24e Journées d'Anesthésie Réanimation

JARCA

Chirurgicale d'Aquitaine

18, 19 & 20 novembre 2015

L'oxygénothérapie nasale à haut débit dans l'insuffisance respiratoire aiguë.

Etude FLORALI.

Jean-Pierre FRAT

Réanimation Médicale

CHRU Poitiers

CHU de Poitiers

Inserm

Institut national de la santé et de la recherche médicale

LIVE

Conflits d’intérêts

- Fisher&Paykel :
  - prêt du matériel pendant l’étude
  - prises en charge déplacements congrès

Insuffisance respiratoire aiguë et prise en charge non-invasive

The New England
Journal of Medici

Volume 333 SEPTEMBER 28, 1995

NONINVASIVE VENTILATION FOR ACUTE EXACERBATIONS OF CHR... PULMONARY DISEASE

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The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Noninvasive Positive-Pressure Ventilation for Respiratory Failure after Extubation

Andrés Esteban, M.D., Ph.D., Fernando Frutos-Vivar, M.D.,
Niall D. Ferguson, M.D., Yaseen Arabi, M.D.,
Carlos Apezteguía, M.D., Marco González, M.D., Scott K. Epstein, M.D.,
Nicholas S. Hill, M.D., Stefano Nava, M.D., Marco-Antonio Soares, M.D.,
Gabriel D'Empaire, M.D., Inmaculada Alía, M.D., and Antonio Anzueto, M.D.

NONINVASIVE VENTILATION IN IMMUNOSUPPRESSED PATIENTS

NONINVASIVE VENTILATION IN IMMUNOSUPPRESSED PATIENTS WITH PULMONARY INFILTRATES, FEVER, AND ACUTE RESPIRATORY FAILURE

GILLES HILBERT, M.D., DIDIER GRUSON, M.D., FRÉDERIC VARGAS, M.D., RUDDY VALENTINO, M.D.,
GEORGES GBIKPI-BENISSAN, M.D., MICHEL DUPON, M.D., JOSY REIFFERS, M.D., AND JEAN P. CARDINAUD, M.D.

Noninvasive Ventilation in Severe Hypoxemic Respiratory Failure

A Randomized Clinical Trial

Miquel Ferrer, Antonio Esquinas, Miguel Leon, Gumersindo Gonzalez, Antonio Alarcon, and Antoni Torres

Unitat de Vigilància Intensiva Respiratòria, Institut Clínic de Pneumologia i Cirurgia Toràcica, Institut d'Investigacions Biomèdiques August Pi i Sunyer, Hospital Clínic, Universitat de Barcelona, Barcelona; Unidad de Cuidados Intensivos, Hospital Morales Meseguer, Murcia; and Unidad de Cuidados Intensivos, Hospital Arnau de Vilanova, Lleida, Spain

ORIGINAL ARTICLE

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.,
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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*

Indications actuelles de la VNI dans l'insuffisance respiratoire aiguë

Bersten NEJM 1991; 325:1825-30
Brochard. NEJM 1995;333:8817-22

Antonelli. JAMA 2000; 283:235-41

The New England
Journal of Medicine

Volume 325 DECEMBER 26, 1991 Number 26

TREATMENT OF SEVERE CARDIOGENIC PULMONARY EDEMA WITH CONTINUOUS POSITIVE AIRWAY PRESSURE DELIVERED BY FACE MASK

ANDREW D. BERSTEN, M.B., B.S., ANDREW W. HOLT, M.B., B.S., ALNIS E. VEDIG, M.B., B.S., GEORGE A. SKOWRONSKI, M.B., B.S., AND CHRISTOPHER J. BAGGOLEY, M.B., B.S.

VARIABLE	OXYGEN (N = 20)	OXYGEN PLUS CPAP (N = 19)	P VALUE†
Intubation and mechanical ventilation — no. (%)	7 (35)	0 (0)	0.005
Stay in ICU (days)			
All patients	2.7±2.0	1.2±0.4	0.006
Excluding 7 ventilated patients	1.7±0.8	—	0.066
Hospital stay (days)			
All patients	7.9±4.1	8.7±8.3	0.68
Survivors only	8.9±3.6	9.5±8.5	0.79
In-hospital deaths — no. (%)	4 (20)	2 (10)	0.36
Predicted in-hospital mortality (%)‡	29±10	28±11	—

Œdème aigu pulmonaire cardiogénique

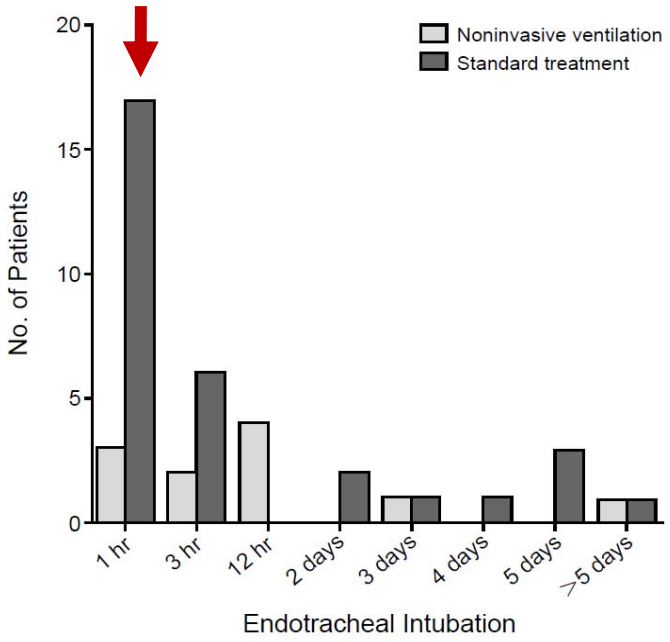
Bersten NEJM 1991; 325:1825-30

The New England
Journal of Medicine

Volume 333 SEPTEMBER 28, 1995 Number 13

NONINVASIVE VENTILATION FOR ACUTE EXACERBATIONS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

LAURENT BROCHARD, M.D., JORDI MANCEBO, M.D., MARC WYSOCKI, M.D., FRÉDÉRIC LOFASO, M.D., GIORGIO CONTI, M.D., ALAIN RAUSS, M.D., GÉRALD SIMONNEAU, M.D., SALVADOR BENITO, M.D., ALESSANDRO GASPARETTO, M.D., FRANÇOIS LEMAIRE, M.D., DANIEL ISABEY, PH.D., AND ALAIN HARF, M.D.



Exacerbation de BPCO

CHARACTERISTIC	STANDARD TREATMENT		NONINVASIVE VENTILATION		P VALUE†
	INTUBATION NOT REQUIRED (N = 11)	INTUBATION REQUIRED (N = 31)	INTUBATION NOT REQUIRED (N = 32)	INTUBATION REQUIRED (N = 11)	
Length of hospital stay — days	20±16	41±36‡	17±9	40±22§	<0.001
Deaths — no. of patients (%)	2 (18)	10 (32)	1 (3)	3 (27)	

Bénéfice de la VNI dans l'insuffisance respiratoire aiguë *de novo ?*

	Patients	n	Objective	Intubation rate VNI / O_2 (%)	Study interests	Drawbacks
Wysocki Chest 1995 107:761-8	ARF non COPD	41	Intubation rate	**62 / 70**	COPD exclusion	Multiple causes, sub-groups
Confalonieri AJRCCM 1999 160:1585-91	ARF with comunity-acquired pneumonia	56	Intubation rate	**21 / 61**	Pneumonie communautaire sévère	Many COPD
Martin AJRCCM 2000 161:807-13	ARF All causes	61	Hospital stay Intubation rate	**28 / 59**		COPD hypercapnia
Ferrer Chest 2005 128:3916-24	Hypoxemic ARF non COPD non hyperCO_2	105	Intubation rate	**25 / 52**	Exclusion BPCO et hypercapnie	1/3 CPE

Limites de la VNI dans l'insuffisance respiratoire aiguë *de novo*

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Miquel Ferrer
Maria Elena Martinez-Quintana
Antonia Lopez-Martinez
Noemi Llamas
Maravillas Alcazar
Antoni Torres

Non-invasive ventilation in community-acquired pneumonia and severe acute respiratory failure

n=184, VNI première ligne
dont 102 IRA « de novo »

	"De novo" ARF			Previous cardiac or respiratory disease		
	NIV success ($n = 55$)	NIV failure ($n = 47$)	p value	NIV success ($n = 61$)	NIV failure ($n = 21$)	p value
ICU mortality, n (%)	0 (0%)	34 (50%)	<0.001	0 (0%)	12 (57%)	<0.001
Hospital mortality, n (%)	5 (9%)	23 (49%)	<0.001	5 (8%)	14 (67%)	<0.001
Among intubated patients, n (%)[a]	–	16 (40%)	–	–	12 (63%)	–

Mortalité élevée
après échec de VNI

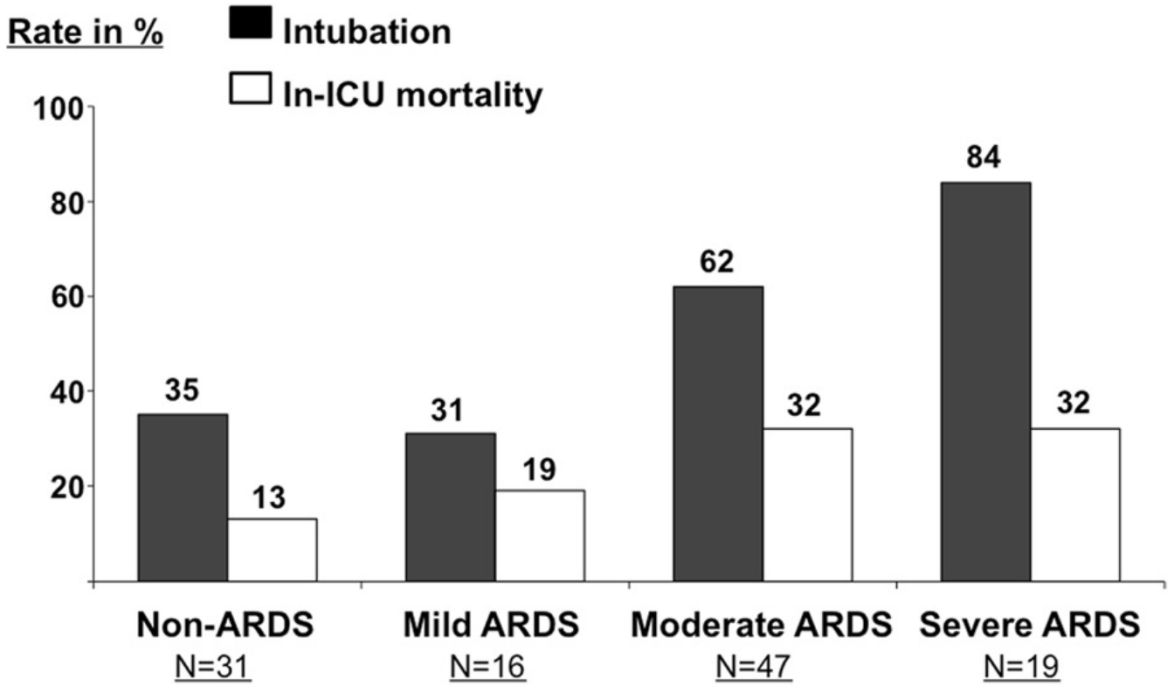
Carillo et al. Intensive Care Med 2012;38:458-66

