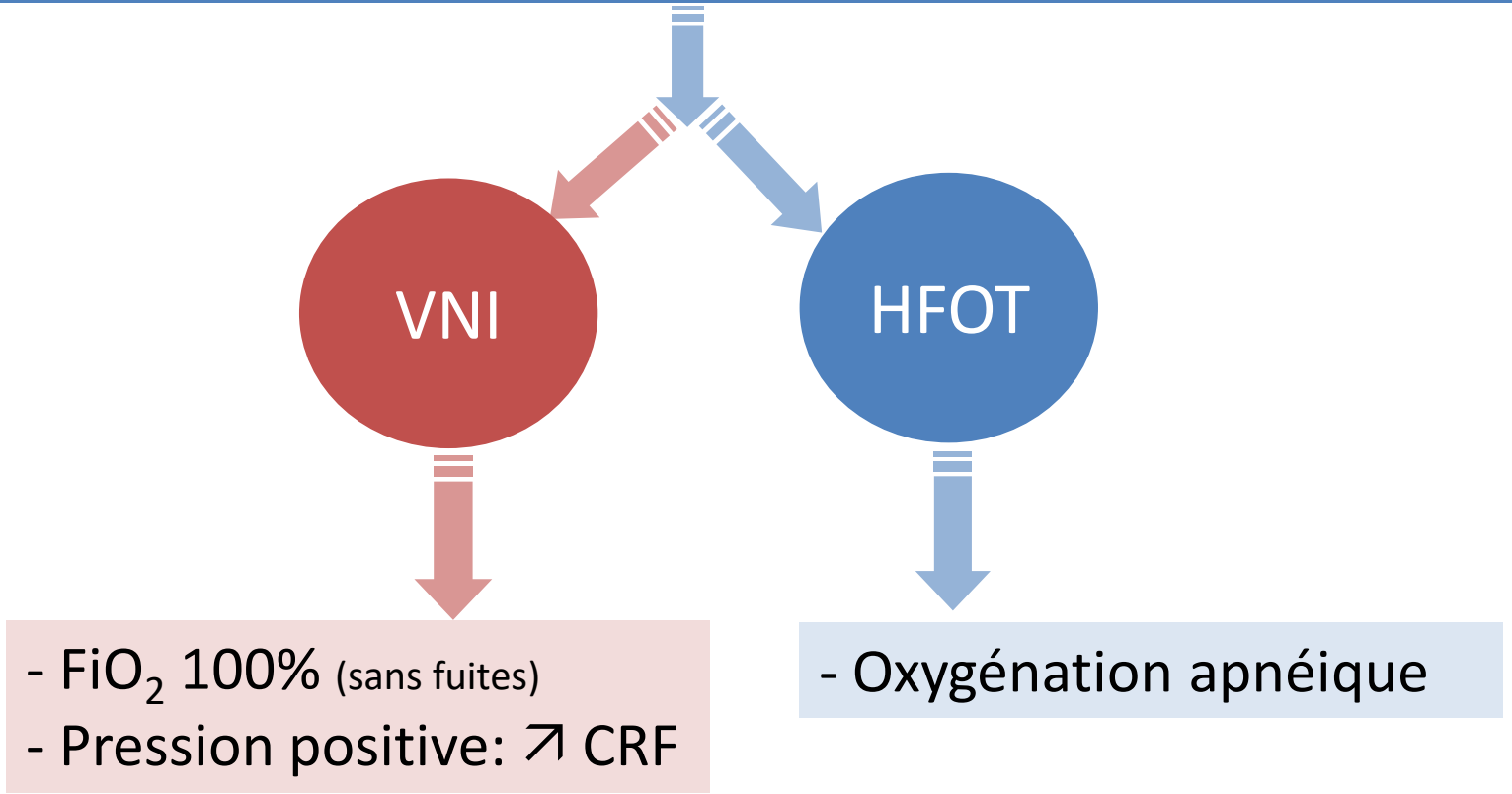
Recommandation SRLF

R4.1 – Non-invasive ventilation should probably be used for pre-oxygenation of hypoxaemic patients in ICU ([Grade 2+] strong agreement).

