Intubation en Réanimation

AER
ACTUALITÉS EN RÉANIMATION

Centre de Congrès de Lyon
08/12/2023 – 9h00

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CLERMONT-FERRAND
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Liens d’intérêts

Dräger (Projets de Recherche, Simulation, Enseignement)
General Electrics (Projets de Recherche)
Fisher & Paykel (Enseignement, Symposium)

Fresenius Kabi (Conférence, Projets de Recherche)
LFB (Enseignement, Projets de Recherche)

MSD (Conférence)
AOP (Projets de Recherche, Conférence)

Edwards Lifescience (Projets de Recherche, Consulting)
Baxter (Conférence, Projets de Recherche)
Smith Medical (Enseignement)

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Intubation Practices and Adverse Peri-intubation Events in Critically Ill Patients From 29 Countries

Vincenzo Russotto, MD; Sheila Nainan Myatra, MD; John G. Laffey, MD, MA; Elena Tassistro, MS; Laura Antolini, PhD; Philippe Bauer, MD, PhD; Jean Baptiste Lascarrou, MD, PhD; Konstanty Szułdrzyński, MD, PhD; Luigi Camporota, MD; Paolo Pelosi, MD; Massimiliano Sorbello, MD; Andy Higgs, MD; Robert Greif, MD; Christian Putensen, MD; Christina Agvald-Öhman, MD, PhD; Athanasios Chalkias, MD, PhD; Kristaps Bokums, MD; David Brewster, MD; Emanuela Rossi, MS; Roberto Fumagalli, MD; Antonio Pesenti, MD; Giuseppe Foti, MD; Giacomo Bellani, MD, PhD; for the INTUBE Study Investigators

JAMA. 2021;325(12):1164-1172. doi:10.1001/jama.2021.1727

Quasi 3000 intubations – 197 ICU – 29 pays

Jusqu'à 50% des cas
Hausse de la mortalité à J28

Table 2. Peri-intubation Adverse Events

Adverse events	No./Total (%)
Major adverse events (primary outcome)	1340/2964 (45.2)
Cardiovascular instability	1172/2753 (42.6)
New need or increase of vasopressors	1053/1172 (89.9)
Systolic pressure <90 mm Hg for >30 min	252/1026 (24.6)
Fluid bolus >15 mL/kg	151/1163 (13.5)
Systolic pressure <65 mm Hg	157/1163 (13.5)
Severe hypoxia (lowest Spo_2<80%)	272/2916 (9.3)
Cardiac arrest	93/2964 (3.1)
With return of spontaneous circulation	49/93 (52.7)
With death	44/93 (47.3)

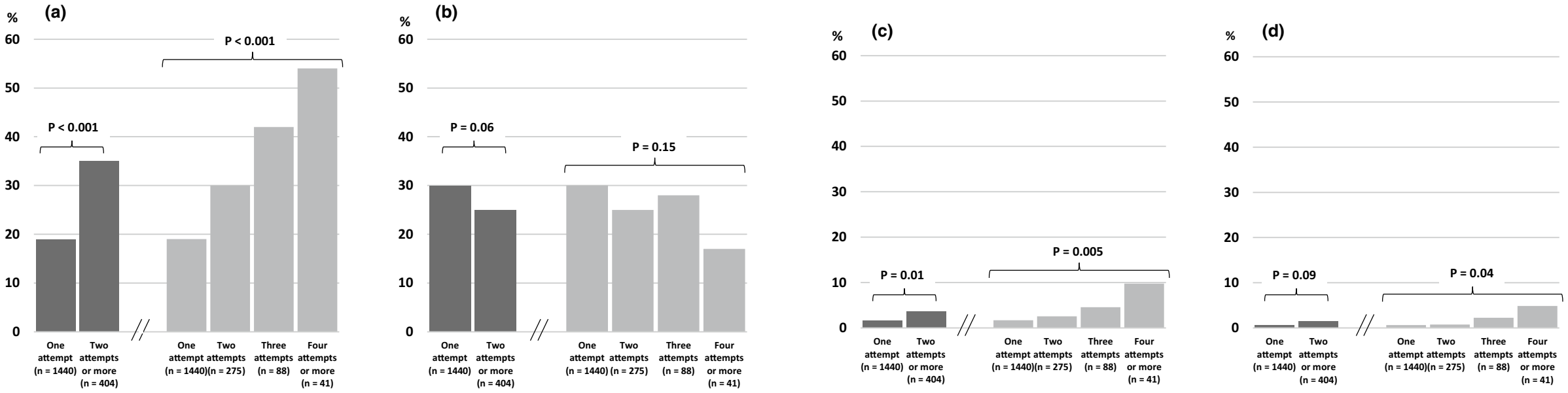
<u>Complications modérées</u>
- intubation œsophagienne
- bris dentaire
- inhalation
- lésion laryngée
- arrythmie

LETTER

First-attempt success is associated with fewer complications related to intubation in the intensive care unit

Audrey De Jong, Amélie Rolle, Joris Pensier, Mathieu Capdevila and Samir Jaber*

Intensive Care Med (2020) 46:1278–1280



Hypoxémie | Collapsus cardiovasculaire | Inhalation | Bris dentaires

Organisation

Geste à très haut risque de complications

Anticipation / Organisation

Facteurs humains +++

RECOMMANDATIONS DE PRATIQUES PROFESSIONNELLES

De la **Société Française d'Anesthésie et de Réanimation (SFAR)**

En association avec le **Groupe Facteurs Humains en Santé (FHS)**

FACTEURS HUMAINS EN SITUATIONS CRITIQUES

Human factors in critical situations

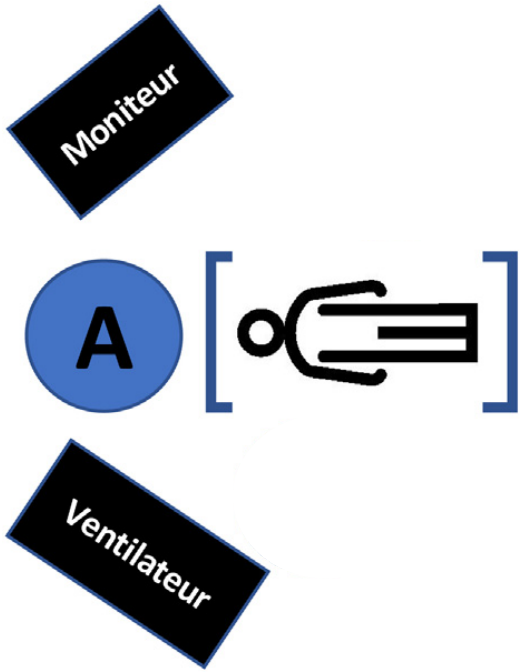
2022

RESPIRATION AND THE AIRWAY

Guidelines for the management of tracheal intubation in critically ill adults

A. Higgs[1,*], B. A. McGrath[2], C. Goddard[3], J. Rangasami[4], G. Suntharalingam[5], R. Gale[6], T. M. Cook[7] and on behalf of Difficult Airway Society, Intensive Care Society, Faculty of Intensive Care Medicine, Royal College of Anaesthetists

British Journal of Anaesthesia, 120 (2): 323–352 (2018)



Organisation

Configuration minimale et rôles de l'équipe

A Premier « intubateur »

B Médicaments – Surveillance - LEADER

C Aide à la gestion des VAS - Ventilateur

D Aide supplémentaire

COMMUNICATION+++

A toutes les étapes…

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Protocole

AER ACTUALITÉS EN RÉANIMATION

Table 3. Techniques, Medications, and Confirmations of Intubations

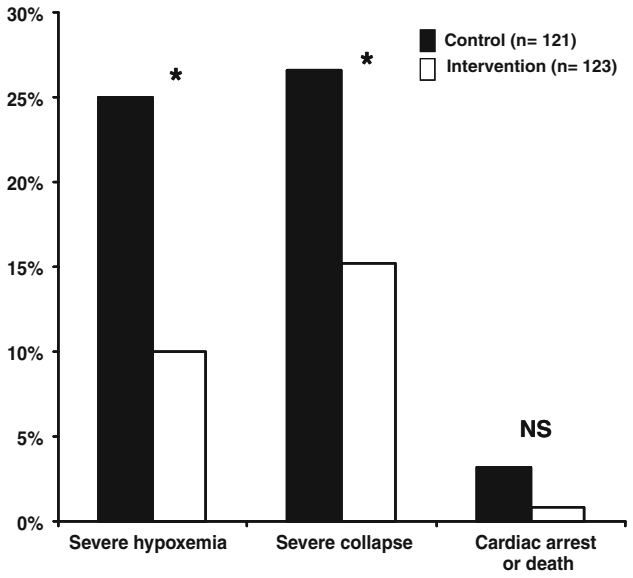
Variable	No. (%) (n = 2964)
Application of an airway management protocol	
Standard protocol	
In place and used	1510 (51.0)
In place and not used[a]	443 (15.0)
No standard protocol in place	1009 (34.0)

Intensive Care Med (2010) 36:248–255
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



Protocole

Early Identification of Patients at Risk for Difficult Intubation in the Intensive Care Unit

Development and Validation of the MACOCHA Score in a Multicenter Cohort Study

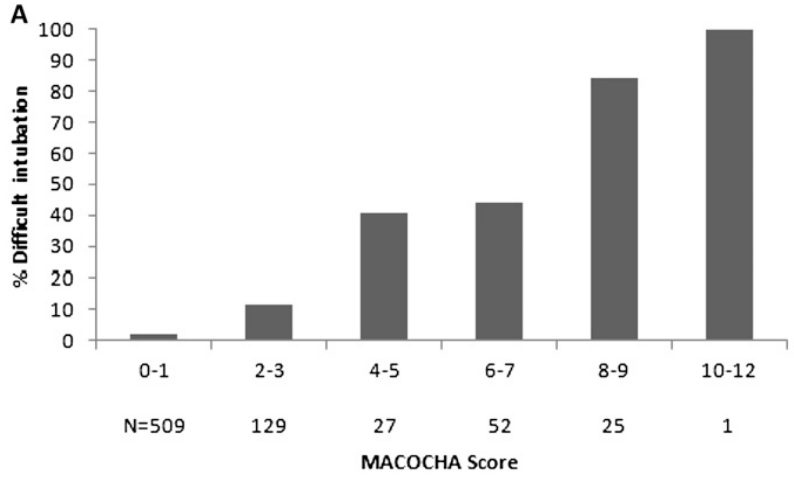
Audrey De Jong[1], Nicolas Molinari[2], Nicolas Terzi[3], Nicolas Mongardon[4], Jean-Michel Arnal[5], Christophe Guitton[6], Bernard Allaouchiche[7], Catherine Paugam-Burtz[8,9], Jean-Michel Constantin[10], Jean-Yves Lefrant[11], Marc Leone[12], Laurent Papazian[13], Karim Asehnoune[14], Nicolas Maziers[15], Elie Azoulay[15], Gael Pradel[16], Boris Jung[1,17], Samir Jaber[1,17], and AzuRéa Network for the Frida-Réa Study Group*

Am J Respir Crit Care Med Vol 187, Iss. 8, pp 832–839, Apr 15, 2013

Recherche systématique de la difficulté d'intubation prédite +++

	Points
Factors related to patient	
Mallampati score III or IV	5
Obstructive sleep apnea syndrome	2
Reduced mobility of cervical spine	1
Limited mouth opening < 3 cm	1
Factors related to pathology	
Coma	1
Severe hypoxemia (< 80%)	1
Factor related to operator	
Non-anesthesiologist	1
Total	12

M. Mallampati score III or IV
A. Apnea Syndrome (obstructive)
C. Cervical spine limitation
O. Opening mouth < 3 cm
C. Coma
H. Hypoxia
A. Anesthesiologist Non-trained
Coded from 0 to 12
0 = easy
12 = very difficult



Pré-oxygénation

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OBLIGATOIRE

Table 3. Techniques, Medications, and Confirmations of Intubations

Variable	No. (%) (n = 2964)
Preoxygenation method (n = 2960)	
Bag-valve mask	1847 (62.4)
Standard facemask	389 (13.2)
Noninvasive ventilation	344 (11.6)
High-flow nasal cannula	160 (5.4)
Anesthesia breathing circuit[b]	56 (1.9)
Continuous positive airway pressure	51 (1.7)
Venturi system	47 (1.6)
Nasal cannula	47 (1.6)
Other[c]	19 (0.6)

Permet de « saturer » la CRF en O_2
Conditionne le temps d'apnée sans désaturation

Déterminants:

