

DÉCUBITUS VENTRAL VIGILE DANS L'IRA HYPOXÉMIQUE CHEZ LE PATIENT COVID

Céline CHARRA & Magali DIREZ
Dr Sophie PERINEL

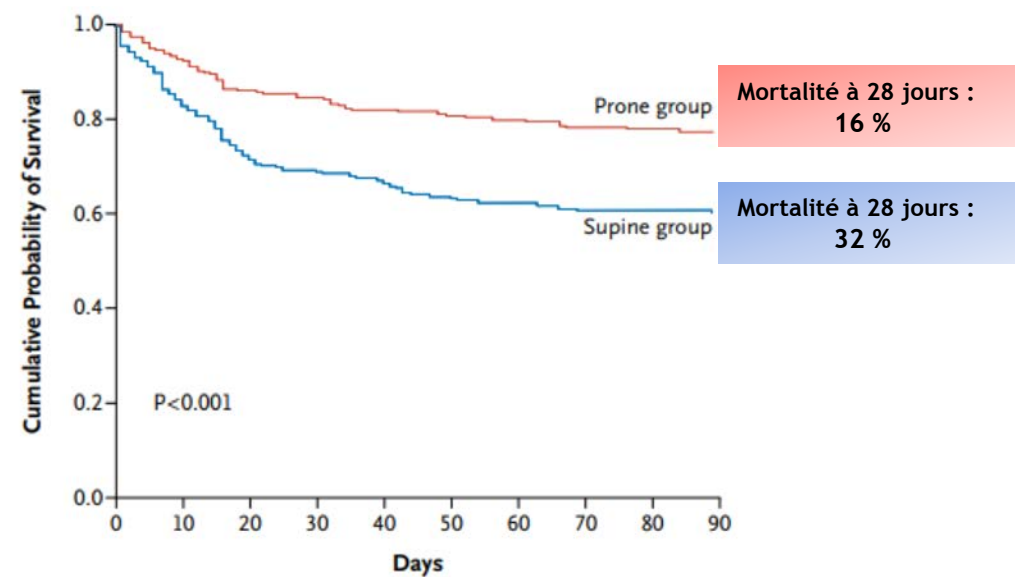
MÉDECINE INTENSIVE ET RÉANIMATION G



CONTEXTE BIBLIOGRAPHIQUE



Probabilité de survie



No. at Risk					
Prone group	237	202	191	186	182
Supine group	229	163	150	139	136

Figure 2. Kaplan–Meier Plot of the Probability of Survival from Randomization to Day 90.

— AVEC DV VIGILE
— SANS DV VIGILE



Prone Positioning in Severe Acute Respiratory Distress Syndrome

Claude Guérin, M.D., Ph.D., Jean Reignier, M.D., Ph.D., Jean-Christophe Richard, M.D., Ph.D., Pascal Beuret, M.D., Arnaud Gacouin, M.D., Thierry Boulain, M.D., Emmanuelle Mercier, M.D., Michel Badet, M.D., Alain Mercat, M.D., Ph.D., Olivier Baudin, M.D., Marc Clavel, M.D., Delphine Chatellier, M.D., Samir Jaber, M.D., Ph.D., Sylvène Rosselli, M.D., Jordi Mancebo, M.D., Ph.D., Michel Sirodot, M.D., Gilles Hilbert, M.D., Ph.D., Christian Bengler, M.D., Jack Richecœur, M.D., Marc Gannier, M.D., Ph.D., Frédérique Bayle, M.D., Gael Bourdin, M.D., Véronique Leray, M.D., Raphaële Girard, M.D., Loredana Baboi, Ph.D., and Louis Ayzac, M.D., for the PROSEVA Study Group*

AUTRE INDICATION ?

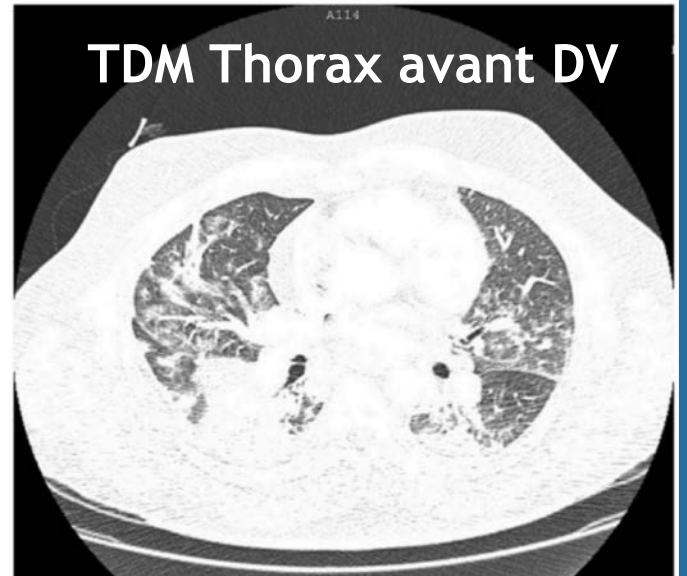
Insuffisance Respiratoire
Aiguë Sévère
chez le patient COVID
hypoxémique