R4.2 – It is possible to use high-flow nasal oxygen (HFNO) for pre-oxygenation in ICU, especially for patients not severely hypoxaemic (Expert opinion: strong agreement).

srlf
SOCIÉTÉ
DE RÉANIMATION
DE LANGUE FRANÇAISE

Avantage théoriques de chaque technique



FLORALI 2

300 patients intubated with acute respiratory failure

RR > 25/min or signs of respiratory distress and PaO_2:FiO_2 ≤ 300 mm Hg

Randomization

Stratification on PaO_2:FiO_2

(PaO_2:FiO_2 ≤ 200 mm Hg)

Hypothesis: NIV > HFOT

NIV

PS → V_T 6-8 ml/kg

PEEP 5 - FiO_2 100%

HFOT

Flow 60L/min

- FiO_2 100%

Primary outcome: severe hypoxemia (SpO_2 < 80%)

NIV
10%

N = 160 x 2
risque α 95% - β=0.05

HFOT
25%

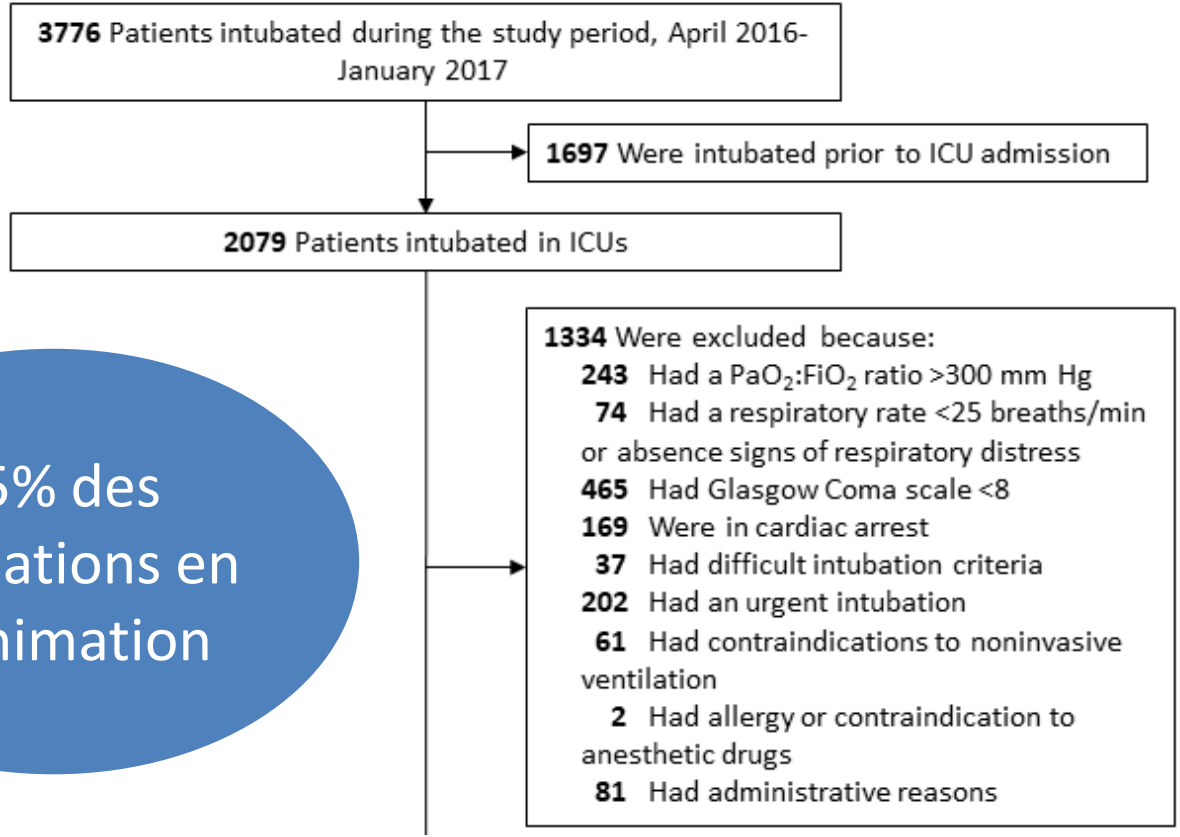
Objectifs secondaires:
SpO_2 en fin de pré-oxygénation, SpO_2 la plus basse pendant la procédure