CRF (position proclive, modalité de pré-oxygénation)
FiO_2 et donc FeO_2
VO_2

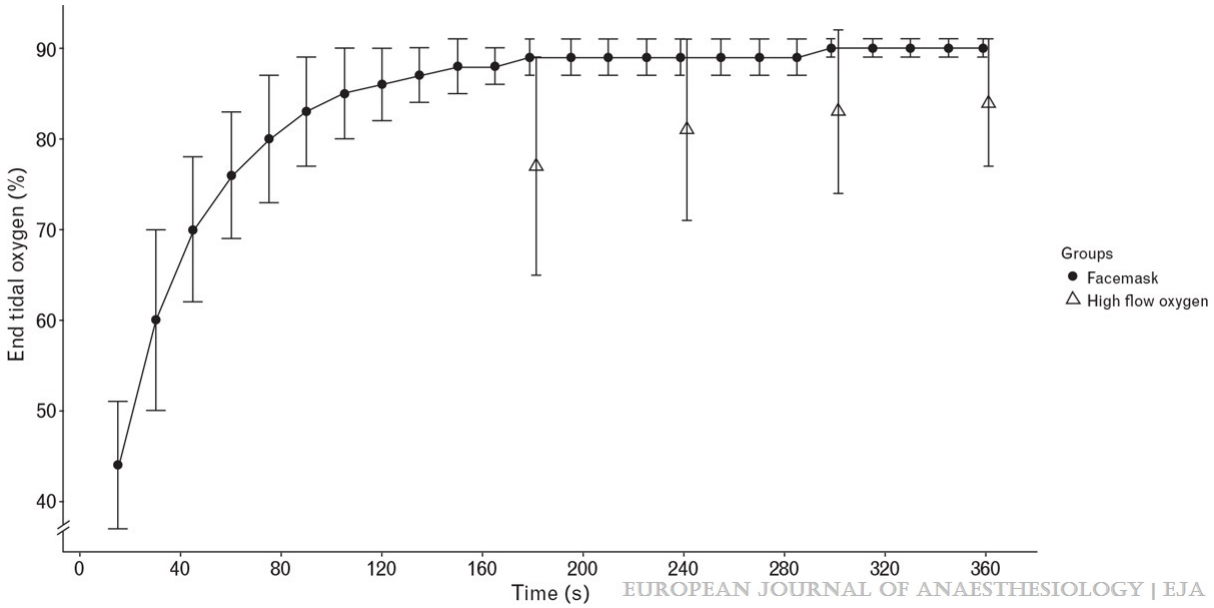
Pré-oxygénation

Comparison of pre-oxygenation using spontaneous breathing through face mask and high-flow nasal oxygen

A randomised controlled crossover study in healthy volunteers

Hanouz, Jean-Luc; Lhermitte, David; Gérard, Jean-Louis; Fischer, Marc Olivier

European Journal of Anaesthesiology 36(5):p 335-341, May 2019.



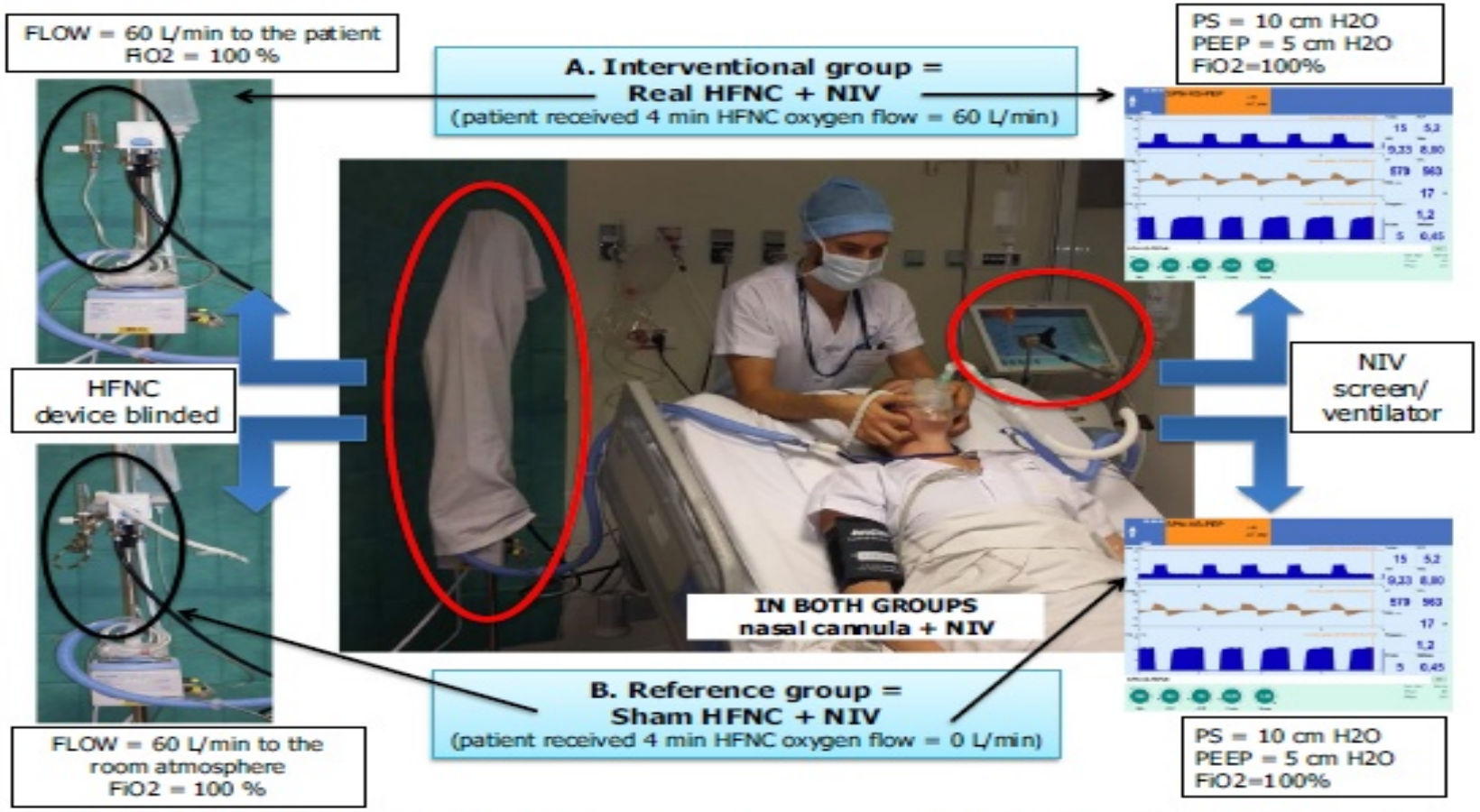
	Face mask group ($n = 50$)	High-flow nasal oxygen group ($n = 50$)	P
ETO_2 at 3 min	89 (2)	77 (12)	<0.001
ETO_2 at 4 min	89 (2)	81 (10)	<0.001
ETO_2 at 5 min	90 (1)	83 (9)*	<0.001
ETO_2 at 6 min	90 (1)	84 (7)*	<0.001

Data presented as mean (SD). ETO_2 in the face mask group was continuously monitored and data recorded every 15 s. ETO_2 in the high-flow nasal oxygen group was measured at the end of 3, 4, 5 and 6 min of pre-oxygenation. * $P < 0.01$ vs. ETO_2 at 3 min according to the Tukey's post hoc test.

Pré-oxygénation

Apnoeic oxygenation via high-flow nasal cannula oxygen combined with non-invasive ventilation preoxygenation for intubation in hypoxaemic patients in the intensive care unit: the single-centre, blinded, randomised controlled OPTINIV trial

Samir Jaber[1,2*], Marion Monnin[1], Mehdi Girard[1], Matthieu Conseil[1], Moussa Cisse[1], Julie Carr[1], Martin Mahul[1], Jean Marc Delay[1], Fouad Belafia[1], Gérald Chanques[1,2], Nicolas Molinari[3] and Audrey De Jong[1,2]