Research

Open Access

Non-invasive ventilation for acute hypoxemic respiratory failure: intubation rate and risk factors

Arnaud W Thille, Damien Contou, Chiara Fragnoli, Ana Córdoba-Izquierdo, Florence Boissier and **Christian Brun-Buisson**



N=113
- Intubation :
  54% (61/113)
- Mortalité intubés :
  46% (28/61)

Critical Care 2013, **17**:R269

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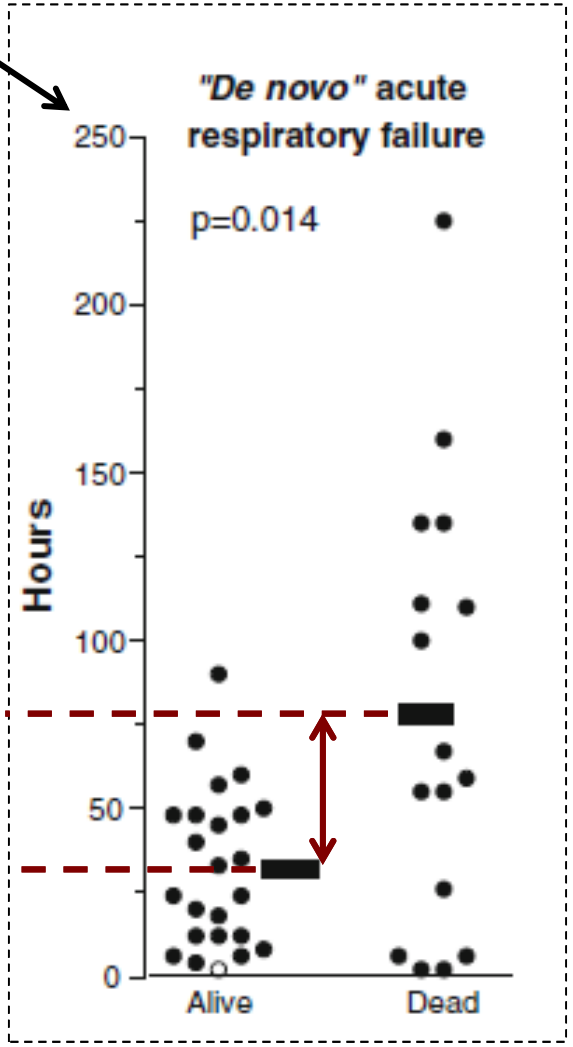
Non-invasive ventilation in community-acquired pneumonia and severe acute respiratory failure

durée moyenne de VNI avant intubation



32 ± 24 vs 78 ± 65 h,
p = 0,014

n=184, VNI première ligne
dont 102 IRA « de novo »

Mortalité associée au retard d'intubation

Carillo et al. Intensive Care Med 2012;38:458-66

Mélangeur air-oxygène

Canule patient

Circuit vers le patient

Humidificateur-réchauffeur
- 37°C
- H_2O 44 mg/l

L'oxygénothérapie nasale humidifiée et réchauffée à haut débit

- Effets physiologiques :
  - FiO_2 élevée, jusqu'à 100%
  - Lavage espace mort
  - Pression positive dans les voies aériennes
  - Diminution travail respiratoire

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

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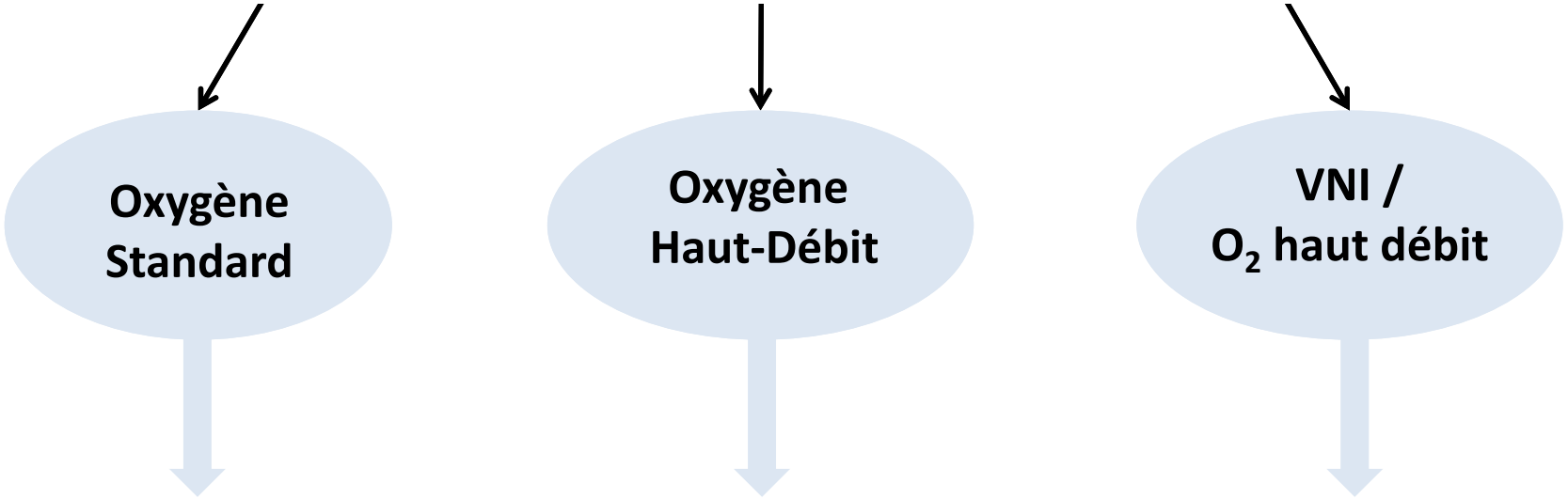
N Engl J Med. 2015 Jun 4;372(23):2185-96

Insuffisance respiratoire aiguë hypoxémique
FR >25 c/min ; PaO_2/FiO_2 ≤300,
$PaCO_2$ ≤45 mmHg

Information et recueil consentement
Randomisation et Stratification
antécédent Insuffisance cardiaque

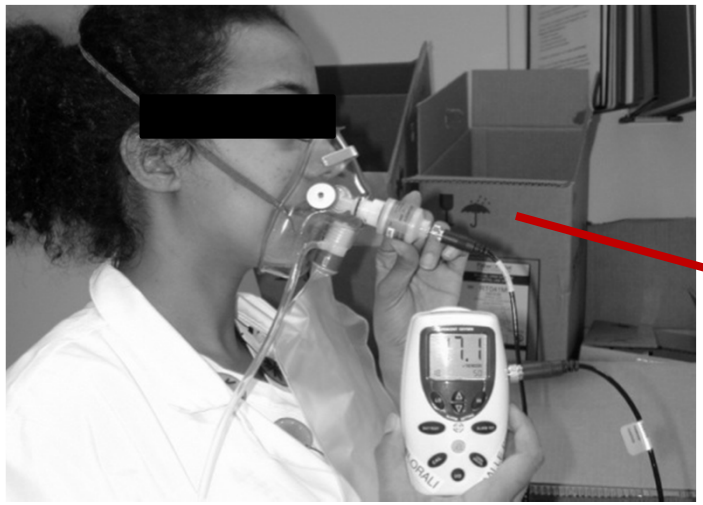


FLORALI

Insuffisance respiratoire aiguë hypoxémique

FR >25 c/min ; PaO_2/FiO_2 ≤300,

$PaCO_2$ ≤45 mm Hg



FiO_2 determinée par un analyseur d'oxygène portable

Critères d'**Exclusion** :

- Contre-indications à la VNI
- BPCO, Ins. Resp. chronique
- OAP
- choc
- Score de Glasgow <12 pts
- Indication à intubation urgente
- Neutropénie profonde (<500/mm^3)

Critères prédéterminés d'intubation

défaillance **respiratoire***

- ✓ *signes de détresse respiratoire persistant ou se majorant après*
- ✓ *pH <7,35,*
- ✓ *SpO2 <90% non expliquée par des problèmes techniques,*
- ✓ *intolérance VNI, dépendance de la VNI > 12h*

défaillance **neurologique**

- ✓ *trouble de la conscience*
- ✓ *agitation*

défaillance **hémodynamique**

- ✓ *PAS <90 mmHg, PAM <65 mmHg*
- ✓ *amines vasopressives,*

FLORALI

FLORALI

Objectif primaire :

Taux d'intubation

Calcul effectif

N= 300 (100 patients/groupe)

α=0.05, 1-β=0.8

Hypothèse: taux d'intubation

- dans groupe O_2 standard : 60%
- dans groupe OHD ou VNI/OHD : 40%

Essai FLORALI

Objectif primaire :