Complications
- Immédiates: régurgitation, infiltrat pulmonaire , trouble du rythme, hypotension
- Tardives: PAVM, SOFA , durée VM, mortalité en réanimation et à J28

Methods

- Dedicated SpO_2 monitor to all participating centers (COVIDIEN)
- Review of SpO_2 curve recording (unaware of study group)

Flow chart of the study



55% des intubations en réanimation

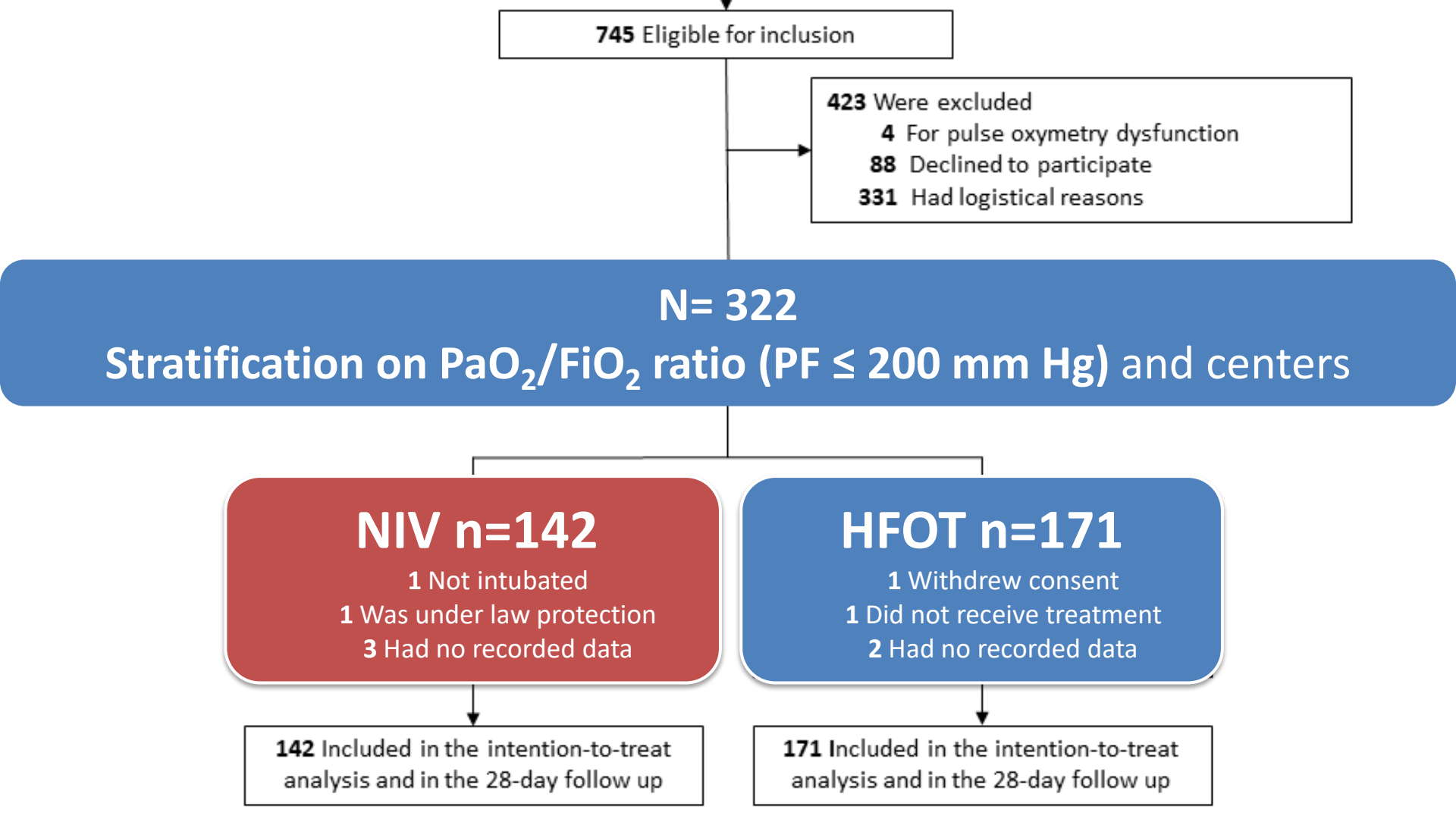

745 Eligible for inclusion
423 Were excluded
4 For pulse oxymetry dysfunction
88 Declined to participate
331 Had logistical reasons
N= 322
Stratification on PaO2/FiO2 ratio (PF ≤ 200 mm Hg) and centers
NIV n=142
1 Not intubated
1 Was under law protection
3 Had no recorded data
HFOT n=171
1 Withdrew consent
1 Did not receive treatment
2 Had no recorded data
142 Included in the intention-to-treat analysis and in the 28-day follow up
171 Included in the intention-to-treat analysis and in the 28-day follow up

Table 1: Baseline Characteristics of the Intention-to-Treat Population according to Study Group