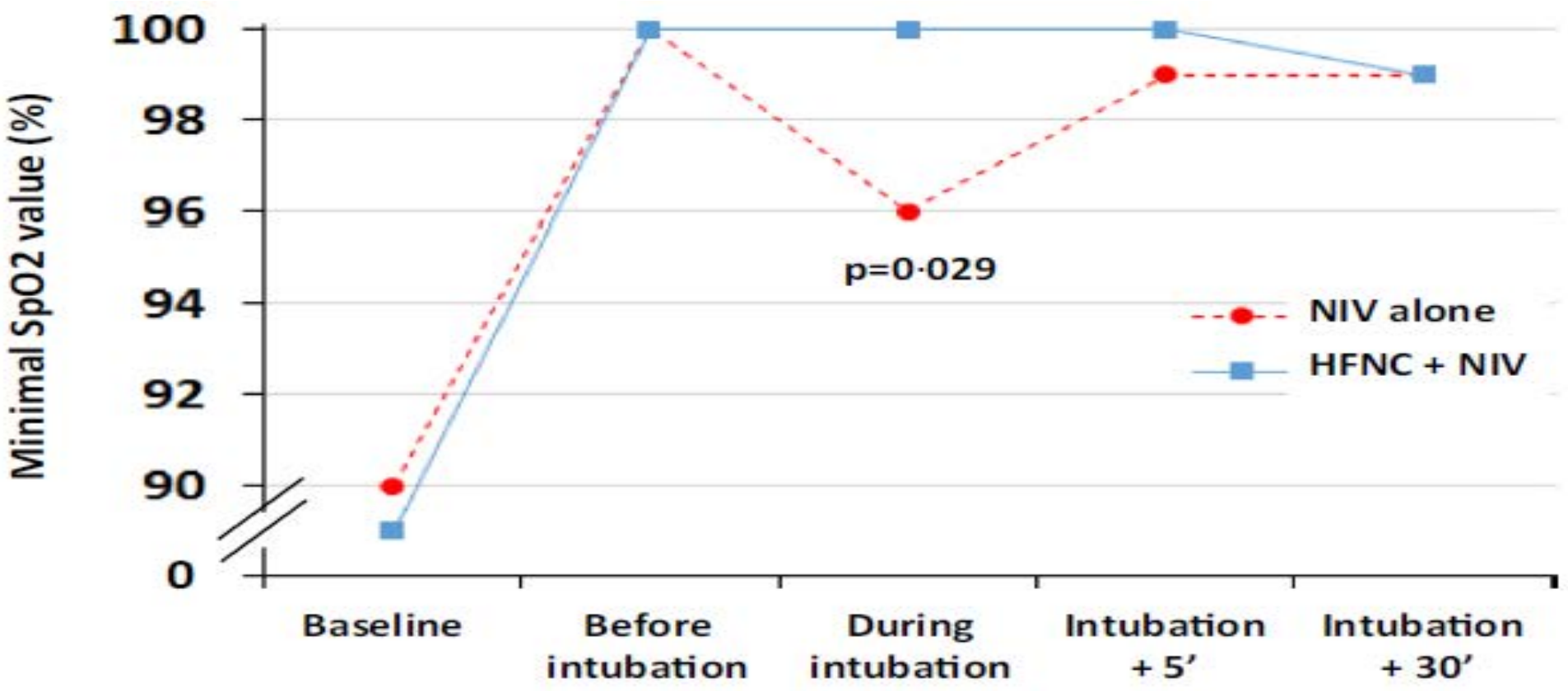
Pré-oxygénation

1. Preoxygenation with NIV Before Intubation
(Positive Pressure = Alveolar recruitment)

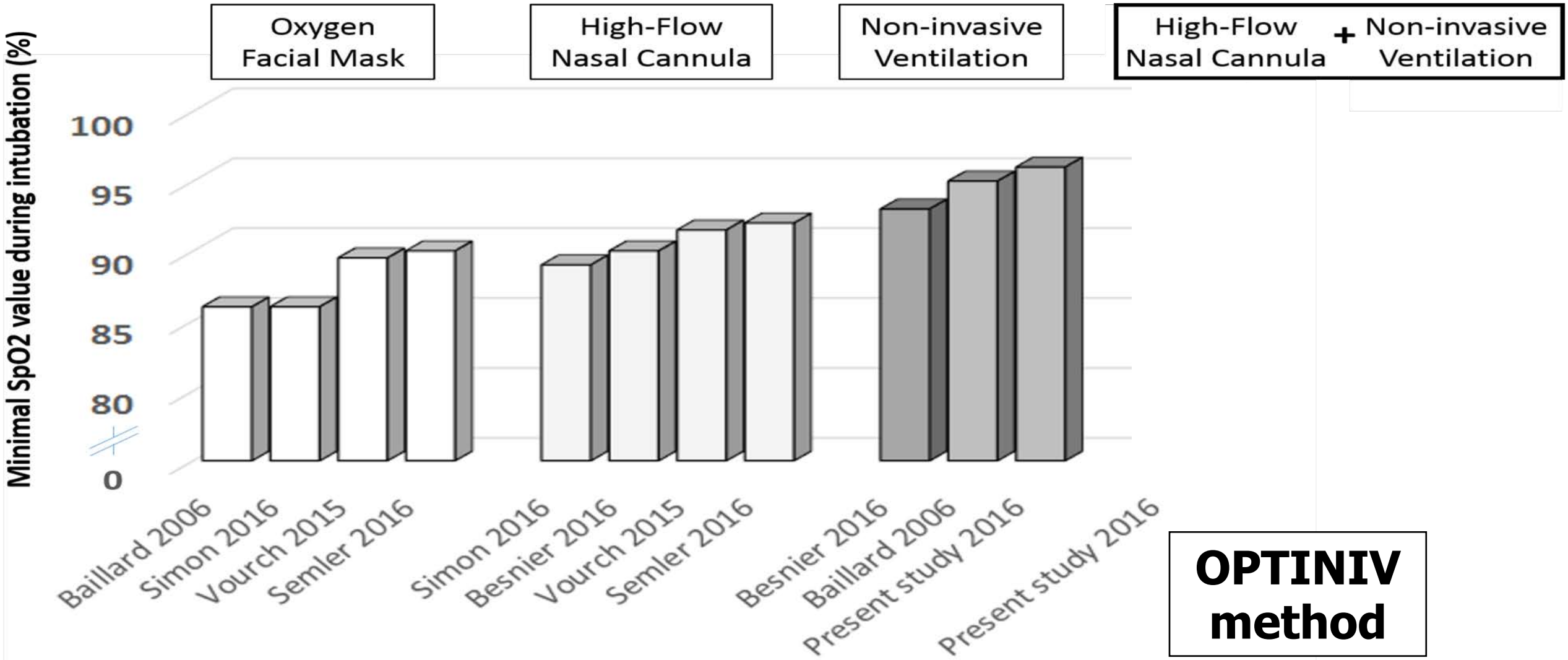
+

2. Apneic Oxygenation
During and before Intubation
(Continuous Oxygen Insufflation during laryngoscopy)

Pré-oxygénation



Pré-oxygénation



OPTINIV method

Oxygénation apnéique

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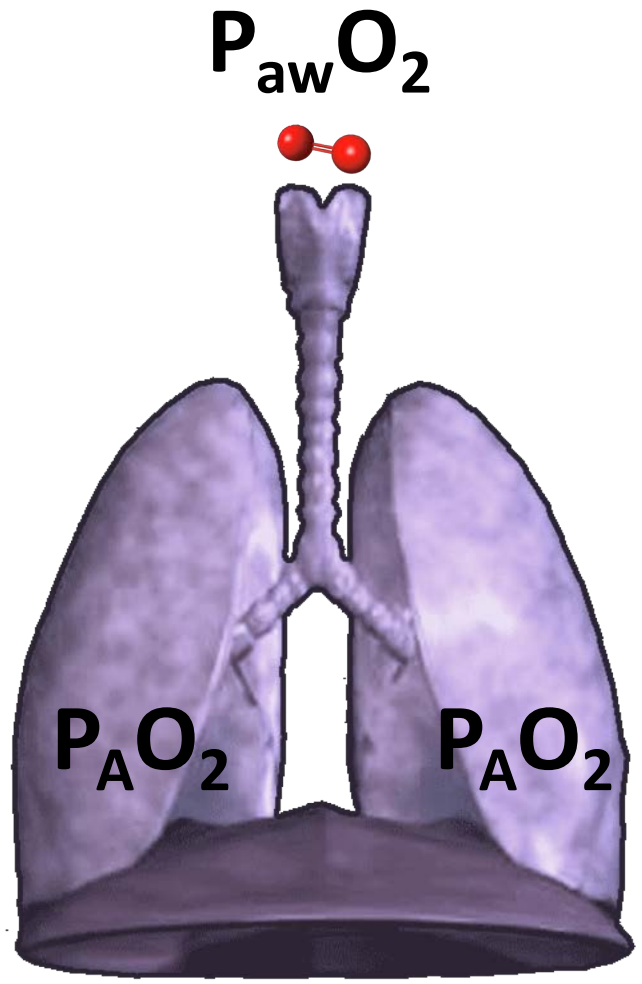
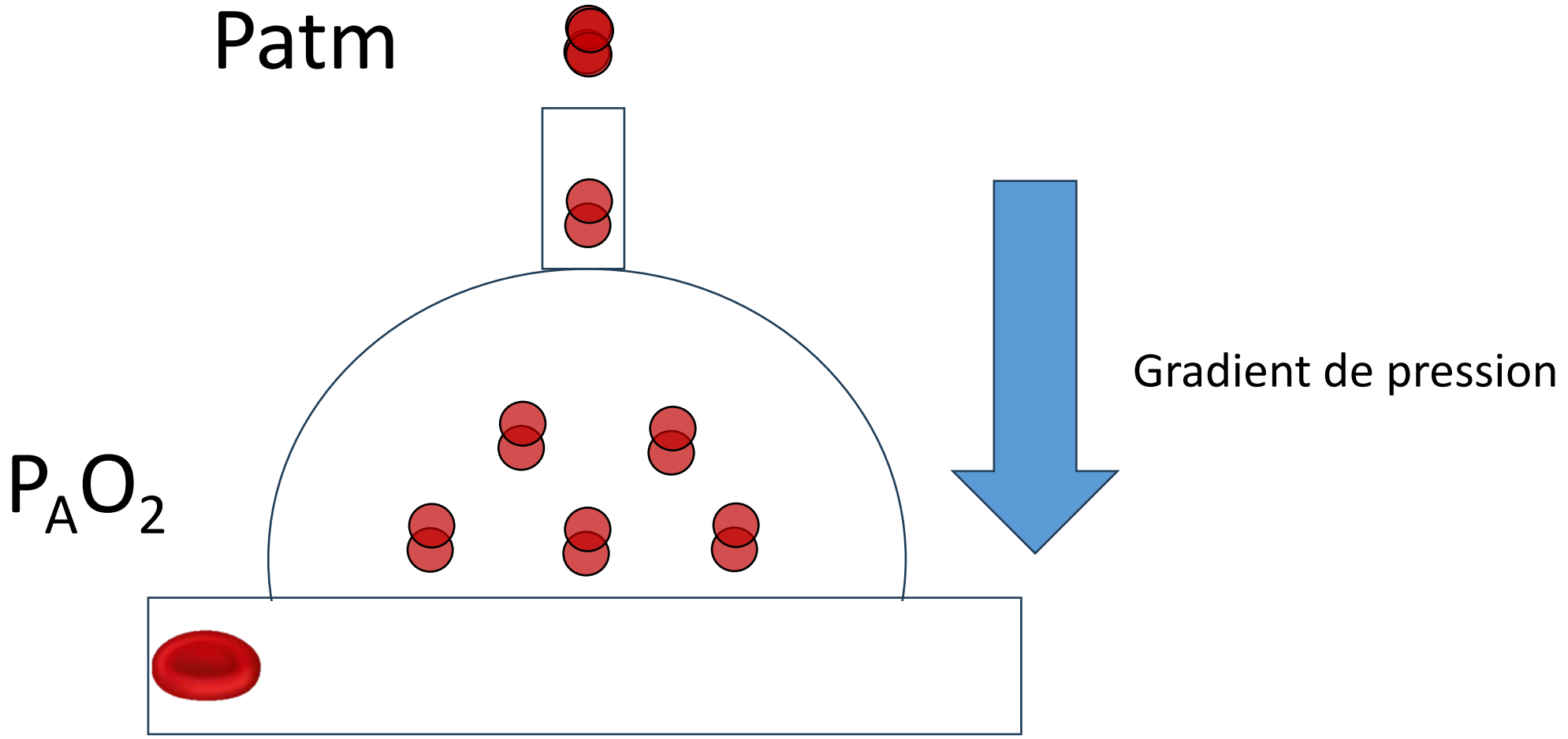
Table 3. Techniques, Medications, and Confirmations of Intubations

Variable	No. (%) (n = 2964)
Apneic oxygenation, No./total (%)[d]	308/2959 (10.4)

Diffusion d'O_2 au niveau alvéolaire
Diminution de la P_AO_2
$P_{aw}O_2 > P_AO_2$ gradient de pression
Entrée d'O_2 dans les alvéoles grâce au haut débit



Oxygénation apnéique



Consommation en O_2
VO_2 = 200-250 mL.min^{-1}

Molécules d'induction

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

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Table 3. Techniques, Medications, and Confirmations of Intubations

Variable	No. (%) (n = 2964)
Induction agent, No./total (%)[f]	2774/2964 (93.6)
Propofol	1230 (41.5)
Midazolam	1079 (36.4)
Etomidate	527 (17.8)
Ketamine	421 (14.2)
Muscle relaxant use, No./total (%)	2095/2776 (75.5)
Rocuronium	1239 (41.8)
Succinylcholine	646 (21.8)
Vecuronium	95 (3.2)
Cisatracurium	85 (2.9)
Opioid use for intubation, No./total (%)	1415/2776 (51.0)
Rapid sequence induction, No./total (%)[e]	1727/2777 (62.2)

ORIGINAL

Etomidate versus ketamine for emergency endotracheal intubation: a randomized clinical trial

Gerald Matchett[1*], Irina Gasanova[1], Christina A. Riccio[1], Dawood Nasir[1], Mary C. Sunna[2], Brian J. Bravenec[1], Omaira Azizad[1], Brian Farrell[2], Abu Minhajuddin[3,4], Jesse W. Stewart[1], Lawrence W. Liang[1], Tiffany Sun Moon[1], Pamela E. Fox[1], Callie G. Ebeling[1], Miakka N. Smith[1], Devin Trousdale[1] and Babatunde O. Ogunnaike[1] on behalf of the EvK Clinical Trial Collaborators

Reason for intubation, *n* (%)		
Shock	189 (47.7)	174 (44.1)
Acute respiratory failure	175 (44.2)	191 (48.4)
Neurological	27 (6.8)	27 (6.8)
Other	5 (1.3)	3 (0.8)
Diagnosis of sepsis (pre-randomization)	136 (34.3)	136 (34.4)
Diagnosis of Sepsis (pre- or post-randomization)	204 (51.5)	196 (49.6)
Peri-intubation intravenous antibiotic therapies[b]	360 (90.9)	358 (90.6)
Acute injury, *n* (%)		
Burn	30 (7.6)	25 (6.3)
Trauma	24 (6.1)	31 (7.8)
None	342 (86.4)	339 (85.8)

Molécules d'induction

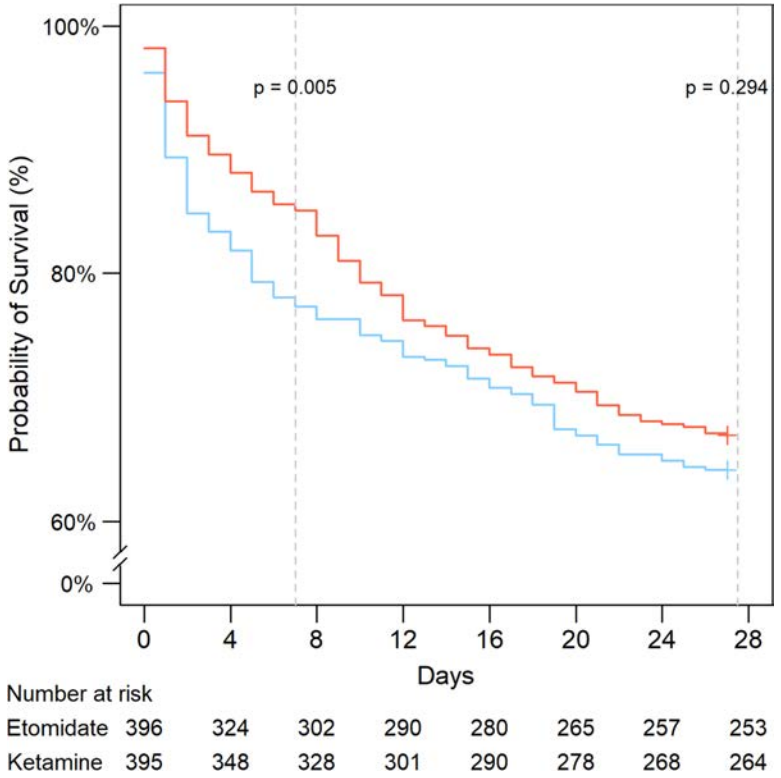


Table 2 Primary and secondary outcomes

Variable	Etomidate ($n = 396$)	Ketamine ($n = 395$)	Difference (95% confidence interval)	p value
Receiving vasopressor or inotrope infusion(s), n (%)[a]	235 (59.3)	213 (53.9)	5.4 (− 1.5, 12.3)	0.124
Duration of vasopressor or inotrope infusion(s) (days), median (IQR)	1 (0, 3)	1 (0, 3)	0 (0, 0)	0.498
Duration of mechanical ventilation, median (IQR)	5 (3, 9)	5 (3, 10)	0 (− 1, 0)	0.446
ICU length-of-stay, median (IQR)	8 (4, 16)	9 (5, 14)	− 1 (− 1, 0)	0.302
Diagnosis of adrenal insufficiency, n (%)	11 (2.8)	4 (1)	1.8 (− 0.1, 3.7)	0.115
Day 7 survival, n (%)	306 (77.3)	336 (85.1)	− 7.8 (− 13, − 2.4)	0.005
Day 28 survival, n (%)	254 (64.1)	264 (66.8)	− 2.7 (− 9.3, 3.9)	0.294