Taux d'intubation

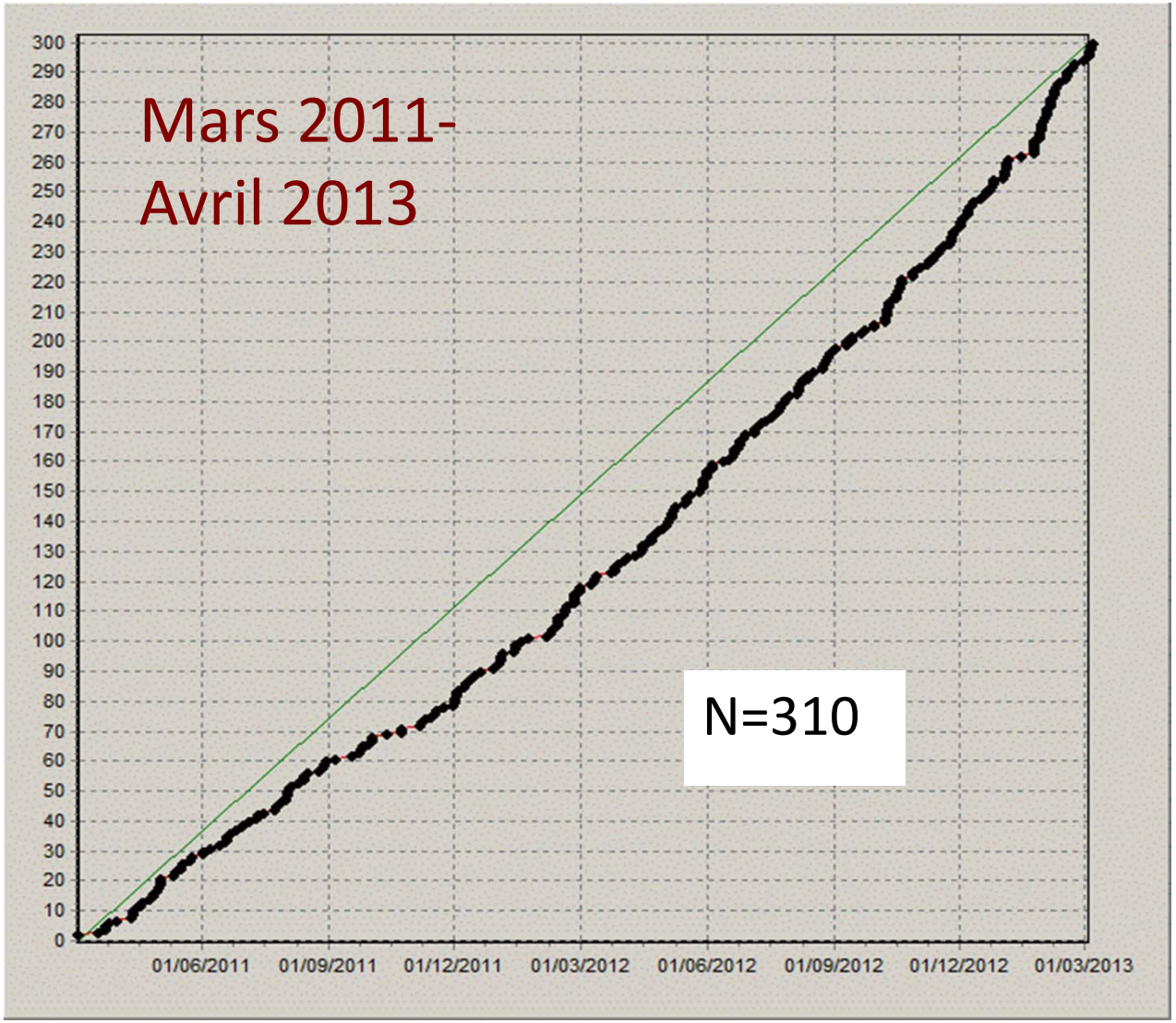
Objectifs secondaires principaux:

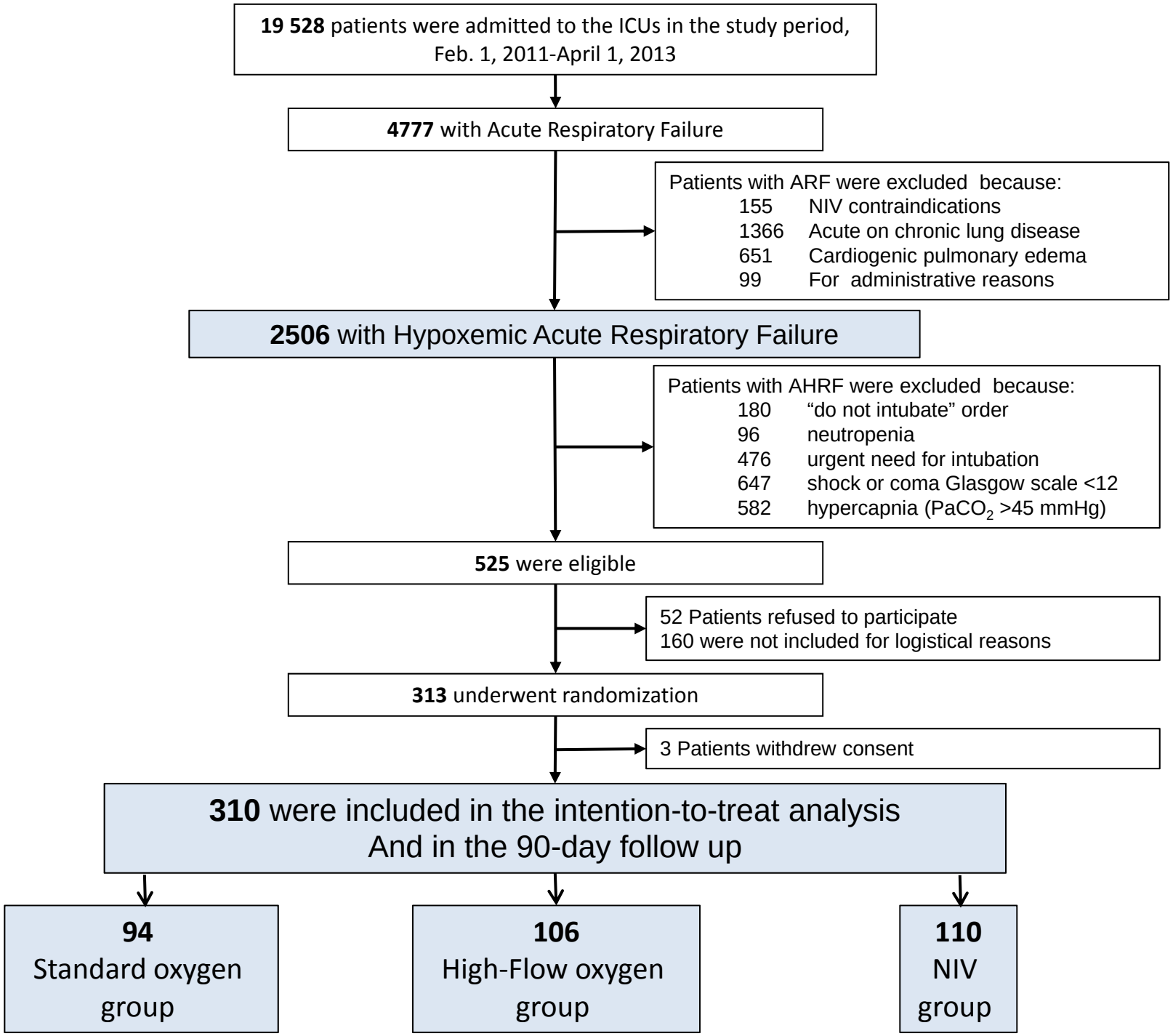
- **mortalite en reanimation et a J90**
- nombre de jours sans ventilation à J28
- Durée de séjour
- Complications

Analyse post-hoc de sous-groupe :

Taux d'intubation des patients avec $PaO_2/FiO_2 \leq 200$

Inclusions FLORALI




19 528 patients were admitted to the ICUs in the study period, Feb. 1, 2011-April 1, 2013
4777 with Acute Respiratory Failure
Patients with ARF were excluded because:
155 NIV contraindications
1366 Acute on chronic lung disease
651 Cardiogenic pulmonary edema
99 For administrative reasons
2506 with Hypoxemic Acute Respiratory Failure
Patients with AHRF were excluded because:
180 "do not intubate" order
96 neutropenia
476 urgent need for intubation
647 shock or coma Glasgow scale <12
582 hypercapnia ($PaCO_2$ >45 mmHg)
525 were eligible
52 Patients refused to participate
160 were not included for logistical reasons
313 underwent randomization
3 Patients withdrew consent
310 were included in the intention-to-treat analysis
And in the 90-day follow up
94
Standard oxygen group
106
High-Flow oxygen group
110
NIV group