	NIV (n=142)	HFOT (n=171)
Age, year	64±13	64±14
Male sex, n (%)	101 (71)	111 (65)
Body-mass index,[a] kg/m^2	27±7	27±6
SAPS II[b], point	52±20	51±19
Oxygen device the last hour before inclusion, n (%)		
Standard oxygen	63 (44)	73 (43)
HFOT	48 (34)	57 (33)
NIV	31 (22)	41 (24)
Vasopressor support at inclusion, n (%)	27 (19)	35 (20)
Bilateral pulmonary infiltrates, n (%)	88 (73)	106 (73)
Respiratory rate, breaths/min	30±8	31±8
PaO_2:FiO_2 ratio, mm Hg	142±65	148±70
Stratification sub-groups, n of patients/total, n (%)		
PaO_2:FiO_2 ratio > 200 mm Hg	25 (18)	46 (27)
PaO_2:FiO_2 ratio ≤ 200 mm Hg	117 (82)	125 (73)
MACOCHA score,[d] n (%)		
<3	119 (84)	144 (85)
≥3	23 (16)	26 (15)
Cormack III or IV, n of patient/total,[e] n (%)	13 (9)	16 (9)
Intubation Difficulty Scale,[f] n (%)		
≤5	121 (87)	151 (89)
>5	18 (13)	18 (11)

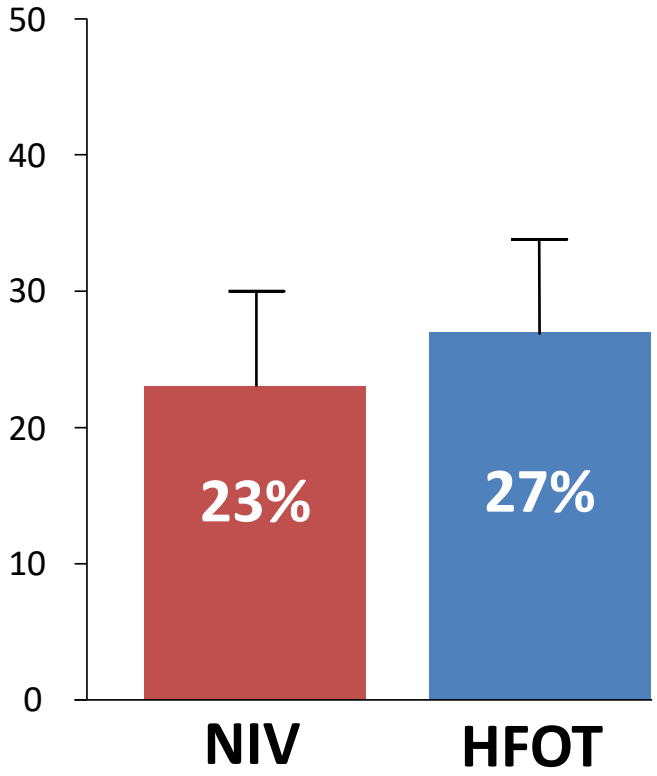
Before inclusion
O_2 > 40%
HFOT > 30%
NIV > 20 %
Vasopressors 20%