Peri-intubation Cardiovascular Collapse in Patients Who Are Critically Ill

Insights from the INTUBE Study

Vincenzo Russotto[1*], Elena Tassistro[2,3*], Sheila N. Myatra[4], Matteo Parotto[5,6], Laura Antolini[2,3], Philippe Bauer[7], Jean Baptiste Lascarrou[8], Konstanty Szułdrzyński[9,10], Luigi Camporota[11], Christian Putensen[12], Paolo Pelosi[13,14], Massimiliano Sorbello[15], Andy Higgs[16], Robert Greif[17,18], Antonio Pesenti[19], Maria Grazia Valsecchi[2,3], Roberto Fumagalli[3,20], Giuseppe Foti[3,21], Giacomo Bellani[3,21], and John G. Laffey[22,23]; for the INTUBE Study Investigators

Am J Respir Crit Care Med Vol 206, Iss 4, pp 449–458, Aug 15, 2022

Table 3. Effect of Vasopressors, Fluid Bolus, Use of Propofol, Age, Adjusted Sequential Organ Failure Assessment Score, Heart Rate, Oxygen Saturation as Measured by Pulse Oximetry/F_{IO_2}, Systolic Blood Pressure on Cardiovascular Instability/Collapse by a Multiple Logistic Regression Model

Variable	OR	(95% CI)	*P* value
Vasopressors	1.143	(0.854–1.530)	0.37
Fluid bolus	1.187	(0.962–1.464)	0.11
Use of propofol	1.283	(1.047–1.572)	0.016
Age (yr)	1.022	(1.016–1.028)	<0.001
Adjusted SOFA	1.024	(0.995–1.053)	0.101
Heart rate	1.008	(1.004–1.012)	<0.001
Sp_{O_2}/F_{IO_2}	0.998	(0.997–0.999)	<0.001
Systolic blood pressure (mm Hg)	0.983	(0.980–0.987)	<0.001

Aucun impact de la dose ajusté au poids du patient

Molécules d'induction

JAMA | Original Investigation

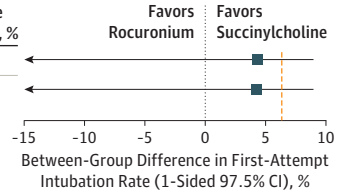
Effect of Rocuronium vs Succinylcholine on Endotracheal Intubation Success Rate Among Patients Undergoing Out-of-Hospital Rapid Sequence Intubation
A Randomized Clinical Trial

Bertrand Guihard, MD; Charlotte Chollet-Xémard, MD; Philippe Lakhnati, MD; Benoit Vivien, MD, PhD; Claire Broche, MD; Dominique Savary, MD; Agnes Ricard-Hibon, MD; Pierre-Jean Marianne dit Cassou, MD; Frédéric Adnet, MD, PhD; Eric Wiel, MD, PhD; Juliette Deutsch, MD; Cindy Tissier, MD; Thomas Loeb, MD; Vincent Bounes, MD, PhD; Emmanuel Rousseau, MD; Patricia Jabre, MD, PhD; Laetitia Huiart, MD, PhD; Cyril Ferdynus, PhD; Xavier Combes, MD, PhD

JAMA. 2019;322(23):2303-2312. doi:10.1001/jama.2019.18254

Figure 2. Difference in Successful First-Attempt Intubation Rate Between Patients Given Rocuronium vs Succinylcholine While Undergoing Out-of-Hospital Rapid Sequence Intubation

	No. of Patients/Total No. (%)		
	Rocuronium Group	Succinylcholine Group	Absolute Difference (1-Sided 97.5% CI), %
Randomized group analysis	456/613 (74.4)	489/617 (79.2)	-4.8 (-9.1 to ∞)
Per-protocol analysis	455/610 (74.6)	489/616 (79.4)	-4.8 (-9.0 to ∞)



The dashed line represents the noninferiority margin of 7%. Because the CI lines go above the prespecified noninferiority margin of 7%, the null hypothesis that succinylcholine is superior cannot be rejected.

Secondary Outcomes				
Prespecified analyses				
Cormack-Lehane grade[d]				
I (best view)	375/609 (61.6)	346/616 (56.2)	5.4 (−0.3 to 10.9)	.06
II	125/609 (20.5)	173/616 (28.1)	−7.6 (−11.5 to −3.7)	<.001
III	81/609 (13.3)	72/616 (11.7)	1.6 (−2.9 to 6.2)	.49
IV (worst view)	28/609 (4.6)	25/616 (4.0)	0.6 (−1.5 to 2.6)	.60
Intubation Difficulty Scale score, mean (SD)[e]	4.2 (2.9)	4.1 (2.4)	0.1 (−0.2 to 0.4)	.52
Intubation Difficulty Scale score >5	138/605 (22.8)	130/614 (21.2)	1.6 (−3.5 to 6.8)	.53
Copenhagen score (reflecting intubation conditions)[f]				
Excellent	327/580 (56.4)	313/584 (53.6)	2.8 (−0.5 to 6.4)	.09
Good	206/580 (35.5)	222/584 (38.0)	−2.5 (−6.1 to 0.5)	.10
Poor	47/580 (8.1)	49/584 (8.4)	−0.3 (−3.0 to 2.6)	.87
Need for alternative intubation techniques				
Stylet	55/610 (9.0)	51/616 (8.3)	0.7 (−1.9 to 2.0)	.97
Gum elastic bougie	114/610 (18.7)	107/616 (17.4)	1.3 (−1.2 to 3.8)	.31
Intubating laryngeal mask airway	10/610 (1.6)	2/616 (0.3)	1.3 (0.5 to 2.4)	.003
Cricothyrotomy	0/610 (0.0)	1/616 (0.2)	−0.2 (−0.5 to 0.2)	
Early intubation-related complications				.04
Patients with at least 1 complication	111/610 (18.2)	143/616 (23.2)	−5 (−9.8 to −0.03)	
Hypoxemia episodes[g]	55/610 (9.0)	61/616 (9.9)	−0.9 (−4.4 to 2.6)	
Severe arrhythmia[h]	12/610 (2.0)	26/616 (4.2)	−2.2 (−3.8 to −0.7)	
Cardiac arrest	22/609 (3.6)	13/615 (2.1)	1.5 (−0.1 to 3.3)	
Pulmonary aspiration[i]	19/610 (3.1)	21/616 (3.4)	−0.3 (−1.7 to 1.1)	
Hypotension episodes[j]	39/610 (6.4)	62/615 (10.1)	−3.7 (−6.8 to −0.3)	
Exploratory analyses[k]				
No. of intubation attempts, mean (SD)	1.4 (0.8)	1.3 (0.6)	0.1 (0.05 – 0.2)	<.001
2	110/609 (18.1)	96/615 (15.6)	2.5 (−2.2 to 6.9)	.31
3	34/609 (5.6)	27/615 (4.4)	1.2 (−0.8 to 3.2)	.23
≥4	10/609 (1.6)	3/615 (0.5)	1.1 (0.2 to 2.0)	.01
Intubation failure under direct laryngoscopy	11/610 (1.8)	4/616 (0.7)	1.1 (0.3 – 2.3)	.01

Célocurine: meilleure visualisation glottique
curarisation un peu plus rapide

Molécules d'induction

NARRATIVE REVIEW

How to improve intubation in the intensive care unit. Update on knowledge and devices

Audrey De Jong[1], Sheila Nainan Myatra[2], Oriol Roca[3,4] and Samir Jaber[1*]

Intensive Care Med (2022) 48:1287–1298

DRUGS FOR RAPID SEQUENCE INDUCTION

HYPNOTICS + NEUROMUSCULAR BLOCKERS

HYPNOTICS	PROS	CONS
ETOMIDATE	• More hemodynamic stability • Rapid onset: 15 to 45 s	• Corticosurrenal insufficiency
KETAMINE	• More hemodynamic stability • Bronchodilatator • Analgesic effect • Rapid onset: 45 to 60 s	• Hallucinations
PROPOFOL	• Bronchodilatator • Rapid onset: 15 to 45 s • Anti-epileptic • Better suppression of upper airway reflexes	• Hemodynamic compromise

NEUROMUSCULAR BLOCKERS	PROS	CONS
SUCCINYLCHOLINE	• Rapid onset: 45-60 s • Improved glottic visualization	• Risk of hyperkalemia • Anaphylactic risk • Increase in oxygen consumption
ROCURONIUM	• No risk of hyperkalemia • Antidote: suggamadex	• Less rapid onset: 45-90 s • Anaphylactic risk

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JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Intubation Practices and Adverse Peri-intubation Events in Critically Ill Patients From 29 Countries

JAMA. 2021;325(12):1164-1172. doi:10.1001/jama.2021.1727

Table 3. Techniques, Medications, and Confirmations of Intubations

Variable	No. (%) (n = 2964)
Method of laryngoscopy (n = 2963)	
Direct laryngoscopy with Macintosh or Miller blade	2416 (81.5)
Video laryngoscopy	505 (17.1)
Other method[g]	42 (1.4)
Use of intubation adjuncts (n = 1055)	
Stylet	816 (77.4)
Bougie	230 (21.8)
Other[h]	9 (0.8)
First method used to confirm intubation (n = 2956)	
Auscultation	1711 (57.9)
Waveform capnography[i]	758 (25.6)
Colorimetric carbon dioxide detection[j]	222 (7.5)
Capnometry[k]	138 (4.7)
None	7 (0.2)
Other[l]	120 (4.1)
Success, No./total (%)	
First pass	2360/2958 (79.8)
Second pass	460/2958 (15.6)
Emergency front-of-neck access[m]	4 (0.13)

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RESPIRATION AND THE AIRWAY

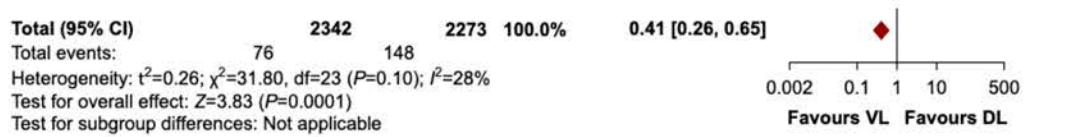
Videolaryngoscopy *versus* direct laryngoscopy for adults undergoing tracheal intubation: a Cochrane systematic review and meta-analysis update

Jan Hansel[1,2,*], Andrew M. Rogers[3], Sharon R. Lewis[4], Tim M. Cook[3,5] and Andrew F. Smith[1,6]

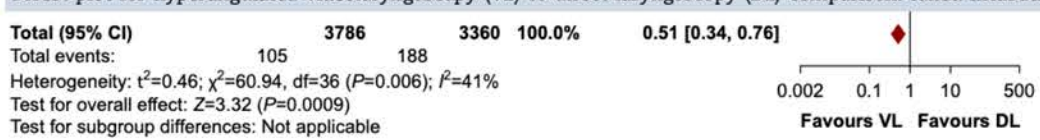
[1]Royal Lancaster Infirmary, Lancaster, UK, [2]University of Manchester, Manchester, UK, [3]Royal United Hospital Bath NHS Trust, Bath, UK, [4]Queen Mary University of London, London, UK, [5]University of Bristol, Bristol, UK and [6]University of Lancaster, Lancaster, UK

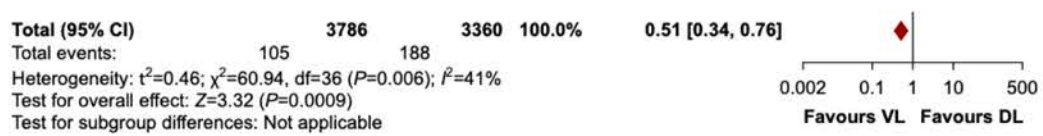
British Journal of Anaesthesia, 129 (4): 612–623 (2022)

Forest plot for Macintosh-style videolaryngoscopy (VL) *vs* direct laryngoscopy (DL) comparison: failed intubation.