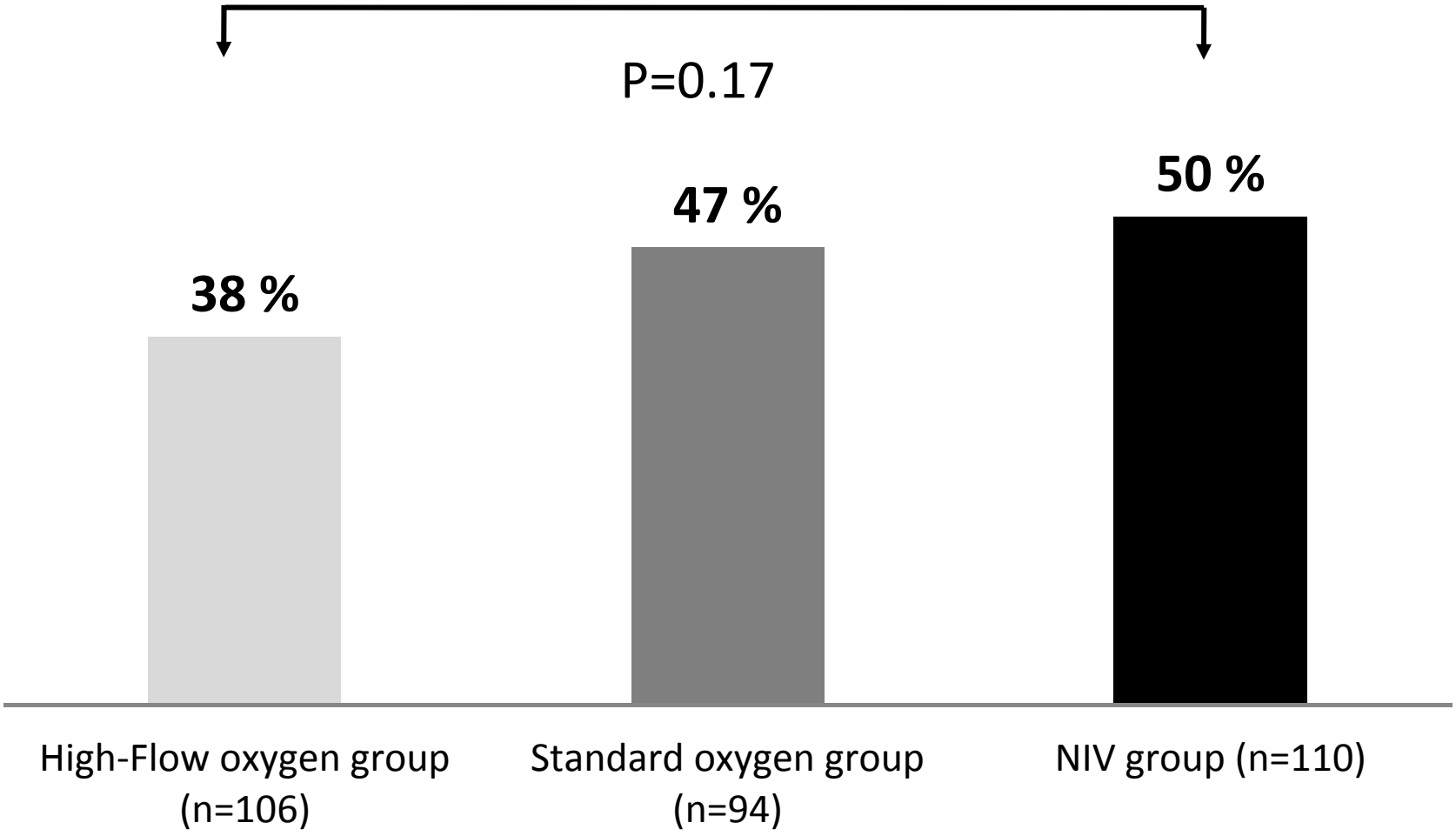
Caractéristiques des patients

Characteristics at inclusion	Standard oxygen Group (n=94)	High-Flow oxygen Group (n=106)	NIV Group (n=110)
Age – yr	59±17	61±16	61±17
Male sex – no. (%)	63 (67.0)	75 (70.7)	74 (67.3)
Body-mass index	26±5	25±5	26±6
SAPS II at inclusion	24±9	25±9	27±9
SOFA at inclusion	3.6±1.8	3.7±2.0	4.2±2.1
Preexisting cardiac failure - no. (%)	4 (4.3)	8 (7.5)	8 (7.3)
Immunodeficiency – no. (%):	30 (31.9)	26 (24.5)	26 (23.6)
Liver cirrhosis – no. (%)	5 (5.3)	6 (5.7)	5 (4.5)
Smoker – no. (%)	36 (38.3)	34 (32.1)	40 (36.4)
Reason for acute respiratory failure, no. (%)			
Community-acquired pneumonia	57 (60.6)	71 (67.0)	69 (62.7)
Hospital acquired pneumonia	13 (13.8)	12 (11.3)	12 (10.9)
other	24 (25.5)	23 (21.7)	29 (26.4)
Bilateral pulmonary infiltrates – no. (%)	80 (85.1)	79 (74.5)	85 (77.3)

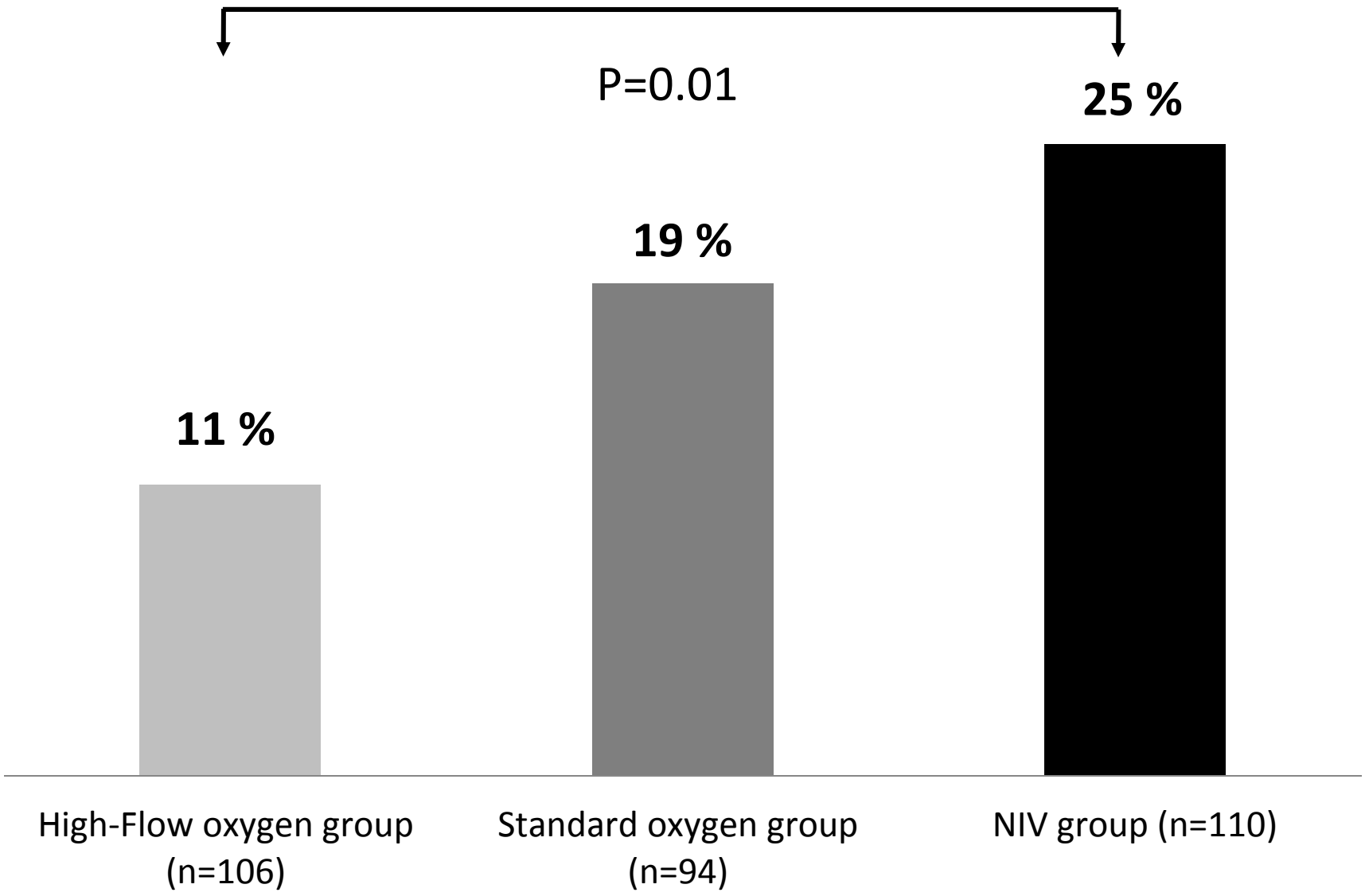
Caractéristiques des patients (2)

Characteristics at inclusion	Standard oxygen Group (n=94)	High-Flow oxygen Group (n=106)	NIV group (n=110)
Clinical parameters			
Respiratory rate - breath/min	32±6	33±6	33±7
Heart rate - beats/min	104±16	106±21	106±21
Systolic arterial pressure – mmHg	130±22	127±24	128±21
Mean arterial pressure – mmHg	89±15	87±17	86±16
Arterial blood gas			
pH	7.44±0.06	7.43±0.06	7.43±0.06
PaO_2 – mmHg	91±33	85±31	90±35
FiO_2	0.66±0.12	0.66±0.13	0.64±0.14
PaO_2:FiO_2 ratio– mmHg	146±53	137±56	150±62
$PaCO_2$ – mmHg	35±5	36±6	34±6