PaO_2:FiO_2 ≤ 200 mm Hg: 77% (n=242)

Difficult intubation: 10-15%

Main Results

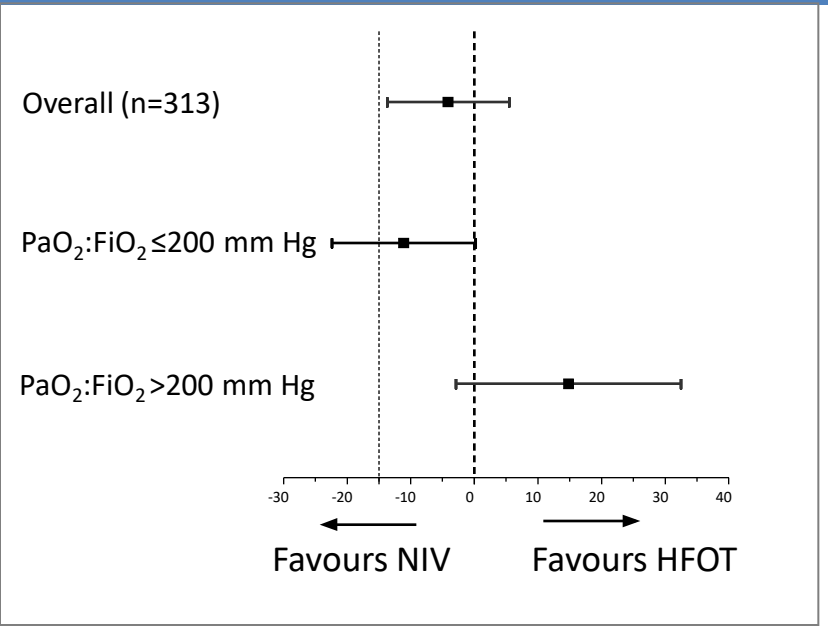
Primary outcome in overall population (N=313)