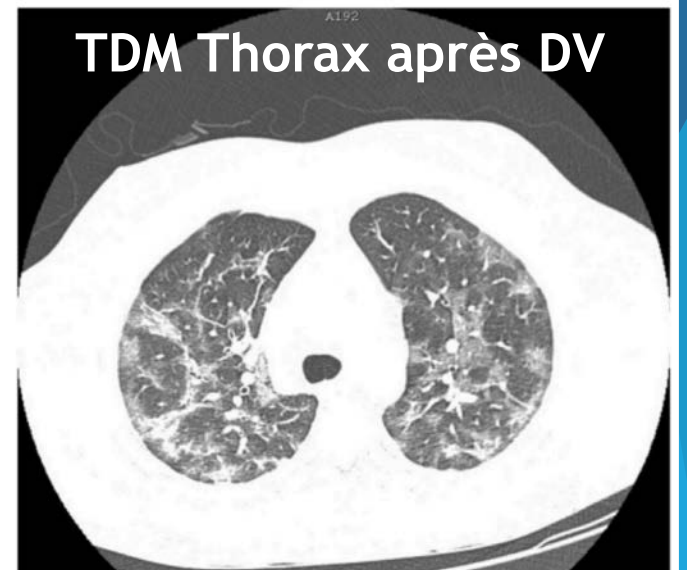
Oxygénothérapie Haut
débit (ONHD)



Décubitus
Ventral Vigile



Respiratory Medicine Case Reports 30 (2020) 101096

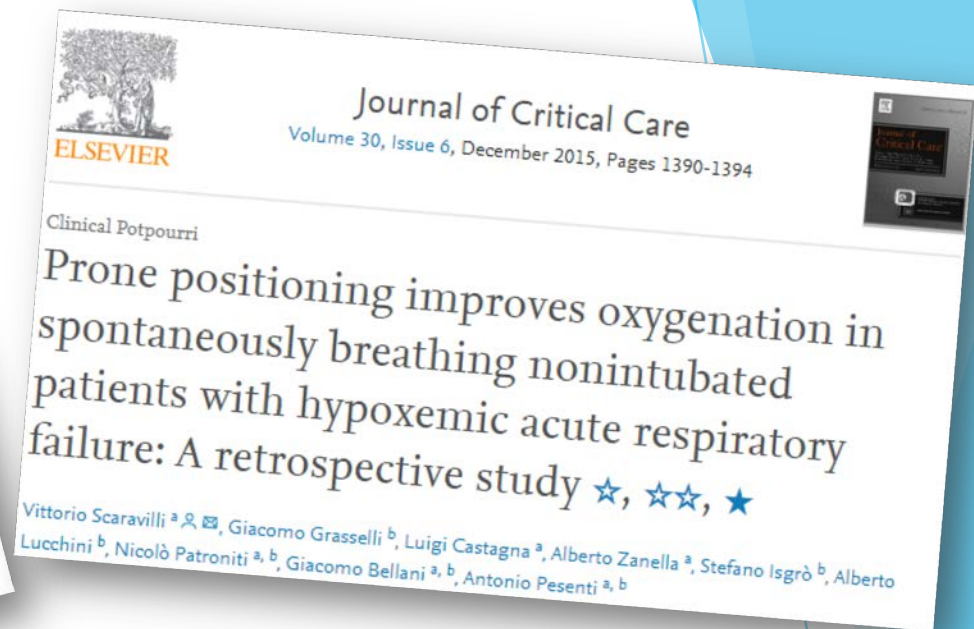


ÉTUDES DV VIGILE PRÉ - COVID



Response to the prone position in spontaneously breathing patients with hypoxemic respiratory failure
C. VALTER¹, A. M. CHRISTENSEN¹, C. TOLLUND² and N. K. SCHÖNEMANN³
Department of Anesthesiology and Intensive Care, ¹Randers Centralsygehus, ²Glostrup Hospital, University of Copenhagen, Copenhagen, and
³Aarhus Amtssygehus, University of Aarhus, Aarhus, Denmark