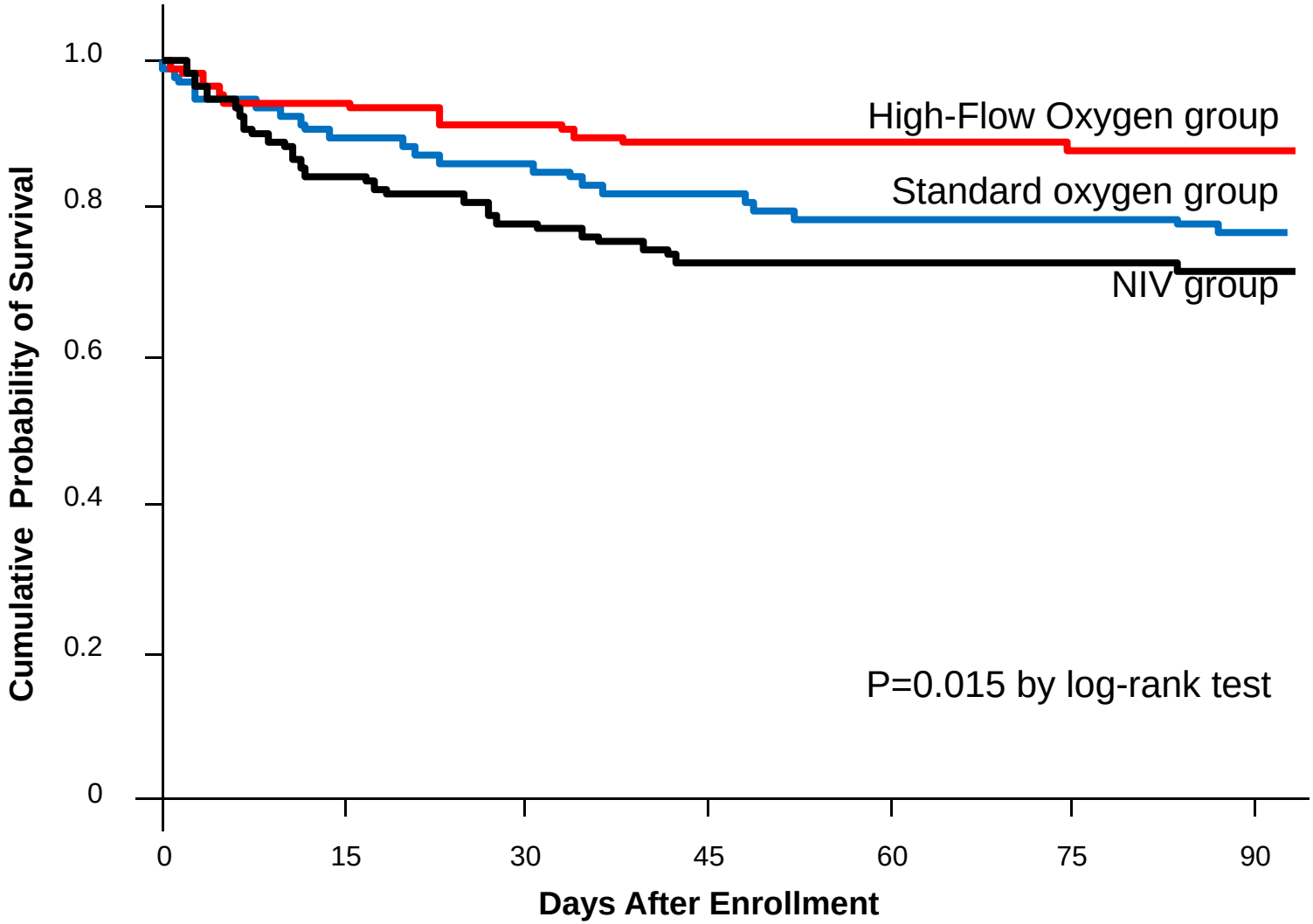
Taux d’intubation



Mortalité en réanimation



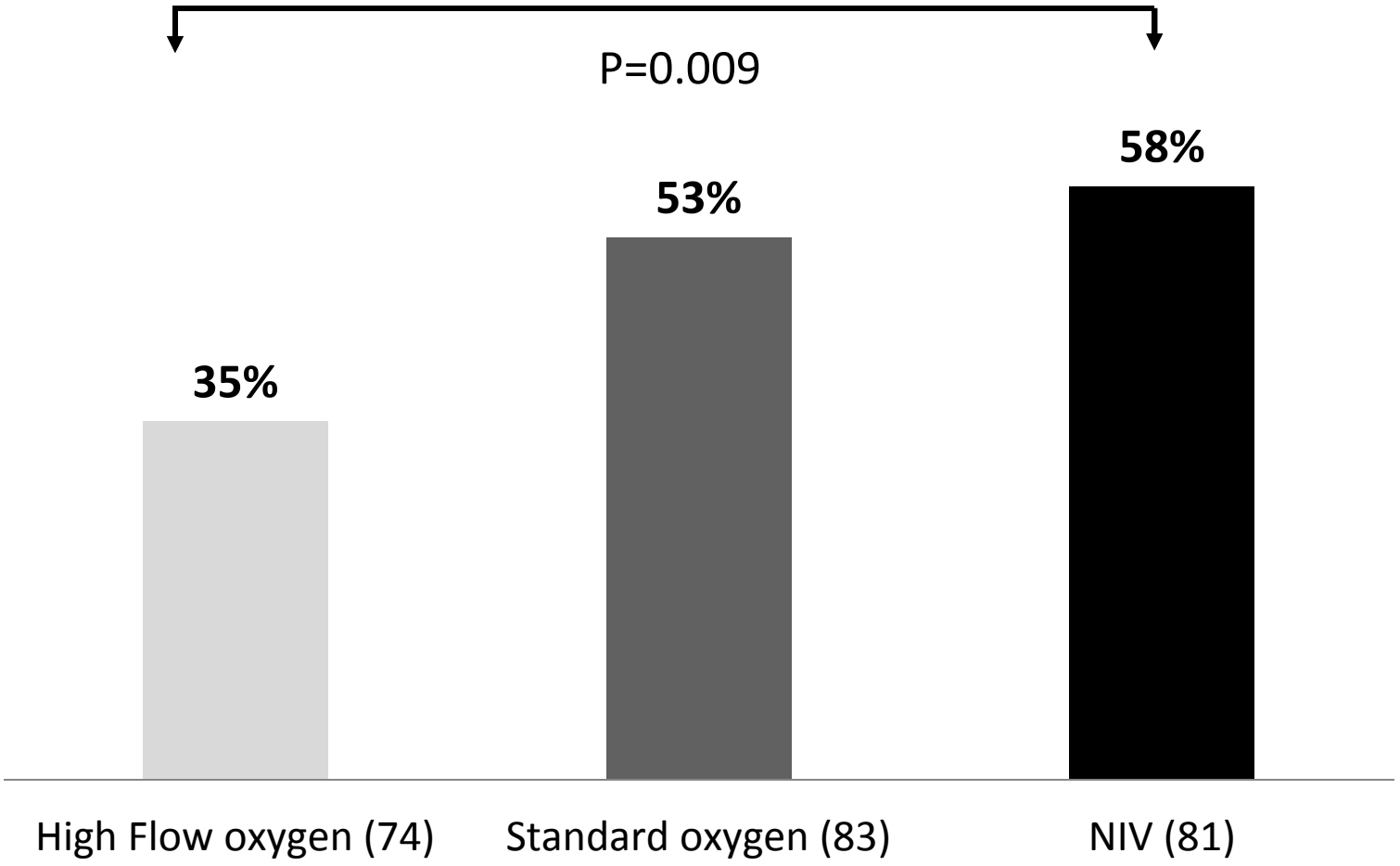
Survie à J90


1.0
0.8
0.6
0.4
0.2
0
Cumulative Probability of Survival
High-Flow Oxygen group
Standard oxygen group
NIV group
P=0.015 by log-rank test
0
15
30
45
60
75
90
Days After Enrollment

	Odds Ratio or Hazard Ratio (95% CI)	
	Standard Oxygen vs. High-Flow Oxygen	NIV vs. High-Flow Oxygen
Mortalité en réanimation – no. (%)		
Non ajustée	1.85 (0.84–4.09)	2.55 (1.21–5.35)
Ajustée (pour PaO_2, SAPS2 et insuffisance cardiaque)	**2.55** (1.07–6.08)	**2.60** (1.20–5.63)
Mortalité à J90 – no. (%)		
Non ajustée	**2.01** (1.01–3.99)	**2.50** (1.31–4.78)
Ajustée (pour SAPS2 et insuffisance cardiaque)	**2.36** (1.18–4.70)	**2.33** (1.22–4.47)

Effet délétère de la VNI …

Taux d'intubation chez les patients avec PaO_2/FiO_2 ≤200 (n=238)



VNI dans l'insuffisance respiratoire aiguë des patients immunodéprimés

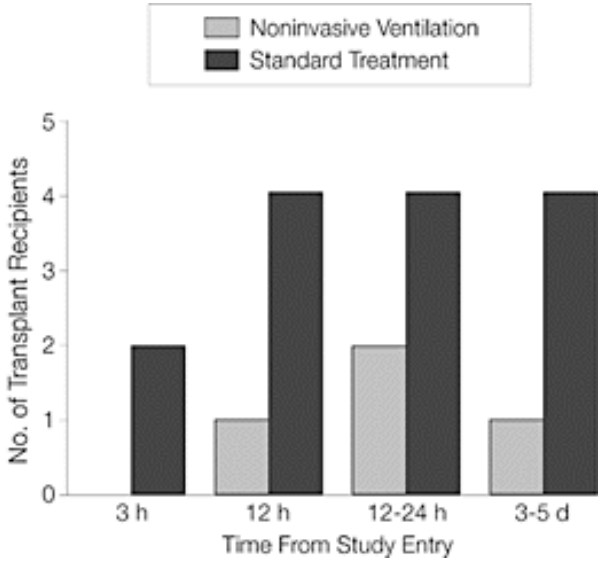
- Bénéfices de la VNI controversés…

Antonelli. JAMA 2000; 283:235-41.
Hilbert. N Engl J Med 2001;344:481-487.
Lemiale. JAMA 2015 Oct 27;314(16):1711-9.

From: **Noninvasive Ventilation for Treatment of Acute Respiratory Failure in Patients Undergoing Solid Organ Transplantation: A Randomized Trial**

The JAMA Network

Variable	Noninvasive Ventilation Group (n = 20)	Standard Treatment Group (n = 20)	*P* Value
Initial improvement in ratio of PaO_2 to fraction of inspired oxygen	14 (70)	5 (25)	.005
Sustained improvement in ratio of PaO_2 to fraction of inspired oxygen, without intubation	12 (60)	5 (25)	.03
Patients intubated within 24 h of study entry	3 (15)	10 (50)	.02
Patients requiring intubation	4 (20)	14 (70)	.002
Failures per subgroup of patients			
Acute respiratory distress syndrome (pulmonary etiology)†	2/5 (40)	2/2 (100)	.28
Acute respiratory distress syndrome (extrapulmonary etiology)†	1/3 (33)	4/5 (80)	.28
Pneumonia†	1/2 (50)	1/2 (50)	.83
Cardiogenic pulmonary edema†	0/4 (0)	5/5 (100)	.007
Pulmonary embolism	0/1 (0)	0/1 (0)	.99
Mucous plugging or atelectasis†	0/5 (0)	2/5 (40)	.22
Duration of mechanical ventilation, d‡§	4 (5)	5 (6)	.58
Duration of mechanical ventilation in survivors, d‡	2 (0.7)	1.6 (2)	.50
Duration of use for all invasive devices present at study entry, d‡	5 (5)	9 (6)	.05
Length of intensive care unit stay, d‡	7 (5)	10 (6)	.18
Length of intensive care unit stay in survivors, d‡	5.5 (3)	9 (4)	.03
ntensive care unit deaths‖	4 (20)	10 (50)	.05
Intensive care unit deaths per subgroup of patients†			
Acute respiratory distress syndrome	3/8 (37)	4/7 (57)	.40
Pneumonia	1/2 (50)	1/2 (50)	.80
Cardiogenic pulmonary edema	0/4 (0)	4/5 (80)	.04
Pulmonary embolism	0/1 (0)	0.1 (0)	.99
Mucous plugging or atelectasis	0/5 (0)	1/5 (20)	.50
Hospital deaths¶	7 (35)	11 (55)	.17



Antonelli. JAMA 2000; 283:235-41

NONINVASIVE VENTILATION IN IMMUNOSUPPRESSED PATIENTS WITH PULMONARY INFILTRATES, FEVER, AND ACUTE RESPIRATORY FAILURE

GILLES HILBERT, M.D., DIDIER GRUSON, M.D., FRÉDERIC VARGAS, M.D., RUDDY VALENTINO, M.D., GEORGES GBIKPI-BENISSAN, M.D., MICHEL DUPON, M.D., JOSY REIFFERS, M.D., AND JEAN P. CARDINAUD, M.D.

TABLE 2. OUTCOMES OF TREATMENT.*

OUTCOME	NONINVASIVE-VENTILATION GROUP (N=26)	STANDARD-TREATMENT GROUP (N=26)	P VALUE	RELATIVE RISK (95% CI)
Intubation — no./total no. (%)	12/26 (46)	20/26 (77)	0.03	0.60 (0.38–0.96)
Immunosuppression from hematologic cancer and neutropenia	8/15 (53)	14/15 (93)	0.02	0.57 (0.35–0.93)
Drug-induced immunosuppression	3/9 (33)	5/9 (56)	0.32	0.60 (0.20–1.79)
Immunosuppression from the acquired immunodeficiency syndrome	1/2 (50)	1/2 (50)	0.83	1.00 (0.14–7.10)
Initial improvement in PaO_2:FiO_2 — no. (%)	12 (46)	4 (15)	0.02	
Sustained improvement in PaO_2:FiO_2 without intubation — no. (%)	13 (50)	5 (19)	0.02	
Death in the ICU — no./total no. (%)†	10/26 (38)	18/26 (69)	0.03	0.56 (0.32–0.96)
Immunosuppression from hematologic cancer and neutropenia	7/15 (47)	13/15 (87)	0.02	0.54 (0.30–0.96)
Drug-induced immunosuppression	3/9 (33)	4/9 (44)	0.50	0.75 (0.23–2.44)
Immunosuppression from the acquired immunodeficiency syndrome	0/2	1/2 (50)	0.50	0.50 (0.13–2.00)
Total duration of any ventilatory assistance — days				
Among all patients	6±3	6±5	0.59	
Among survivors	5±2	3±5	0.12	
Length of ICU stay — days				
Among all patients	7±3	9±4	0.11	
Among survivors	7±3	10±4	0.06	
Death in the hospital — no./total no. (%)	13/26 (50)	21/26 (81)	0.02	0.62 (0.40–0.95)
Immunosuppression from hematologic cancer and neutropenia	8/15 (53)	14/15 (93)	0.02	0.57 (0.35–0.93)
Drug-induced immunosuppression	4/9 (44)	6/9 (67)	0.32	0.67 (0.28–1.58)
Immunosuppression from the acquired immunodeficiency syndrome	1/2 (50)	1/2 (50)	0.83	1.00 (0.14–7.10)

Hilbert. N Engl J Med 2001;344:481-487.

Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Effect of Noninvasive Ventilation vs Oxygen Therapy on Mortality Among Immunocompromised Patients With Acute Respiratory Failure

A Randomized Clinical Trial

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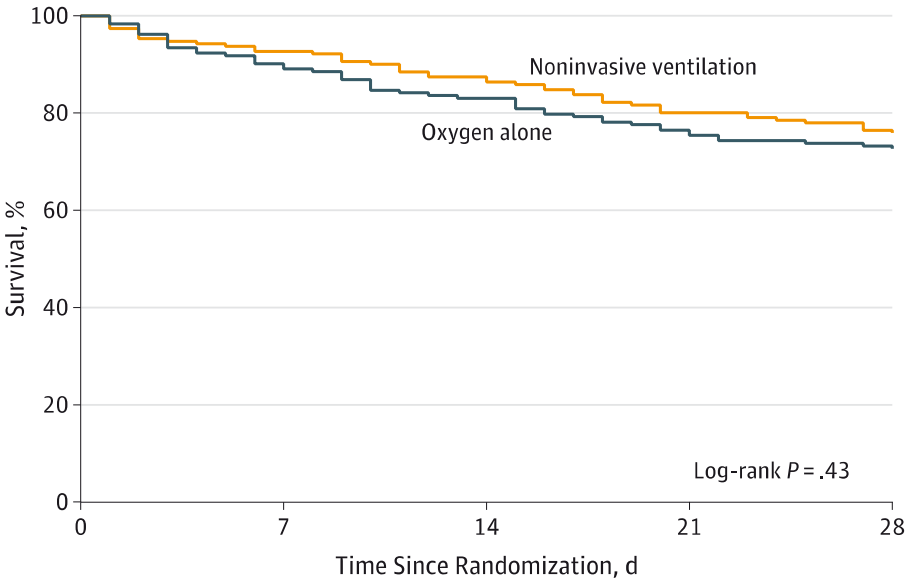

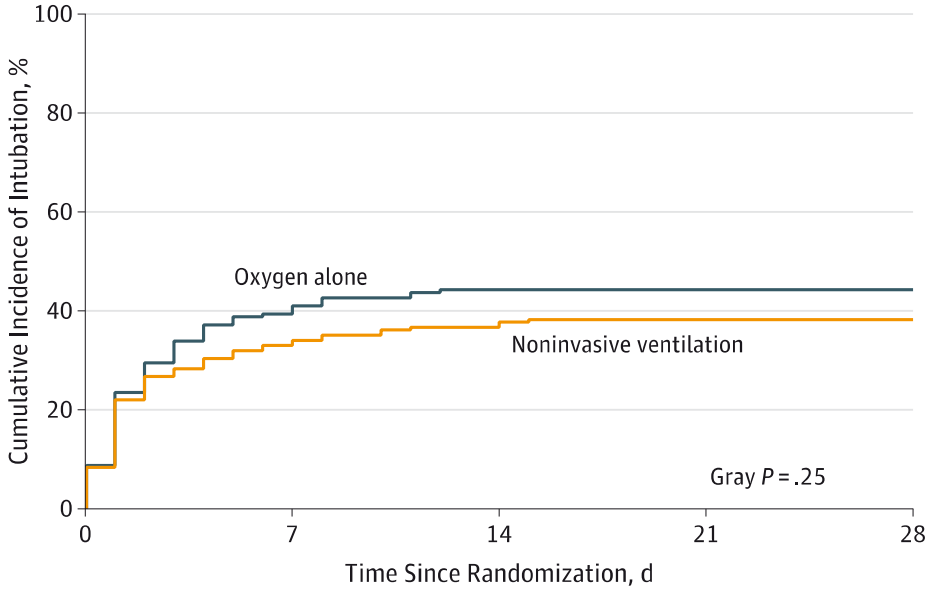

JAMA. 2015 Oct 27;314(16):1711-9.

Characteristic	No. (%)	
	Oxygen Alone (n = 183)	Noninvasive Ventilation (n = 191)
Respiratory parameters at randomization during oxygen therapy, median (IQR)		
Respiratory rate, /min	25 (21-30)	27 (21-31)
Oxygen saturation (Spo_2), %	96 (4-98)	96 (94-98)
Oxygen flow, L/min	9 (6-15)	9 (5-15)
Pao_2:Fio_2 ratio, mm Hg[c]	130 (86-205)	156 (95-248)
SOFA score at randomization, median (IQR)[d]	5 (3-7)	5 (3-7)

40% des patients traités par OHD

Lemiale V. JAMA. 2015 Oct 27;314(16):1711-9.

Intensive Care Med (2015) 41:2008–2010
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LETTER

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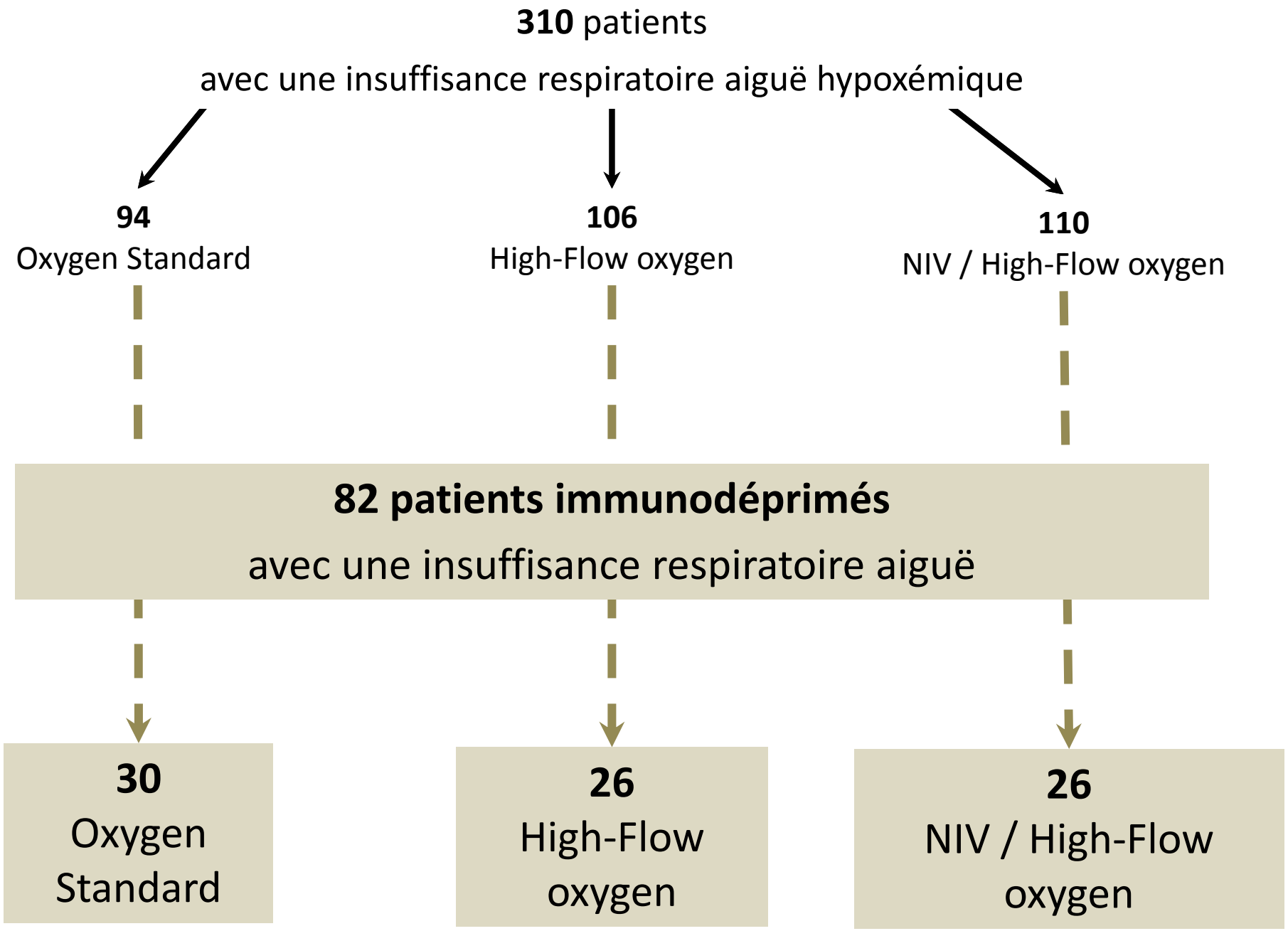
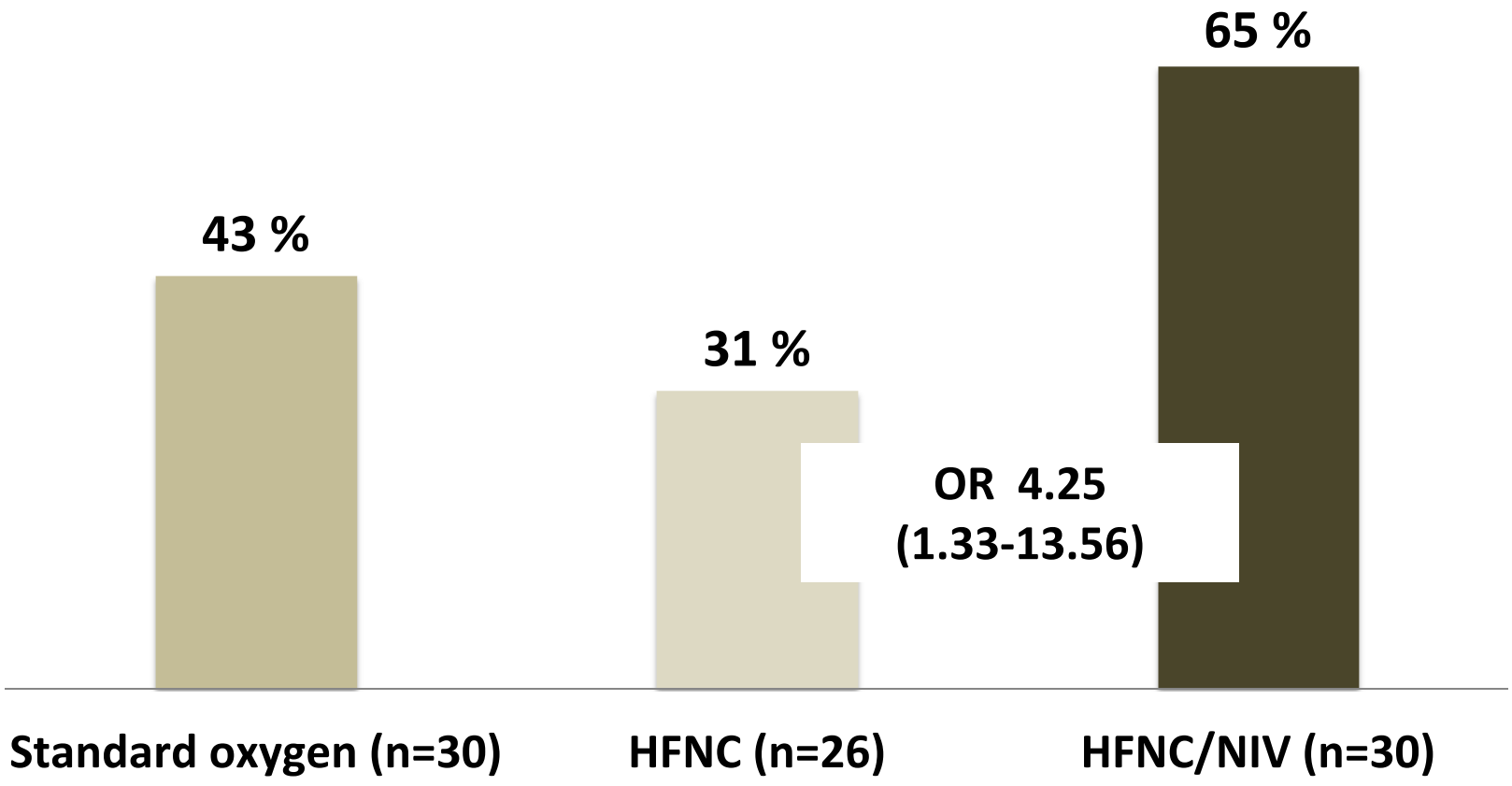
High-flow oxygen therapy in cancer patients with acute respiratory failure