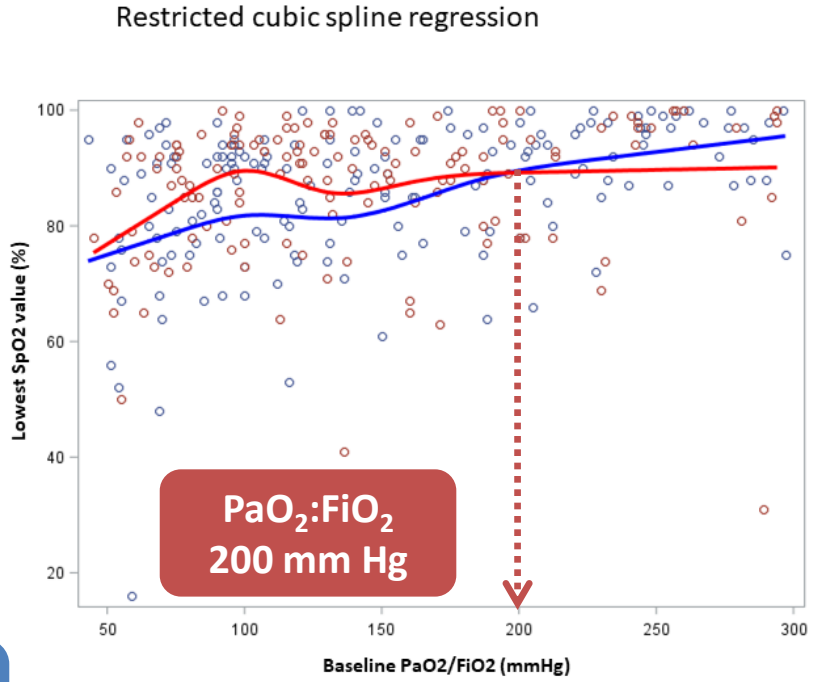


Rate of severe hypoxemia

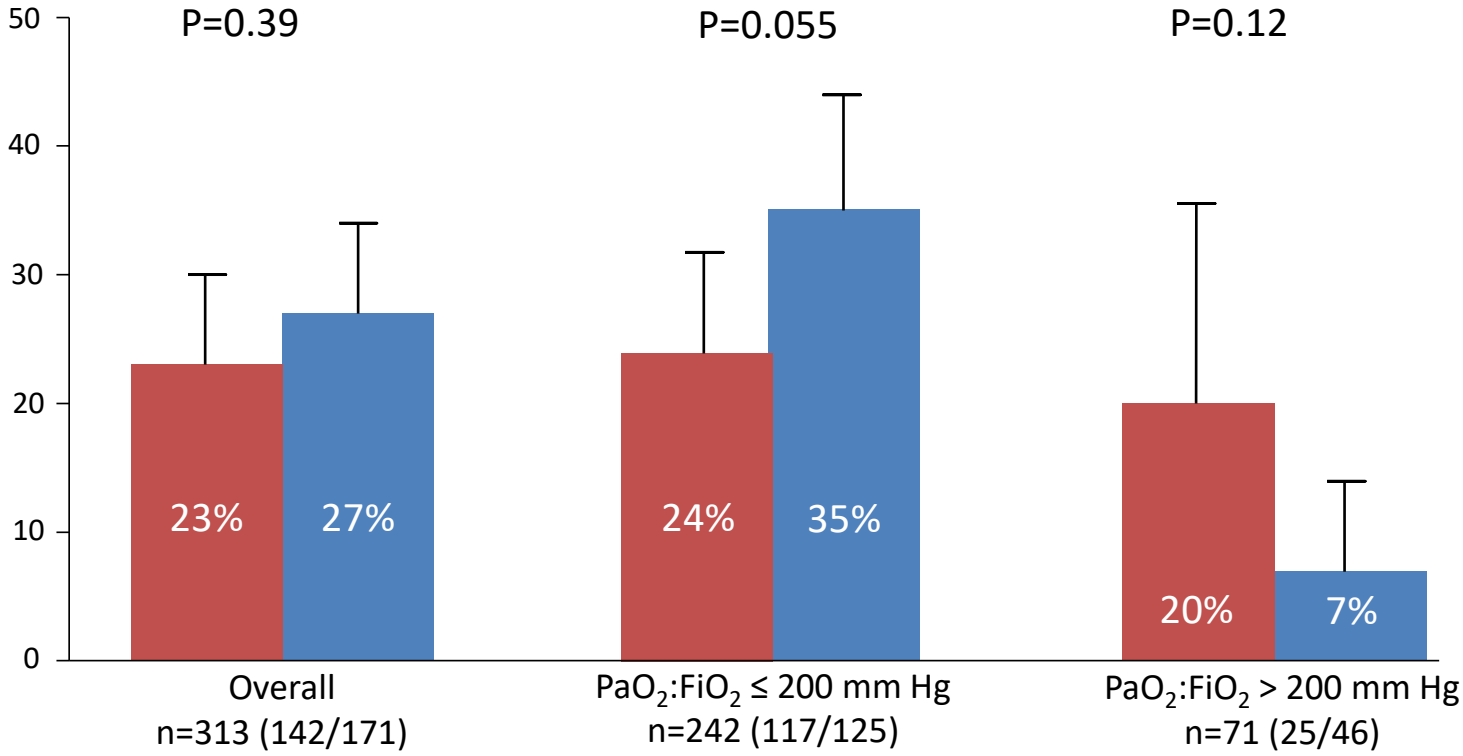
(SpO_2 < 80%): 23% vs. 27%, p=0.39

Test d'interaction positif (p = 0.03)