- 4 cas rapportés pour éviter IOT :
- Sous oxygénothérapie simple
 - Échec de VNI ou CPAP
 - 100 % amélioration sans IOT



	All procedures (n=43)			
pH	7.42 ± 0.03	7.42 ± 0.03	7.43 ± 0.03	0.80
PaCO ₂ (mmHg)	45.4 ± 9.6	45.7 ± 9.0	45.3 ± 9.0	0.64
HCO ₃ ⁻ (mMol/L)	28.7 ± 4.9	28.8 ± 5.0	28.5 ± 4.1	0.44
PaO ₂ (mmHg)	89 ± 28	124 ± 53 [†]	91 ± 42	< 0.001
HbO ₂ (%)	94.8 ± 2.7	96.6 ± 1.5 [†]	95.2 ± 2.3	< 0.001
Base excess (mMol/L)	3.8 ± 4.2	3.9 ± 4.3	3.6 ± 3.4	0.61

- 43 séances de DV vigile
- 15 patients (VNI, OHDN ou oxygène)
- Pneumopathie ou choc septique
- 13/15 => amélioration sans IOT

PREMIERS CAS RAPPORTÉS - COVID 2020



Clinical (emergency department) data related to case 2.

Variable	4 May, 2020	
	08:00	18:00
Respiratory rate (breaths/min)	28	22
Heart rate (bpm)	100	85
Peripheral oxygen saturation (%)	94	96
Oxygen via a nonrebreather face mask (L/min)	10	–
Oxygen via a nasal cannula (L/min)	–	3

Biochemical data related to case 2.

Variable	4 May, 2020	
	08:27	17:58
pH	7.51	7.48
pO ₂	41.7	50
pCO ₂	31.2	35.2
Bicarbonate	26.5	26.9
Base excess	1.9	2.6
SaO ₂	83.6	89.3
SpO ₂	83	89
Oxygen support	Room air	Room air
Lactic acid	11	12
PaO ₂ /FiO ₂	198	238

MÉTA-TRIAL : PROTOCOLE

Table 1 Eligibility criteria in each trial

	USA and Canada	Ireland	France and Spain
Inclusion criteria	1. COVID-19 pneumonia based on the Centers for Disease Control guidelines. 2. Presence of acute hypoxaemic respiratory failure. 3. Acute onset within 7 days of insult or new (within 7 days) or worsening respiratory symptoms. 4. Bilateral opacities on chest X-ray or CT scanner not fully explained by effusions, lobar or lung collapse, or nodules. 5. Cardiac failure not the primary cause of acute respiratory failure. 6. Written informed consent 7. $\text{PaO}_2/\text{FiO}_2$ ratio <200 mm Hg or $\text{SpO}_2/\text{FiO}_2$ <240 with HFNC at 50 L/min and peripheral capillary oxygen saturation (SpO_2) maintained at 92%–95%.	1. Suspected or confirmed COVID-19 infection. 2. Bilateral Infiltrates on chest X-ray $\text{SpO}_2 < 94\%$ on FiO_2 40% by either venturi facemask or HFNC 3. Respiratory rate <40 breath/min. 4. Written informed consent.	1. Adult patient suffering from COVID-19 pneumonia according to the diagnostic criteria in effect at the time of inclusion or very strongly suspected. 2. Patient treated by nasal high flow therapy. 3. Moderate or severe ARDS: bilateral radiological opacities not explained entirely by effusions, atelectasis or nodules; acute hypoxaemia with worsening within the seven previous days, not entirely explained by left ventricular failure; $\text{PaO}_2/\text{FiO}_2$ ratio <300 mm Hg (or equivalent $\text{SpO}_2/\text{FiO}_2$). 4. Written informed consent in France and oral consent in Spain.
Exclusion criteria	1. Patients with a consistent $\text{SpO}_2 < 80\%$ when evaluated with a FiO_2 of 0.6, or signs of respiratory fatigue (respiratory rate >40/min, partial pressure of carbon dioxide (PaCO_2) >50 mm Hg/pH <7.30 and obvious accessory respiratory muscle use). 2. Immediate need for intubation ($\text{PaO}_2/\text{FiO}_2 < 50$ mm Hg or $\text{SpO}_2/\text{FiO}_2 < 90$, unable to protect airway or mental status change). 3. Haemodynamic instability (sustained systolic blood pressure <90 mm Hg, sustained mean blood pressure below 65 mm Hg or requirement for vasopressor). 4. Unable to collaborate with HFNC/PP with agitation or refusal of HFNC/PP. 5. Chest trauma or any contraindication for PP. 6. Pneumothorax. 7. Age <18 years. 8. Pregnant. 9. Body mass index >40 kg/m².	1. Age <18 years. 2. Uncooperative or likely to be unable to lie on abdomen for 16 hours. 3. Vomiting or bowel obstruction. 4. Palliative care. 5. Multiorgan failure. 6. Standard contraindications to PP including the presence of an open abdominal wound, unstable pelvic fracture, spinal lesions and instability, pregnancy $>20/40$ gestation and brain injury without monitoring of intracranial pressure.	1. Indication for immediate tracheal intubation. 2. Significant acute progressive circulatory insufficiency. 3. Impaired consciousness, confusion and restlessness. 4. Body mass index >40 kg/m². 5. Chest trauma or other contraindication to PP. 6. Pneumothorax. 7. Vulnerable person: safeguard of justice, curatorship or tutorship known at inclusion. 8. Pregnant or lactating woman.