Forest plot for hyperangulated videolaryngoscopy (VL) *vs* direct laryngoscopy (DL) comparison: failed intubation.





Forest plot for channelled videolaryngoscopy *vs* direct laryngoscopy comparison: failed intubation.

Nécessite une formation+++

Peu de données en réanimation

Résultats parfois contradictoires

Problème de comparateur ?

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Video versus Direct Laryngoscopy for Tracheal Intubation of Critically Ill Adults

M.E. Prekker, B.E. Driver, S.A. Trent, D. Resnick-Ault, K.P. Seitz, D.W. Russell, J.P. Gaillard, A.J. Latimer, S.A. Ghamande, K.W. Gibbs, D.J. Vonderhaar, M.R. Whitson, C.R. Barnes, J.P. Walco, I.S. Douglas, V. Krishnamoorthy, A. Dagan, J.J. Bastman, B.D. Lloyd, S. Gandotra, J.K. Goranson, S.H. Mitchell, H.D. White, J.A. Palakshappa, A. Espinera, D.B. Page, A. Joffe, S.J. Hansen, C.G. Hughes, T. George, J.T. Herbert, N.I. Shapiro, S.G. Schauer, B.J. Long, B. Imhoff, L. Wang, J.P. Rhoads, K.N. Womack, D.R. Janz, W.H. Self, T.W. Rice, A.A. Ginde, J.D. Casey, and M.W. Semler, for the DEVICE Investigators and the Pragmatic Critical Care Research Group*

Table 1. Characteristics of the Patients at Baseline.*

Characteristic	Video Laryngoscope (N=705)	Direct Laryngoscope (N=712)
Median age (IQR) — yr	54 (36–66)	55 (39–67)
Female sex — no. (%)	240 (34.0)	258 (36.2)
Median body-mass index (IQR)‡	26.3 (22.7–31.4)	26.5 (23.0–31.6)
Location of intubation — no. (%)		
Emergency department	495 (70.2)	493 (69.2)
Intensive care unit	210 (29.8)	219 (30.8)
Active conditions — no. (%)§		
Sepsis or septic shock	188 (26.7)	216 (30.3)
Traumatic injury	171 (24.3)	167 (23.5)
Cardiac arrest before intubation	48 (6.8)	65 (9.1)
Median APACHE II score (IQR)¶	16 (11–22)	16 (11–22)
Primary indication for intubation — no. (%)‖		
Altered mental status	318 (45.1)	324 (45.5)
Acute respiratory failure	215 (30.5)	216 (30.3)
Emergency procedure	41 (5.8)	51 (7.2)
Cardiac arrest	38 (5.4)	47 (6.6)
Other	93 (13.2)	74 (10.4)

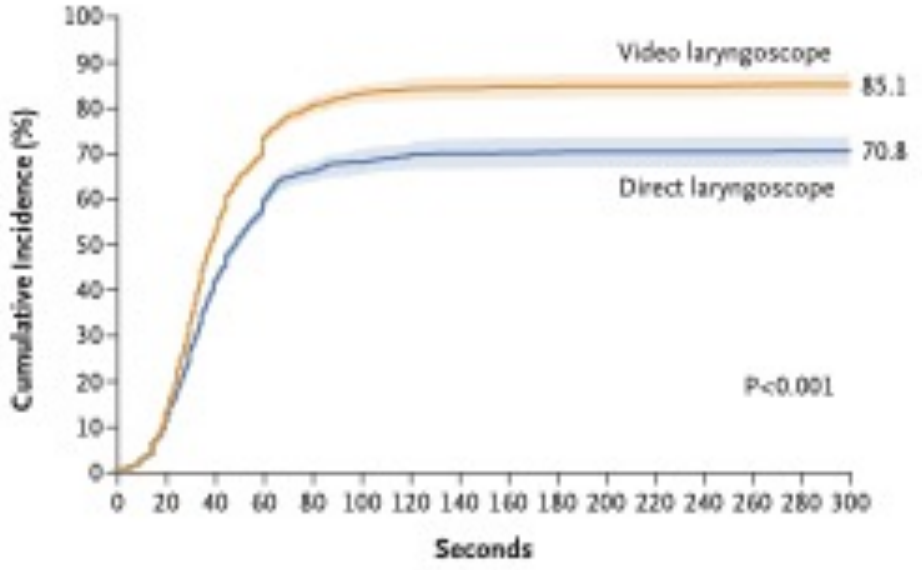
Table 3. Outcomes of Tracheal Intubation.

Outcome	Video Laryngoscope (N=705)	Direct Laryngoscope (N=712)	Absolute Difference or Median Difference (95% CI)*
Primary outcome: successful intubation on first attempt — no. (%)	600 (85.1)	504 (70.8)	14.3 (9.9 to 18.7)†
Secondary outcome: severe complication during intubation — no. (%)‡	151 (21.4)	149 (20.9)	0.5 (–3.9 to 4.9)
Peripheral oxygen saturation <80% — no./total no. (%)§	64/658 (9.7)	69/659 (10.5)	–0.7 (–4.2 to 2.7)
Systolic blood pressure <65 mm Hg — no./total no. (%)	20/624 (3.2)	29/644 (4.5)	–1.3 (–3.6 to 1.0)
New or increased use of vasopressors — no. (%)	91 (12.9)	87 (12.2)	0.7 (–2.9 to 4.3)
Cardiac arrest not resulting in death — no. (%)	2 (0.3)	0	0.3 (–0.3 to 0.8)
Cardiac arrest resulting in death — no. (%)	1 (0.1)	3 (0.4)	–0.3 (–1.0 to 0.4)
Exploratory procedural outcomes			
Median duration of intubation (IQR) — sec¶	38 (26–60)	46 (30–83)	–8 (–12 to –4)
Successful intubation on first laryngoscope blade insertion — no./total no. (%)‖	636/704 (90.3)	546/706 (77.3)	13.0 (9.1 to 16.9)
Successful intubation on first attempt without occurrence of a severe complication — no. (%)**	484 (68.7)	420 (59.0)	9.7 (4.5 to 14.8)
Reason for intubation failure on first attempt — no. (%)††			
Inadequate view of vocal cords	26 (3.7)	123 (17.3)	–13.6 (–16.8 to –10.3)
Inability to insert an endotracheal tube or bougie	49 (7.0)	51 (7.2)	–0.2 (–3.0 to 2.6)
Other	17 (2.4)	24 (3.4)	–1.0 (–2.8 to 0.9)
Not reported	23 (3.3)	40 (5.6)	–2.4 (–4.6 to –0.1)
Exploratory safety outcomes — no. (%)			
Esophageal intubation	6 (0.9)	9 (1.3)	–0.4 (–1.6 to 0.8)
Injury to teeth	3 (0.4)	2 (0.3)	0.1 (–0.6 to 0.9)
Operator-reported aspiration	7 (1.0)	12 (1.7)	–0.7 (–2.0 to 0.6)
Exploratory clinical outcomes‡‡			
Median ICU-free days (IQR)	20 (0–25)	19 (0–24)	1 (–1 to 3)
Median ventilator-free days (IQR)	24 (0–26)	23 (0–26)	1 (0 to 2)
In-hospital death — no. (%)			
Within 1 hr after randomization§§	15 (2.1)	27 (3.8)	–1.7 (–3.6 to 0.2)
Within 28 days after randomization	184 (26.1)	191 (26.8)	–0.7 (–5.5 to 4.0)

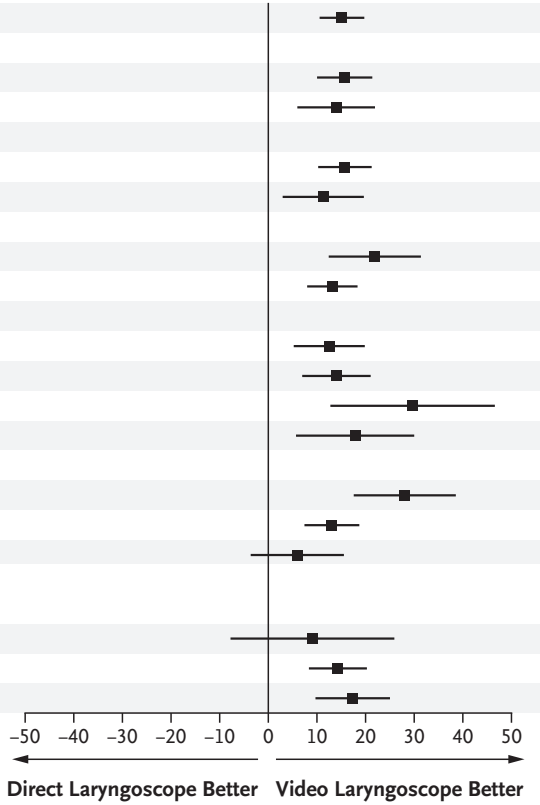
N Engl J Med. 2023;389(5):418-29

Video versus Direct Laryngoscopy for Tracheal Intubation of Critically Ill Adults

M.E. Prekker, B.E. Driver, S.A. Trent, D. Resnick-Ault, K.P. Seitz, D.W. Russell, J.P. Gaillard, A.J. Latimer, S.A. Ghamande, K.W. Gibbs, D.J. Vonderhaar, M.R. Whitson, C.R. Barnes, J.P. Walco, I.S. Douglas, V. Krishnamoorthy, A. Dagan, J.J. Bastman, B.D. Lloyd, S. Gandotra, J.K. Goranson, S.H. Mitchell, H.D. White, J.A. Palakshappa, A. Espinera, D.B. Page, A. Joffe, S.J. Hansen, C.G. Hughes, T. George, J.T. Herbert, N.I. Shapiro, S.G. Schauer, B.J. Long, B. Imhoff, L. Wang, J.P. Rhoads, K.N. Womack, D.R. Janz, W.H. Self, T.W. Rice, A.A. Ginde, J.D. Casey, and M.W. Semler, for the DEVICE Investigators and the Pragmatic Critical Care Research Group*



Subgroup	Video Laryngoscope	Direct Laryngoscope
	no. of events/total no. (%)	
Overall	600/705 (85.1)	504/712 (70.8)
Location in hospital		
Emergency department	425/495 (85.9)	352/493 (71.4)
Intensive care unit	175/210 (83.3)	152/219 (69.4)
Body-mass index		
<30	402/468 (85.9)	343/483 (71.0)
≥30	179/217 (82.5)	155/216 (71.8)
Traumatic injury		
Yes	151/171 (88.3)	114/167 (68.3)
No	449/534 (84.1)	390/545 (71.6)
Anticipated difficulty of intubation		
Easy	206/232 (88.8)	172/223 (77.1)
Moderate	266/317 (83.9)	235/331 (71.0)
Difficult	51/67 (76.1)	30/62 (48.4)
Not reported	77/89 (86.5)	67/96 (69.8)
No. of operator's previous intubations		
<25	128/160 (80.0)	83/154 (53.9)
25–100	379/441 (85.9)	330/448 (73.7)
>100	93/104 (89.4)	91/109 (83.5)
Proportion of previous intubations performed with a video laryngoscope		
<0.25	39/44 (88.6)	27/34 (79.4)
0.25–0.75	335/398 (84.2)	303/429 (70.6)
>0.75	226/262 (86.3)	174/248 (70.2)



N Engl J Med. 2023;389(5):418-29

ORIGINAL

Impact of Macintosh blade size on endotracheal intubation success in intensive care units: a retrospective multicenter observational MacSize-ICU study

Thomas Godet[1,2,6*], Audrey De Jong[2], Côme Garin[1], Renaud Guérin[1], Benjamin Rieu[1], Lucile Borao[1], Bruno Pereira[3], Nicolas Molinari[4], Jean-Etienne Bazin[1], Matthieu Jabaudon[1,5], Gérald Chanques[2], Emmanuel Futier[1,5] and Samir Jaber[2]