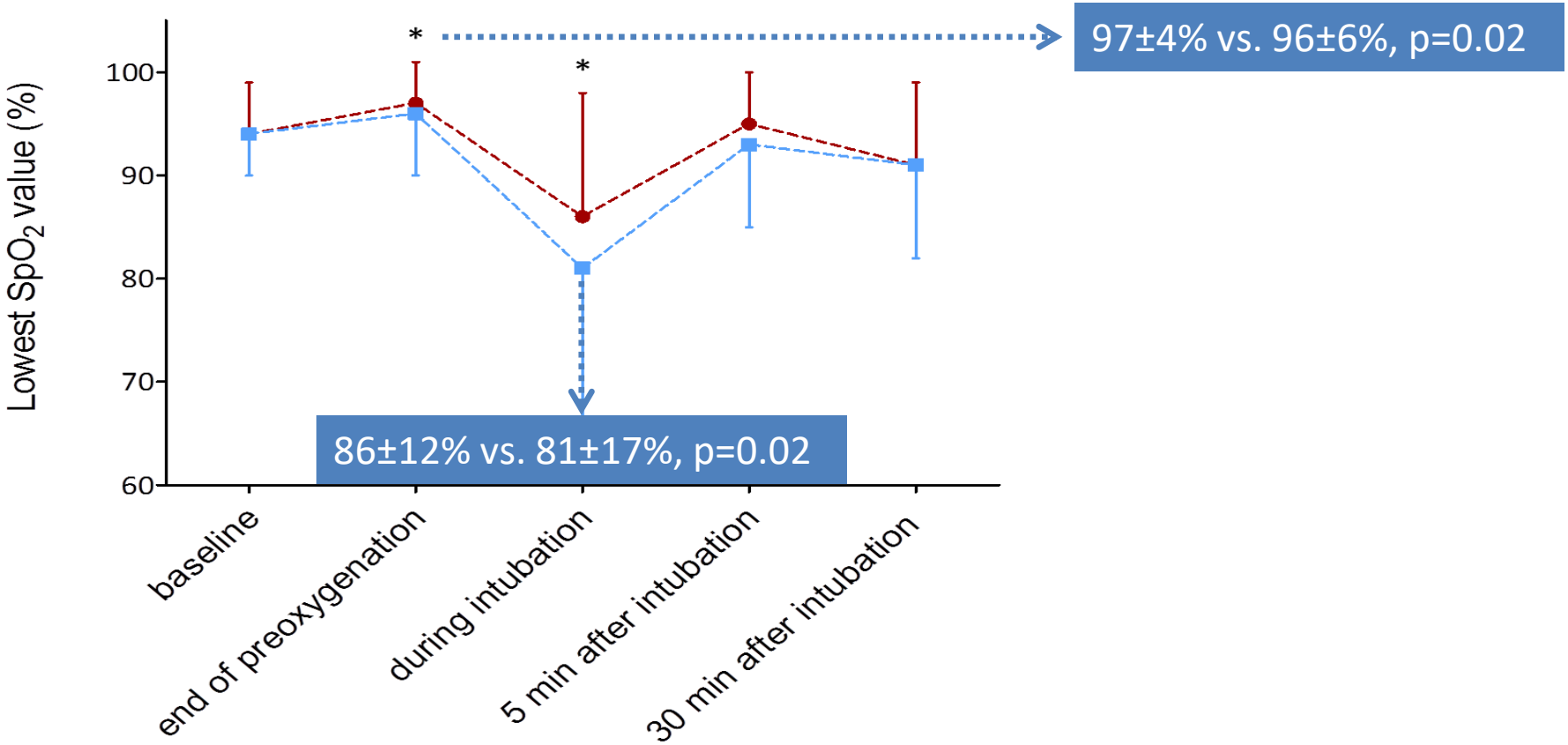


Qualitative interaction between
the level of PaO_2:FiO_2 at baseline and treatment