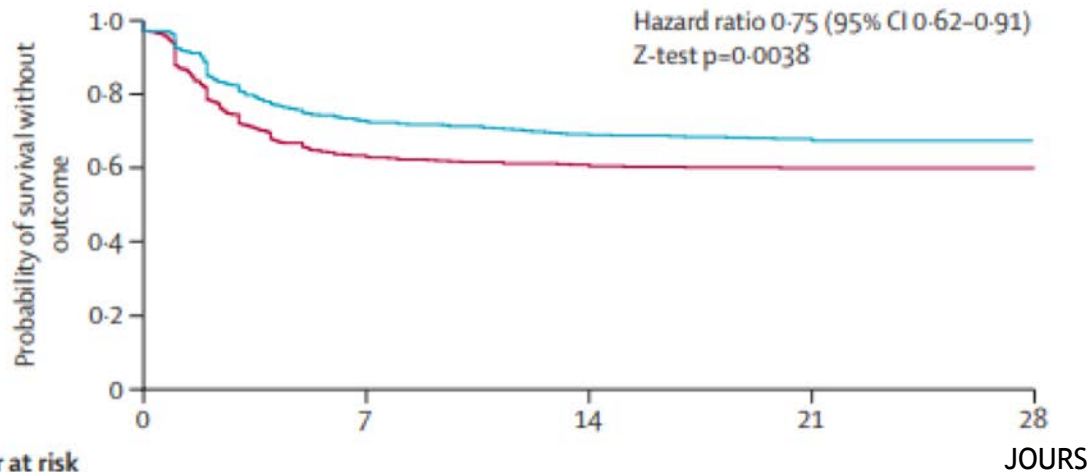
MÉTA-TRIAL : RÉSULTATS

Awake prone positioning for COVID-19 acute hypoxaemic respiratory failure: a randomised, controlled, multinational, open-label meta-trial

Stephan Ehrmann*, Jie Li*, Miguel Ibarra-Estrada*, Yonatan Perez*, Ivan Pavlov*, Bairbre McNicholas*, Oriol Roca*, Sara Mirza, David Vines, Roxana Garcia-Salcido, Guadalupe Aguirre-Avalos, Matthew W Trump, Mai-Anh Nay, Jean Dellamonica, Saad Nseir, Idrees Mogri, David Cosgrave, Dev Jayaraman, Joan R Masclans, John G Laffey, Elsa Tavernier, for the Awake Prone Positioning Meta-Trial Group†



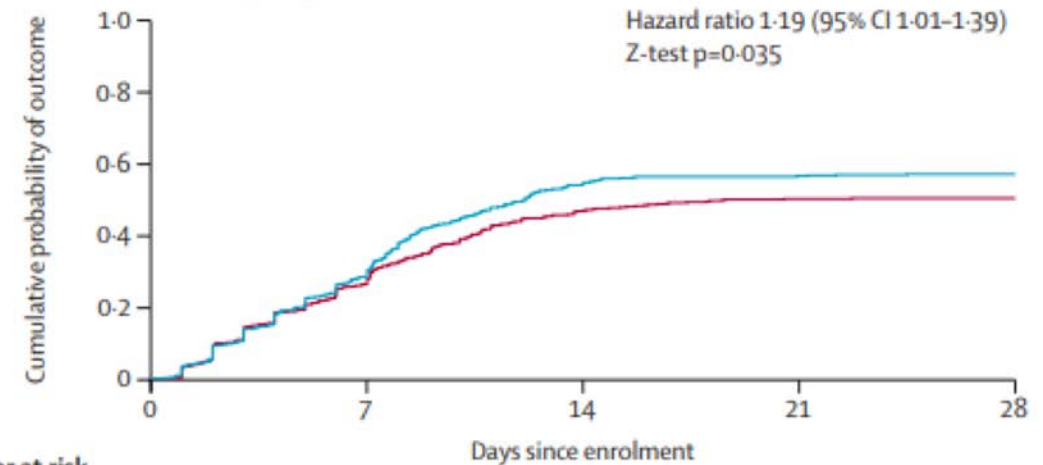
B Intubation (Probabilité de non-recours à l'intubation)