Intensive Care Med (2022) 48:1176–1184

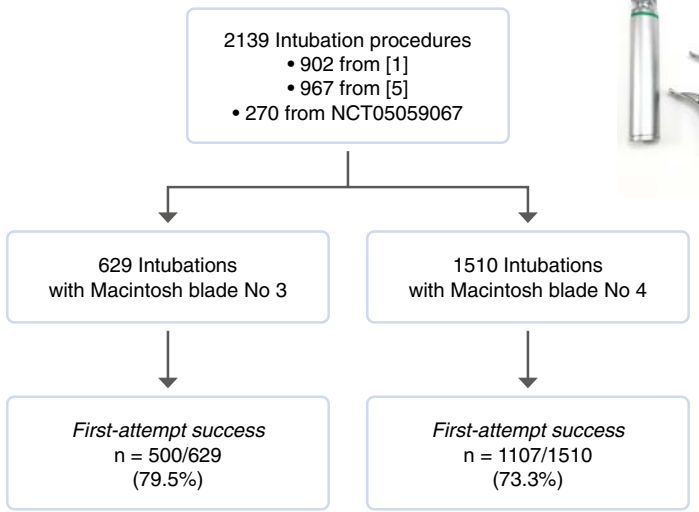


Fig. 1 Flowchart of included patients

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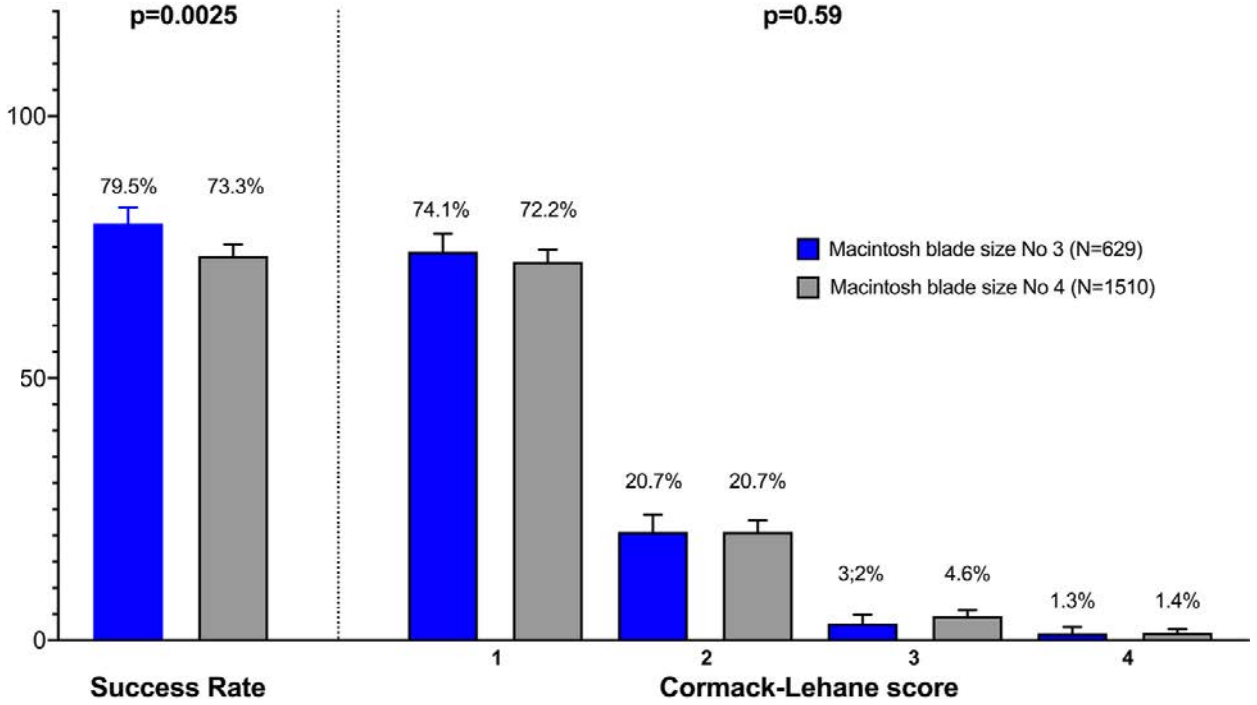

Table 2 Success of first-attempt direct laryngoscopy and glottic view according to Macintosh blade sizes in ICU

	Before IPTW				After IPTW			
	Overall (*n* = 2139)	Macintosh blade No 3 (*n* = 629)	Macintosh blade No 4 (*n* = 1510)	*p*	Macintosh blade No 3	Macintosh blade No 4	Standardized difference |∂|	*p*
Success of first-attempt DL	1607 (75.1)	500 (79.5)	1107 (73.3)	0.0025	(84.1)	(72.1)		< 0.0001
Cormack–Lehane score				0.48				0.19
1	1556/2118 (72.7)	466/624 (74.7)	1090/1494 (73)		(69.5)	(62)	0.16	
2	443/2118 (20.7)	130/624 (20.8)	313/1494 (20.9)		(21.9)	(27)	0.12	
3	90/2118 (4.2)	20/624 (3.2)	70/1494 (4.7)		(6.4)	(8.4)	0.076	
4	29/2118 (1.4)	8/624 (1.3)	21/1494 (1.4)		(2.2)	(2.7)	0.029	

Data are presented as mean ± standard deviation or number (percentage). A $p < 0.05$ is considered statistically significant. Standardized differences $|\partial| > 0.2$ are considered to be an imbalance

OBSERVATIONAL STUDY

OPEN

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Effect of Laryngoscope Blade Size on First Pass Success of Tracheal Intubation in Critically Ill Adults

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Seiji Koike, MAS[2]
Ran Ran, MD[1]
Matthew W. Semler, MD, MSc[3]
Christopher Barnes, MD[4]
Susan B. Stempek, PA-C, MMSc[5]
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for the Pragmatic Critical Care Research Group

Critical Care Explorations
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Adjusted Outcomes	Macintosh Size 3 Blade	Macintosh Size 4 Blade	*p*	Adjusted OR (CI)
Duration of intubation (s)[a]	125.0 (90–200.3)	142.0 (88–218.8)	0.249	0.883 (0.718–1.086)
Median lowest O_2 saturation (%)[a]	93.5 (84.1–99.0)	93.5 (81.6–97.8)	0.97	1 (0.778–1.27)
Severe hypoxemia[a]	33.1 (15.2%)	42.8 (12.2%)	0.501	0.772 (0.362–1.643)
First-pass success[a]	177.0 (81.2%)	249.0 (71.1%)	0.007	0.566 (0.372–0.850)
Cormack-Lehane grade view			0.019	1.458 (1.064–2.003)
I	105.6 (48.4%)	135.7 (38.8%)		
II	65.4 (30.0%)	116.4 (33.2%)		
III	35.4 (16.2%)	72.0 (20.6%)		
IV	11.6 (5.3%)	26.0 (7.4%)		
Additional equipment:	35.9 (16.4%)	57.8 (16.4%)	0.988	1.003 (0.638–1.594)
Direct laryngoscopy	8.0 (3.6%)	7.9 (2.2%)	0.334	0.611 (0.221–1.691)
Video laryngoscopy	27.9 (12.8%)	49.8 (14.2%)	0.629	1.131 (0.692–1.880)
Reposition[a]	4.8 (7.9%)	5.2 (4.6%)	0.323	0.522 (0.140–1.987)
Complications				
Aspiration	8.7 (4.0%)	10.0 (2.8%)	0.47	0.71 (0.280–1.839)
Esophageal intubation	5.8 (2.7%)	9.8 (2.8%)	0.917	1.057 (0.382–3.204)
Airway trauma	0.9 (0.0%)	0.9 (0.0%)	0.739	0.597 (0.015–21.87)
Cardiac arrest	2.8 (1.3%)	5.4 (1.5%)	0.803	1.203 (0.295–6.195)

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Intubation Practices and Adverse Peri-intubation Events in Critically Ill Patients From 29 Countries

JAMA. 2021;325(12):1164-1172. doi:10.1001/jama.2021.1727

Table 3. Techniques, Medications, and Confirmations of Intubations

Variable	No. (%) (n = 2964)
Use of intubation adjuncts (n = 1055)	
Stylet	816 (77.4)
Bougie	230 (21.8)
Other[h]	9 (0.8)

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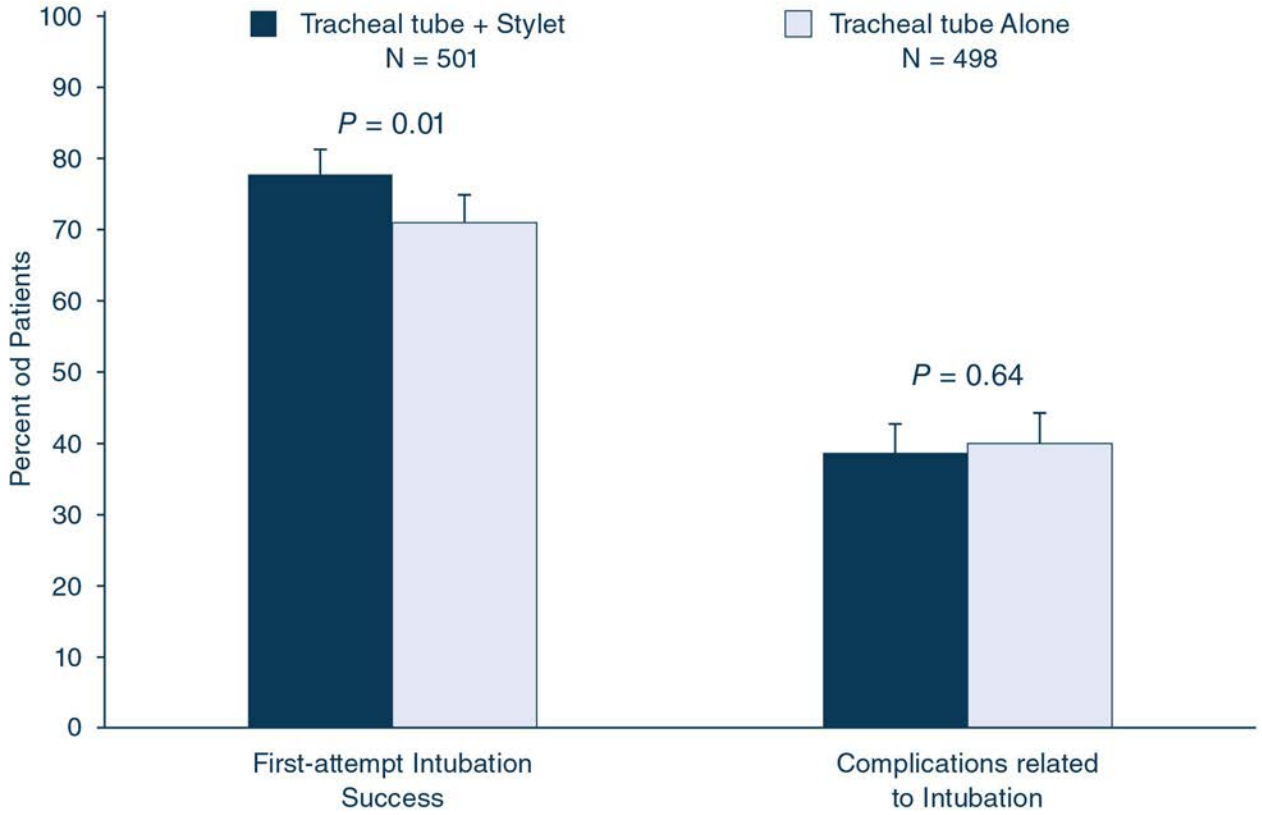
ORIGINAL

Effect of the use of an endotracheal tube and stylet versus an endotracheal tube alone on first-attempt intubation success: a multicentre, randomised clinical trial in 999 patients

Samir Jaber[1,31*], Amélie Rollé[2], Thomas Godet[3], Nicolas Terzi[4], Béatrice Riu[5], Pierre Asfar[6], Jeremy Bourenne[7], Séverin Ramin[8], Virginie Lemiale[9], Jean-Pierre Quenot[10,11,12], Christophe Guitton[13], Eloi Prudhomme[14,15], Cyril Quemeneur[16], Raiko Blondonnet[3], Mathieu Biais[17,18], Laurent Muller[19], Alexandre Ouattara[20,21], Martine Ferrandiere[22], Piehr Saint-Léger[23], Thomas Rimmelé[24], Julien Pottecher[25], Gerald Chanques[1], Fouad Belafia[1], Claire Chauveton[26,27], Helena Huguet[28,29], Karim Asehnoune[30], Emmanuel Futier[3], Elie Azoulay[9], Nicolas Molinari[22] and Audrey De Jong[1] on behalf of the STYLETO trial group