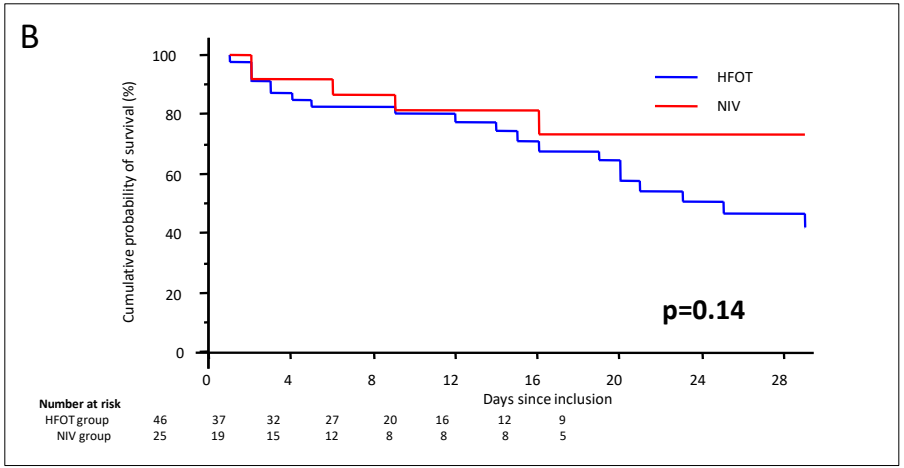


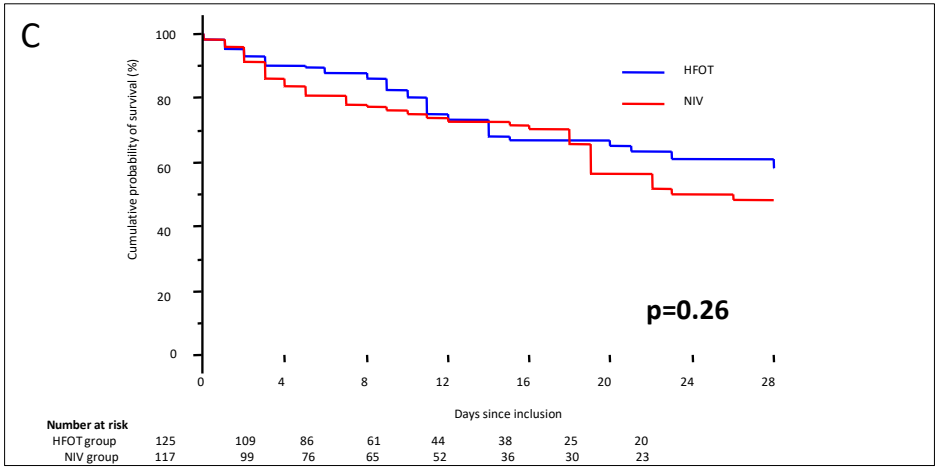
The risk of severe hypoxemia was significantly lower with NIV than with HFOT after adjustment for PaO_2 at randomization,
adjusted odds ratio 0·56 (95% CI, 0·32-0·99, p=0·0459)

Patients with PaO_2:FiO_2 ≤ 200 mm Hg



Mortality at day 28





Conclusions

1. Preoxygenation with NIV or HFOT during intubation procedure did not change the risk of severe hypoxemia and other immediate or late complications.

2. However, NIV enabled preventing severe hypoxemia in the pre-specified stratum of patients with severe-moderate hypoxemia as compared with HFOT.

- 28 centres participants
- 322 inclusions d'avril 2016 à décembre 2016