	HFNC–NIV ($n = 69$)	Others ($n = 69$)	p
Outcome			
Treatment limitations in ICU	18 (26)	21 (30)	0.435
ICU length of stay (days)	9 (5–15)	6 (3–12)	0.082
Hospital length of stay (days)	16 (9–32)	12 (5–19)	**0.016**
Mortality of ventilated patients at day 28	17/33 (52)	26/36 (72)	0.076
Mortality at day 28	25 (36)	37 (54)	**0.027**

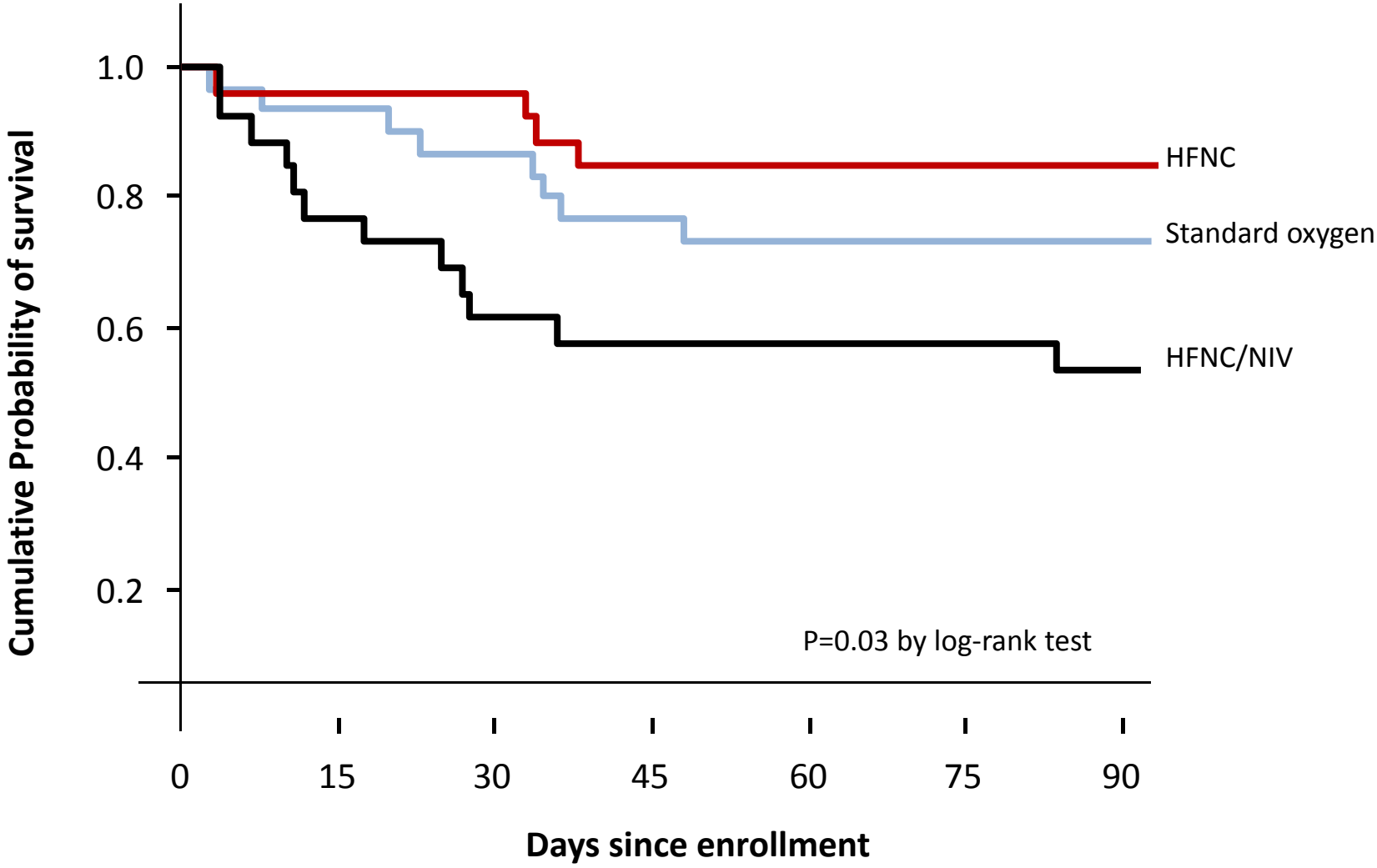
patients never treated with HFNC, the day-28 mortality rate was 36/63 (57 %) vs 26/75 (35 %) for HFNC patients, $p = 0.008$.


310 patients
avec une insuffisance respiratoire aiguë hypoxémique
94
Oxygen Standard
106
High-Flow oxygen
110
NIV / High-Flow oxygen
82 patients immunodéprimés
avec une insuffisance respiratoire aiguë
30
Oxygen Standard
26
High-Flow oxygen
26
NIV / High-Flow oxygen

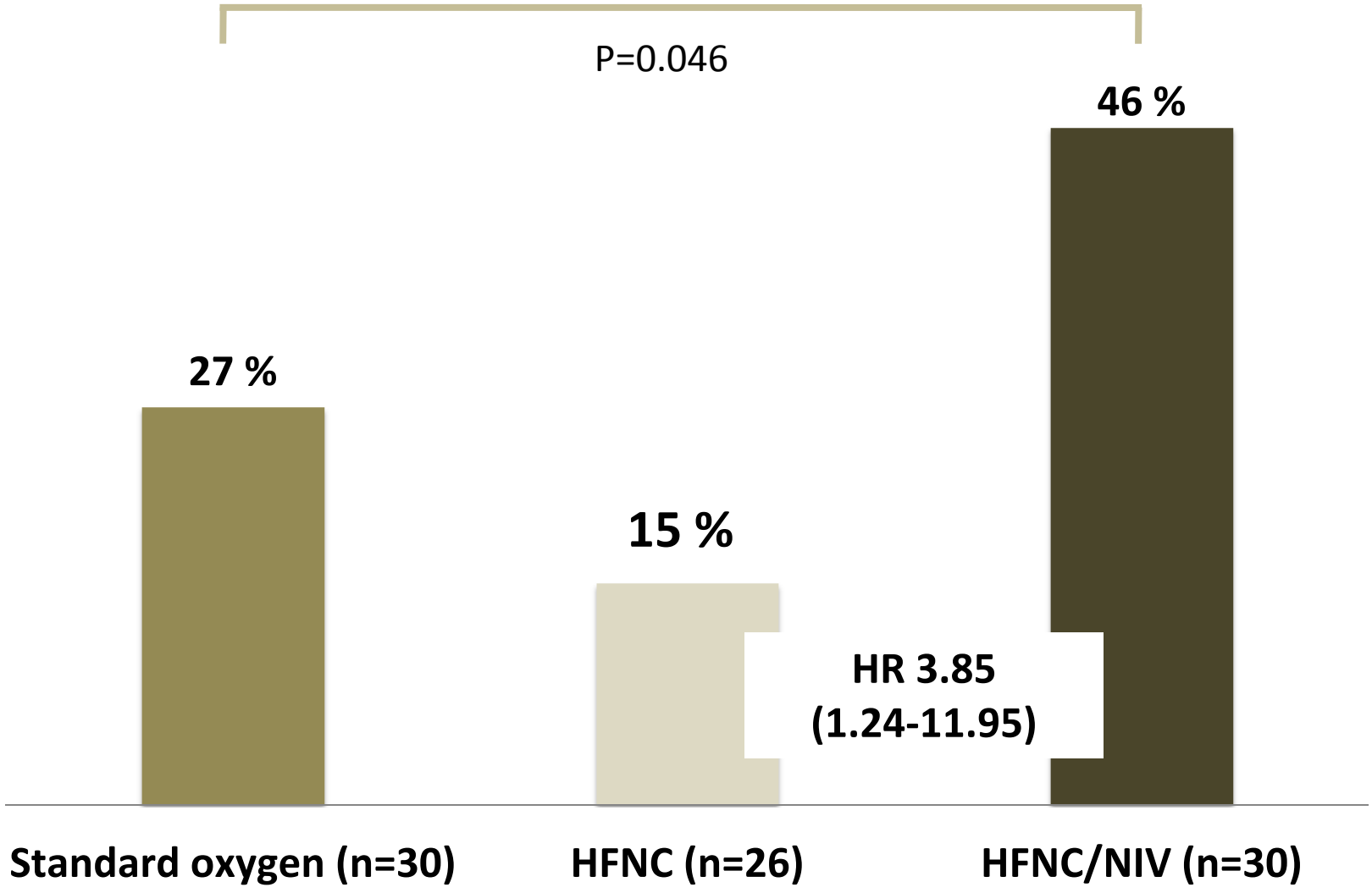
Taux d'intubation



Survie à J90


Cumulative Probability of survival
1.0
0.8
0.6
0.4
0.2
HFNC
Standard oxygen
HFNC/NIV
P=0.03 by log-rank test
0
15
30
45
60
75
90
Days since enrollment