Intensive Care Med (2021) 47:653–664



ORIGINAL

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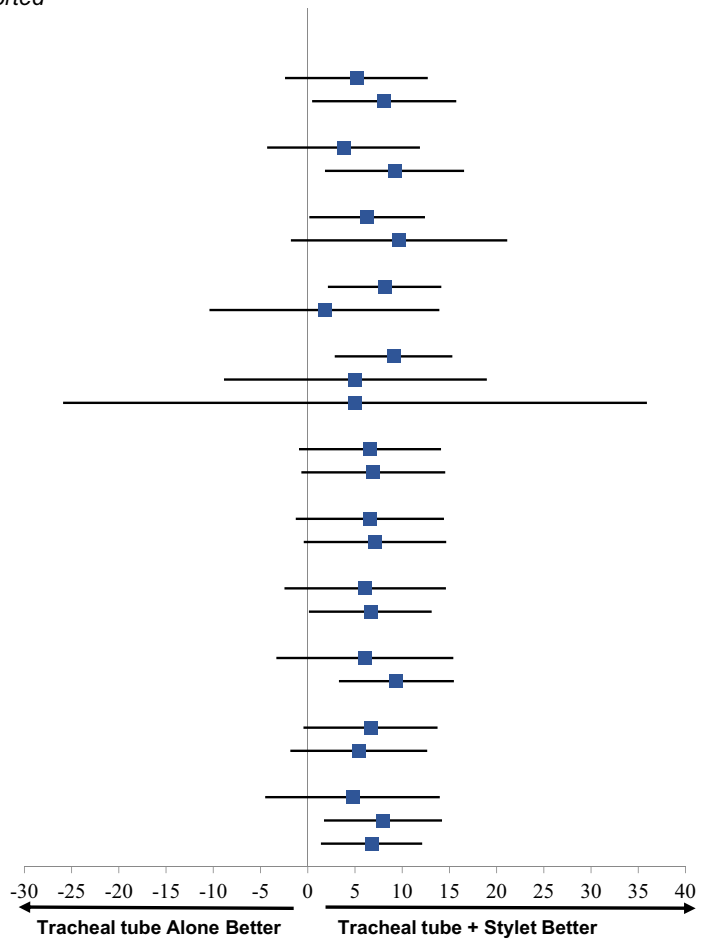
Effect of the use of an endotracheal tube and stylet versus an endotracheal tube alone on first-attempt intubation success: a multicentre, randomised clinical trial in 999 patients

Subgroup	Tracheal tube + Stylet	Tracheal tube Alone	*P* Value for Interaction
	no. of first-attempt intubation success reported / no. of patients (%)		
SAPS II			0.65
< 44	193/244 (79.1%)	176/238 (73.9%)	
≥ 44	196/252 (77.8%)	177/254 (69.7%)	
Fraction of inspired oxygen level in previous 6 hr			0.31
< 40%	163/213 (76.5%)	168/231 (72.7%)	
≥ 40%	218/271 (80.4%)	176/247 (71.3%)	
BIPAP in previous 6 hr			0.56
No	308/398 (77.4%)	273/384 (71.1%)	
Yes	80/98 (81.6%)	77/107 (72.0%)	
Body-mass index			0.32
< 30 kg/m²	313/393 (79.6%)	276/386 (71.5%)	
≥ 30 kg/m²	77/105 (73.3%)	73/102 (71.6%)	
MACOCHA score			0.68
0-3	284/346 (82.1%)	246/337 (73.0%)	
4-7	58/83 (69.9%)	59/91 (64.8%)	
8-12	11/20 (55.0%)	10/20 (50.0%)	
Indication for intubation			0.94
Acute respiratory failure	197/245 (80.4%)	172/233 (73.8%)	
Other indication	194/254 (76.4%)	184/265 (69.4%)	
Neuromuscular blockade			0.95
Nondepolarizing	192/257 (74.7%)	171/251 (68.1%)	
Depolarizing	189/232 (81.5%)	171/230 (74.3%)	
Operator			0.58
Expert	104/115 (90.4%)	97/115 (84.3%)	
Non-expert	279/377 (74.0%)	252/374 (67.4%)	
Operator's prior number of tracheal intubations			0.13
< 30	132/204 (64.7%)	122/208 (58.7%)	
≥ 30	235/262 (89.7%)	208/259 (80.3%)	
Operator's experience in operating room			0.32
< 2 yr	163/179 (91.1%)	130/154 (84.4%)	
≥ 2 yr	216/307 (70.4%)	215/331 (65.0%)	
Operator specialty			0.25
Anesthesia	244/283 (86.2%)	223/285 (78.2%)	
Intensive care	139/209 (66.5%)	126/204 (61.8%)	
Overall	392/501 (78.2%)	356/498 (71.5%)	



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Effect of Use of a Bougie vs Endotracheal Tube With Stylet on Successful Intubation on the First Attempt Among Critically Ill Patients Undergoing Tracheal Intubation

A Randomized Clinical Trial

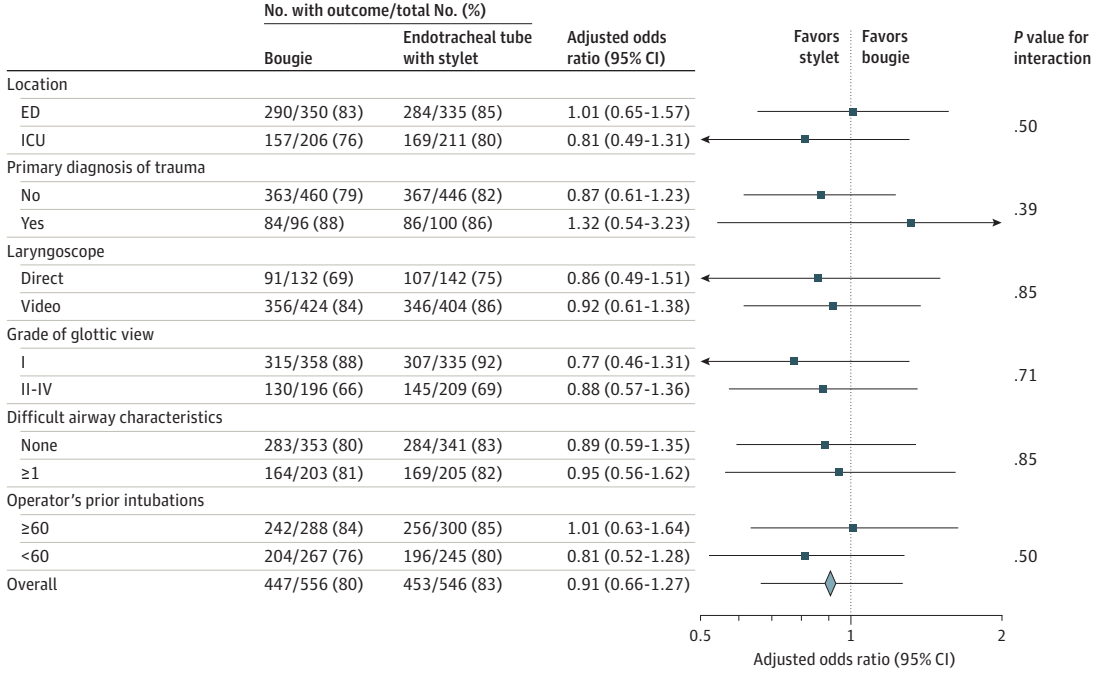
Brian E. Driver, MD; Matthew W. Semler, MD; Wesley H. Self, MD; Adit A. Ginde, MD; Stacy A. Trent, MD; Sheetal Gandotra, MD; Lane M. Smith, MD, PhD; David B. Page, MD; Derek J. Vonderhaar, MD; Jason R. West, MD; Aaron M. Joffe, DO; Steven H. Mitchell, MD; Kevin C. Doerschug, MD; Christopher G. Hughes, MD; Kevin High, RN; Janna S. Landsperger, PA-C; Karen E. Jackson, MD; Michelle P. Howell, RN; Sarah W. Robison, MD; John P. Gaillard, MD; Micah R. Whitson, MD; Christopher M. Barnes, MD; Andrew J. Latimer, MD; Vikas S. Koppurapu, MD; Bret D. Alvis, MD; Derek W. Russell, MD; Kevin W. Gibbs, MD; Li Wang, MS; Christopher J. Lindsell, PhD; David R. Janz, MD; Todd W. Rice, MD; Matthew E. Prekker, MD; Jonathan D. Casey, MD; for the BOUGIE Investigators and the Pragmatic Critical Care Research Group

JAMA. 2021;326(24):2488-2497. doi:10.1001/jama.2021.22002

Table 3. Outcomes of Tracheal Intubation

Outcome	Group, No. (%)		Absolute risk difference or difference in medians (95% CI)[a]
	Bougie (n = 556)	Stylet (n = 546)	
Primary outcome			
Successful intubation on the first attempt[b]	447 (80.4)	453 (83.0)	−2.6 (−7.3 to 2.2)
Secondary outcome			
Lowest oxygen saturation <80%, No./total (%)	58/526 (11.0)	46/524 (8.8)	2.2 (−1.6 to 6.0)
Exploratory procedural outcomes			
Time from induction to intubation			
Median (IQR), s	124 (97-180) [n = 543]	112 (85-157) [n = 530]	12 (4 to 20)
Cormack-Lehane grade of glottic view, No./total No. (%)[c]			
Grade 1 (best view)	358/554 (64.6)	335/544 (61.6)	3.0 (−2.8 to 8.9)
Grade 2	153/554 (27.6)	163/544 (30.0)	−2.3 (−7.9 to 3.2)
Grade 3	30/554 (5.4)	35/544 (6.4)	−1.0 (−4.0 to 2.0)
Grade 4 (worst view)	13/554 (2.3)	11/544 (2.0)	0.3 (−1.6 to 2.2)

Figure 2. Subgroup Analysis of the Primary Outcome



Matériel

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Intubation Practices and Adverse Peri-intubation Events in Critically Ill Patients From 29 Countries

JAMA. 2021;325(12):1164-1172. doi:10.1001/jama.2021.1727

Table 3. Techniques, Medications, and Confirmations of Intubations

Variable	No. (%) (n = 2964)
First method used to confirm intubation (n = 2956)	
Auscultation	1711 (57.9)
Waveform capnography[i]	758 (25.6)
Colorimetric carbon dioxide detection[j]	222 (7.5)
Capnometry[k]	138 (4.7)
None	7 (0.2)
Other[l]	120 (4.1)

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RÉPUBLIQUE FRANÇAISE

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LE SERVICE PUBLIC DE LA DIFFUSION DU DROIT

Décret n° 94-1050 du 5 décembre 1994

Conditions de fonctionnement des établissements de santé en ce qui concerne la pratique de l'anesthésie