Mortalité à J90



Conditions d'utilisation de l'OHD

- Insuffisance respiratoire aiguë hypoxémique, non hypercapnie
- Pas de défaillance associée : hémodynamique ou neurologique

- Critères prédéterminés d'intubation :
  - Persistance ou aggravation de l'insuffisance respiratoire
  - Défaillance hémodynamique
  - Altération état de conscience ou agitation

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

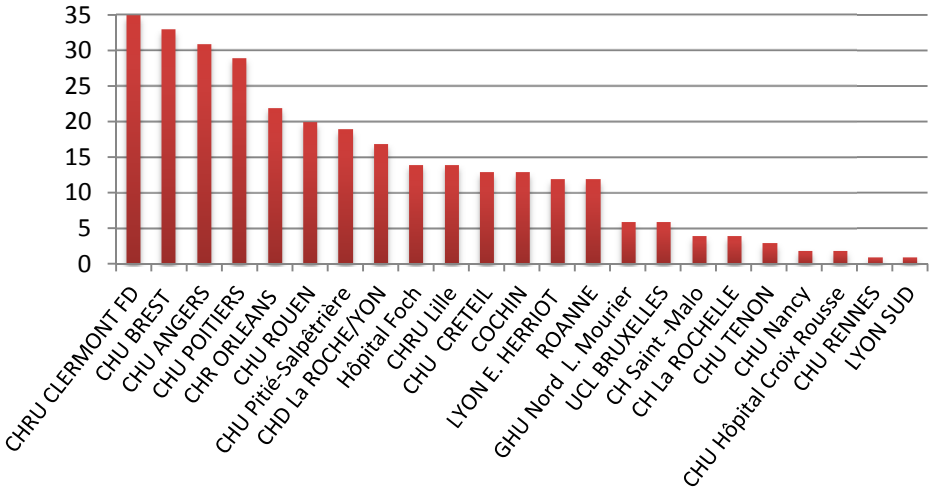
Table 3 Analysis of hospital outcomes for the early HFNC failure group compared with the late HFNC failure group (as reference) using the propensity score analysis

Variables	Crude		Propensity-adjusted[a]		Propensity-matched[b]	
	Odds ratio (95 % CI)	*P* value[c]	Odds ratio (95 % CI)	*P* value[c]	Odds ratio (95 % CI)	*P* value[c]
Primary outcome						
Overall ICU mortality	0.323 (0.158–0.658)	0.002	0.317 (0.143–0.700)	0.005	0.369 (0.139–0.984)	0.046
Secondary outcomes						
Extubation success	3.284 (1.361–7.923)	0.008	3.091 (1.193–8.013)	0.020	2.057 (0.746–5.672)	0.163
Ventilator-weaning	3.056 (1.470–6.351)	0.003	3.380 (1.492–7.656)	0.004	2.495 (1.039–5.991)	0.041
Ventilator-free days to day 28	0.542 (0.383–0.768)[d]	0.001[e]	0.516 (0.349–0.763)[d]	0.001[e]	0.639 (0.431–0.946)[d]	0.026[e]
14-Day mortality from HFNC application	0.949 (0.455–1.977)	0.888	0.712 (0.312–1.622)	0.418	0.608 (0.231–1.606)	0.316
14-Day mortality from intubation	0.653 (0.325–1.311)	0.231	0.482 (0.218–1.067)	0.072	0.447 (0.168–1.184)	0.105
28-Day mortality from HFNC application	0.820 (0.416–1.616)	0.566	0.680 (0.318–1.457)	0.322	0.896 (0.440–1.824)	0.763
28-Day mortality from intubation	0.571 (0.287–1.138)	0.111	0.557 (0.258–1.198)	0.134	0.802 (0.380–1.692)	0.563
Length of ICU stay	0.827 (0.586–1.169)[f]	0.282[g]	0.830 (0.552–0.800)[f]	0.372[g]	1.329 (0.598–2.952)[f]	0.485[g]

Conclusion

- Malgré l'absence de différence sur le taux d'intubation entre les groupes,
- La mortalité des patients en IRA hypoxémique traités par OHD est significativement plus basse comparativement aux deux autres groupes de patients
- Le taux d'intubation est significativement plus bas chez les patients avec une hypoxémie sévère traités par OHD.

- Ces résultats doivent être confirmés chez les patients immunodéprimés.
- Cependant il faut rester vigilant sur l'indication de l'OHD qui concerne les patients mono-défaillants respiratoires.



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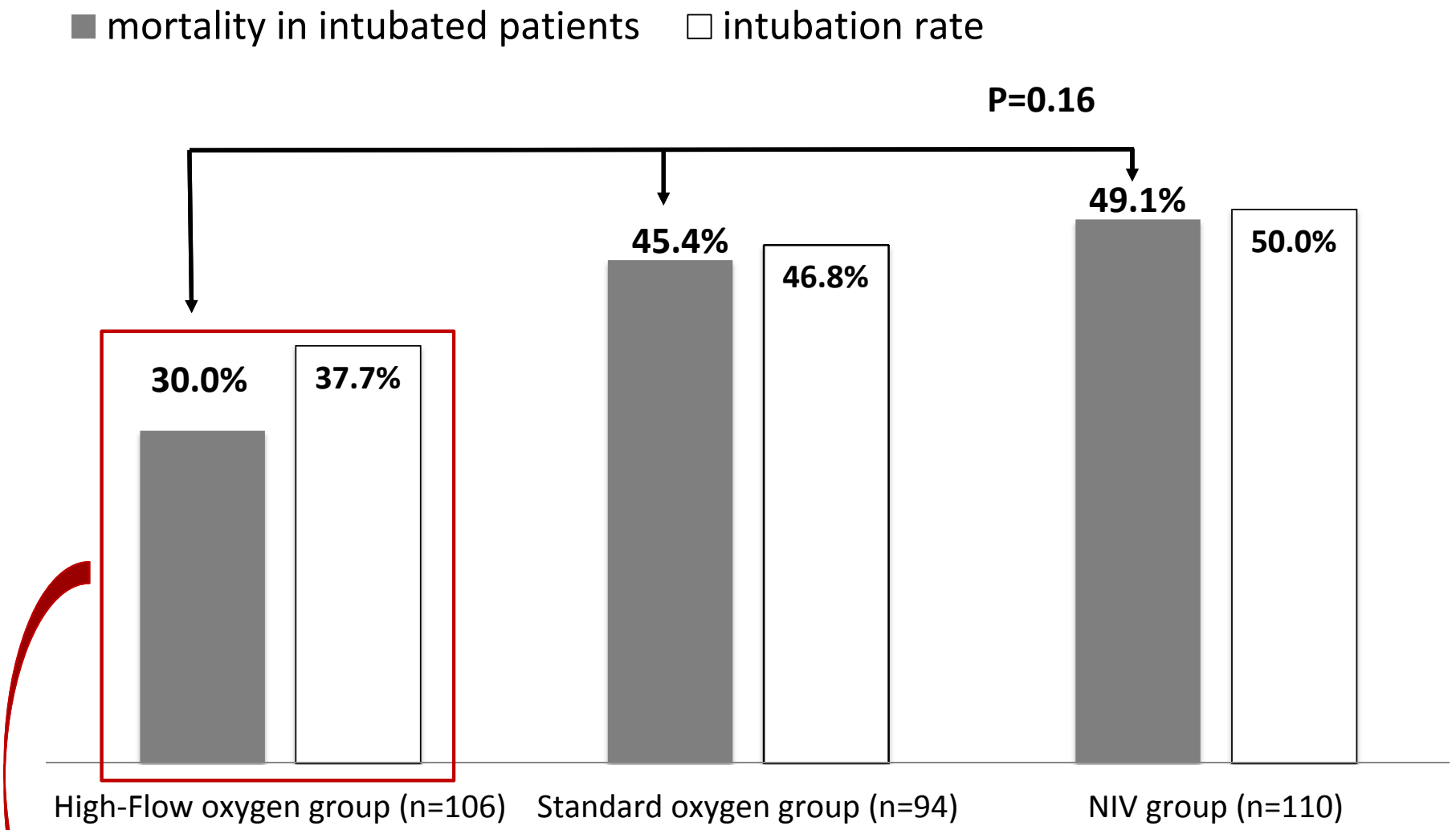

Effets cumulatifs d'un nombre moindre d'episodes d'intubation et d'une mortalité plus basse chez les patients intubés dans le groupe High-Flow

Benefits of High-Flow oxygen

Secondary outcomes	High-Flow group (n=86)	Standard oxygen group (n=74)	NIV group (n=91)	P Value
Respiratory patient-discomfort at H1– mm	29±26	40±29	43±29	<0.01
Grade of dyspnea at H1				<0.001
Marked improvement – no. (%)	19 (22.1)	5 (6.8)	13 (14.3)	
Slight improvement– no. (%)	46 (53.5)	26 (35.1)	40 (44.0)	
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 at H1 – cycles/min	28±7	31±7	31±8	<0.01

Potential deleterious effect of NIV ?

High Tidal volume : 9.3 ±3 ml/kg of predicted body weight

Séjour en Réanimation

Outcomes	Study Group			
	High-Flow Oxygen Group (N =106)	Standard Oxygen Group (N = 94)	NIV Group (N = 110)	P Value†
Cause of death				
Refractory shock – no. (%)	6 (46.1)	12 (60.0)	18 (56.2)	0.04
Refractory hypoxemia – no. (%)	5 (38.5)	6 (30.0)	8 (25)	0.73
Cardiac arrest – no. (%)	1 (7.7)	1 (5.5)	3 (9.4)	0.52
Other – no. (%)	1 (7.7)	1 (5.0)	3 (9.4)	0.52
Complications during ICU-stay				
Cardiac dysrythmia – no. (%)	11 (10.4)	16 (17.0)	17 (15.4)	0.35
Septic shock – no. (%)	19 (17.9)	26 (27.7)	34 (30.9)	0.08