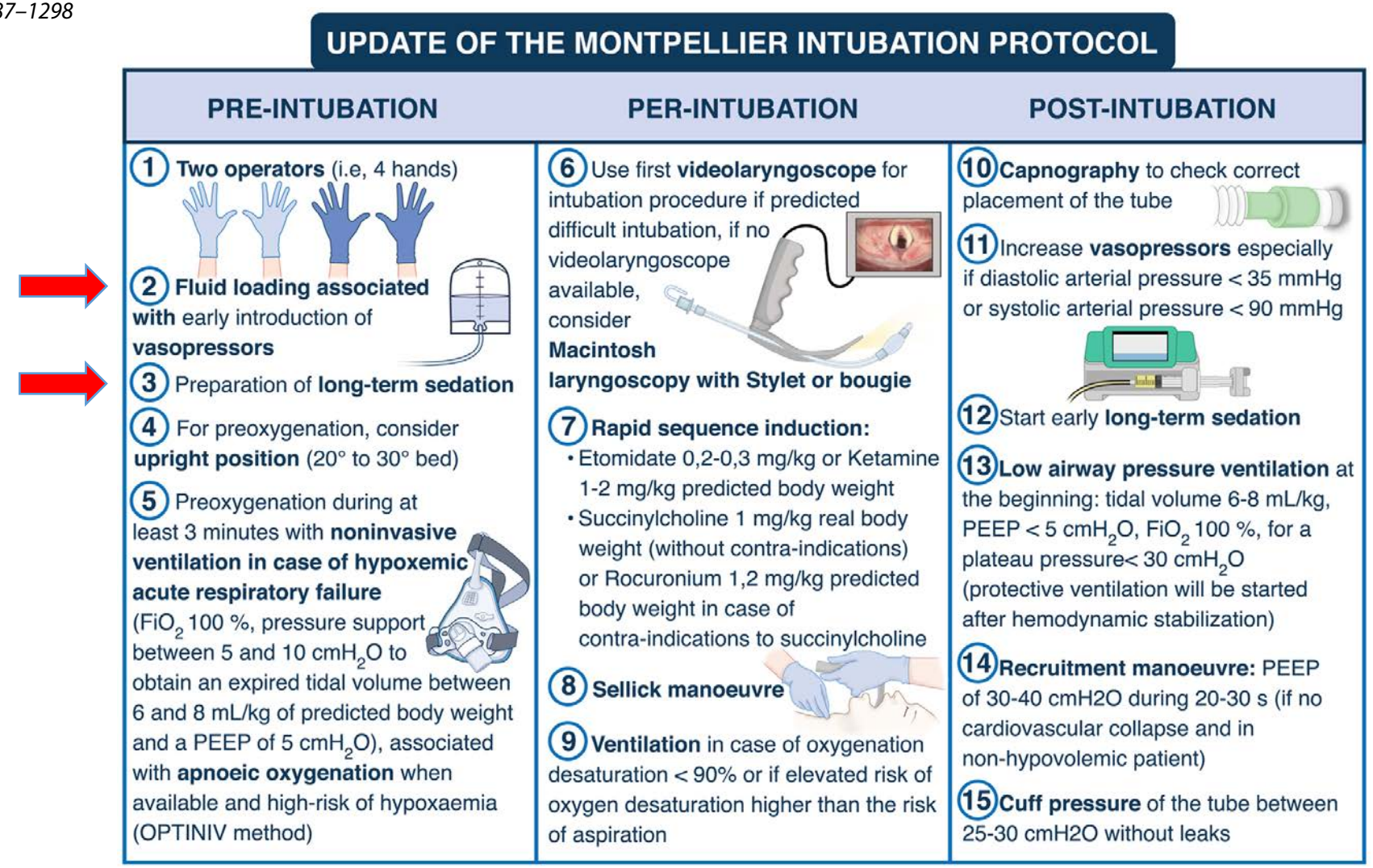
Protocole

NARRATIVE REVIEW

How to improve intubation in the intensive care unit. Update on knowledge and devices

Audrey De Jong[1], Sheila Nainan Myatra[2], Oriol Roca[3,4] and Samir Jaber[1*]

Intensive Care Med (2022) 48:1287–1298



Aides cognitives

INTUBATION DIFFICILE IMPREVUE EN REANIMATION

DEFINITION Echec après **2 laryngoscopies** et/ou **technique alternative**

APPEL RENFORT MEDICAL ET PARAMEDICAL
- ❑Tel ……
- ❑CHARIOT INTUBATION DIFFICILE
- ❑CHARIOT D'URGENCE

INITIER
- ❑ Branchement CAPNOGRAPHE si non fait antérieurement
- ❑ VENTILATION BAVU FiO_2 =1
- ❑ Oxygénation pharyngée (administration continue d'O_2)
- ❑ Evaluer relâchement musculaire (curarisation) et sédation

MISE EN ŒUVRE MOYENS NIVEAU 1
- ❑ Surélévation de la tête (coussin sous l'occiput)
- ❑ Mobilisation glottique externe : maneuvre BURP (Backward, Upward, Rightward, Pressure)
- ❑ Lame métallique (droite ou courbe) (si non utilisée initialement)
- ❑ Mandrin long béquillé
- ❑ Glottiscope (+/- mandrin long béquillé) ou vidéolaryngoscope

EVALUER SpO_2 ET RELÂCHEMENT MUSCULAIRE
Ventilation BAVU si nécessaire ?

MISE EN ŒUVRE MOYENS NIVEAU 2
- ❑ Dispositif supra-glottique permettant l'oxygénation , la ventilation et l'intubation (masque laryngé)
- ❑ Fibroscope

EVALUER SpO_2 ET RELÂCHEMENT MUSCULAIRE
Ventilation BAVU si nécessaire ?

MISE EN ŒUVRE MOYENS NIVEAU 3
- ❑ Cricothyroïdotomie
- ❑ Appel ORL ou chirurgien : tel ……
- ❑ Trachéotomie chirurgicale

SUCCES:

CONFIRMATION
- ❑ Capnogramme
- ❑ Auscultation
- ❑ Courbe de débit expiratoire

TRACABILITÉ

CERTIFICAT Intubation difficile

Référentiels: Conférence d'Expert SFAR 2006, ASA Task Force Anesthesiology 2013; 118:251-70, RFE SFAR SRLF 2016

Réalisée en 2016 par le CAMR Validation CAMR & Comité Réanimation 2018

ARRET CARDIAQUE EN SERVICE DE RÉANIMATION

DEBUTER LA PROCEDURE
- ☐ Appeler renfort médical - **Tél: ……**
- ☐ Noter l'heure ……h……
- ☐ Désigner un leader
- ☐ Personne dédiée au chronomètre / rapport écrit

VERIFIER
- ☐ Confirmer arrêt cardiaque (Scope, SpO_2, $EtCO_2$, pression)
- ☐ ***Absence de LATA***
- ☐ Chariot d'urgence sur place / Plan dur
- ☐ Arrêt médicaments hypotenseurs

APPEL A L'AIDE

- ☐ MCE 100-120 / minutes
- ☐ Dépression sternale > **5-6 cm** de profondeur
- ☐ Relaxation complète
- ☐ **Rotation** toutes les 2 min

ET

- ☐ **VENTILATION** sur **Sonde** ou **Masque Facial / BAVU**
- ☐ Mettre en FiO_2 = 1
- ☐ FR basse 10/min
- ☐ Patient intubé : **vérifier Intubation,** sinon **: Intuber**

ASYSTOLIE
- ☐ Adrénaline 1 mg IVD / 3 à 5 min
- **Evaluation / 2 min de l'efficacité de la RCP :**
  - ☐ $EtCO_2$ > 10 mmHg
  - ☐ PAD > 20 mmHg
  - ☐ reprise activité cardiaque efficace

FV ou TV
- ☐ **CEE** Biphasique 200J Monophasique 360J
- ☐ suivi de 2 min de RCP

Répéter **3 fois** si nécessaire

Après 3ème CEE
- ☐ Adrénaline 1 mg IVD
- ☐ Amiodarone 1ère dose 300 mg 2ème dose 150 mg après 5 CEE (CI si intox Anesth. Locaux) relais 900 mg/j IVSE après 7 CEE

- ☐ Vérification / Pose **voie veineuse ou intra osseuse**
- ☐ Monitorage (Scope, Pression invasive, $EtCO_2$)
- ☐ Echographie Diagnostique (ETT; Pleurale; Abdo…)
- ☐ GDS si biochimie délocalisée (dosage Hb et K+)

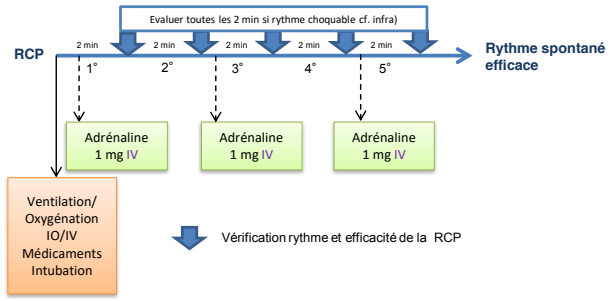
SI REPRISE RYTHME : Discuter
- ☐ Hypothermie thérapeutique (32 – 35°C) 12 à 24h
- ☐ Nécessité d'une coronarographie
- ☐ Sédation post arrêt cardiaque

☐ **Cf. ALGORITHMES AU VERSO**

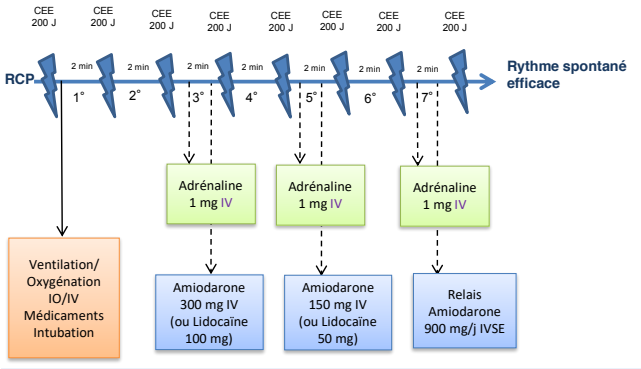
RECHERCHE ETIOLOGIQUE ET TRAITEMENT ADAPTE
- ☐ Respiratoire :
  - ☐ Hypoxiques : Extubation, Pneumothorax, Obstruction de sonde …
  - ☐ Bronchospasme
- ☐ Cardiovasculaire :
  - ☐ Hypovolémie et/ou hémorragique
  - ☐ Embolie cruorique, gazeuse (Déconnexion de VVC)
  - ☐ Anaphylaxie
  - ☐ Pneumothorax compressif / Déconnexion drain pleural
  - ☐ Coronaropathie
- ☐ Métabolique (dyskaliémie, dysphosphatémie, dysmagnésémie)
- ☐ Neurologique : AVC, HTIC

ARRET CARDIAQUE REFRACTAIRE : Réanimation Prolongée
- ☐ Echec RCP: après plus de 15 minutes sans retour à un rythme cardiaque spontané efficace (si la structure hospitalière le permet)
- ☐ Contact centre de référence : Tel: ……
- évaluer rapidement indication / faisabilité d'**assistance circulatoire extracorporelle**.
- ☐ En faveur: patient jeune, peu de comorbidités, no-flow < 5 min, low-flow < 30 min, CO_2 expiré > 10 mmHg au cours de la RCP, causes réversibles d'arrêt cardiaque

Algorithme : Arrêt cardiaque et rythme NON choquable



Algorithme: ACR et rythme choquable



Référence : ERC Guidelines 2021 http://www.cprgu/idelines.eu

Réalisée en 2016 par le CAMR, mis à jour en 2022 par le CAMR et le comité Réanimation

Avant intubation

Position demi-assise 30° ou RAMP ou *sniffing* position
Optimisation hémodynamique (expansion volémique + noradrénaline en place)
Equipement
- **Chariot d'urgence**
- **Chariot d'intubation difficile (fibroscope, DSG, matériel de cricothyroïdotomie)**
- **Sédation**
- **Vasopresseurs**
- **Capnographe**
- **Aspiration opérationnelle**
- **BAVU branché (15 L.min^{-1})**
- **Voies veineuses contrôlées**

Equipe dédiée (au moins 2 médecins + 1 infirmière + 1 aide à l'extérieur de la chambre)

- Aide cognitive dédiée à l'intubation difficile en réanimation disponible
- Communication entre les intervenants

Score MACOCHA

Préoxygénation
VNI > BAVU > ONHD > O_2 standard

Induction en séquence rapide
Kétamine 1-2 mg.kg^{-1} >> Etomidate ou Propofol
Succinylcholine 1 mg.kg^{-1} ou Rocuronium 1.2 mg.kg^{-1}

Manœuvre de Sellick

Peroxygénation
Maintien de l'ONHD

< 3

- Laryngoscopie directe (Lame de MacIntosh)
- Lame metal à usage unique (ou réutilisable)
- Stylet malléable ou long mandrin béquillé
- Pas plus de 2 essais en 2 minutes

≥ 3

- Vidéolaryngoscope

OU

- Laryngoscopie directe (Lame de MacIntosh)
- Lame metal à usage unique (ou réutilisable)
- Stylet malléable ou long mandrin béquillé
- Pas plus de 2 essais en 2 minutes

Succès de l'intubation
courbe de capnographie

Echec d'intubation
→ Reprise au BAVU
→ Annonce claire
→ Appeler de l'aide (anesthésiste expert)

Ventilation efficace
⇢ contrôle de la capnographie
⇢ Intubation à travers le DSG

Echec d'intubation
→ Reprise au BAVU
→ Annonce claire
→ Appeler de l'aide (anesthésiste expert)

- Vidéolaryngoscope
- Relâchement de la manoeuvre de Sellick
- BURP ou mobilisation externe laryngée
- Pas plus de de 2 essais en 2 minutes

Echec d'intubation
→ Reprise au BAVU

- Dispositif supra-glottqiue (DSG)
- Relâchement de la manoeuvre de Sellick
- BURP ou mobilisation externe laryngée
- Pas plus de de 2 essais en 2 minutes

Echec d'intubation
→ Reprise au BAVU

Cricothyroïdotomie d'urgence
- scalpel – doigt – mandrin
- chirurgicale si équipe disponible

Après intubation

- PEEP minimale 5-6 cmH_2O
- Volume courant 6-8 mL.kg^{-1} de poids ideal théorique
- Ventilation protectrice
- Maneouvre de recrutement alvéolaire [g]
- Optimisation hémodynamique (expansion volémique et vasopressurs)

O_2

Merci pour votre attention!

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