Number at risk (number censored)	0	7	14	21	28
Standard care	557 (0)	345 (0)	310 (0)	299 (0)	298 (298)
Awake prone positioning	564 (0)	405 (0)	358 (0)	344 (0)	341 (341)

— OHDN + DV VIGILE
— OHDN

D Weaning of high-flow nasal cannula (Sevrage OHDN)



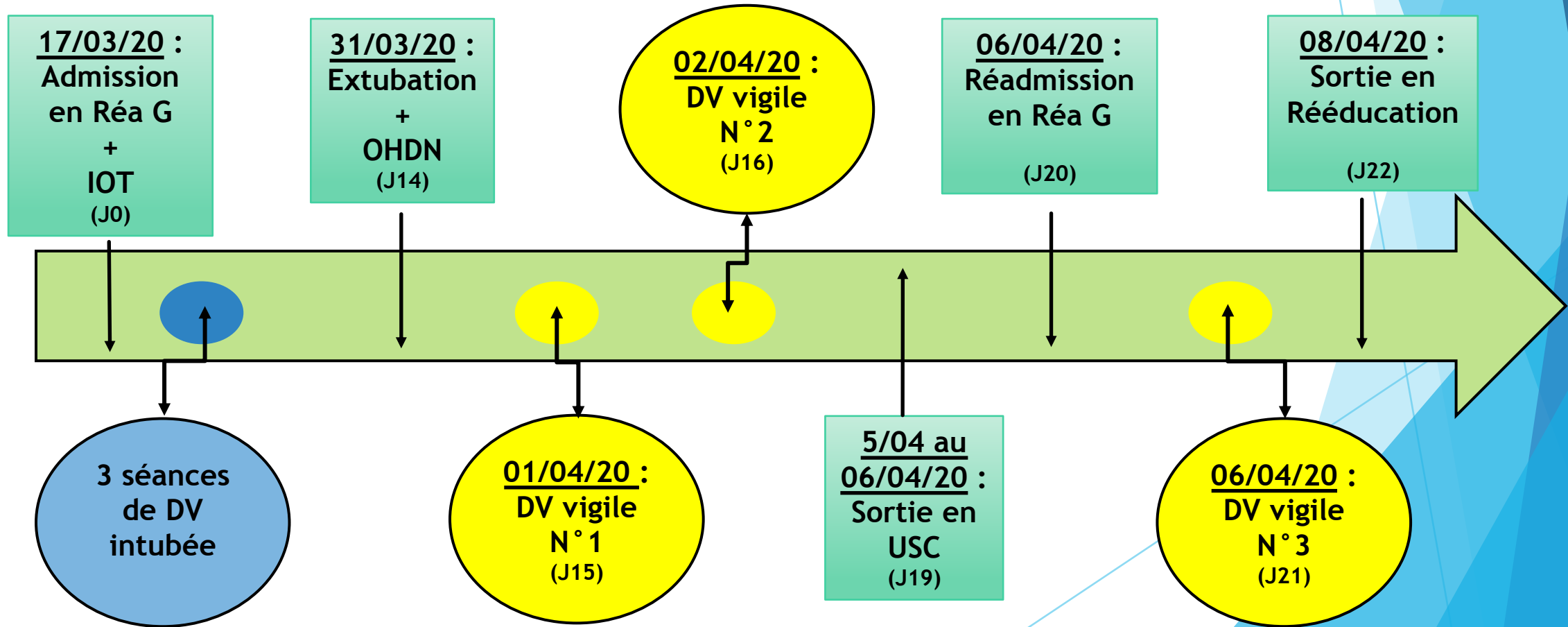
Number at risk (number censored)	0	7	14	21	28
Standard care	556 (0)	186 (0)	36 (0)	11 (0)	5 (5)
Awake prone positioning	559 (0)	228 (0)	34 (0)	7 (0)	1 (1)

- Sevrage OHDN plus rapide
- Diminution du risque d'IOT

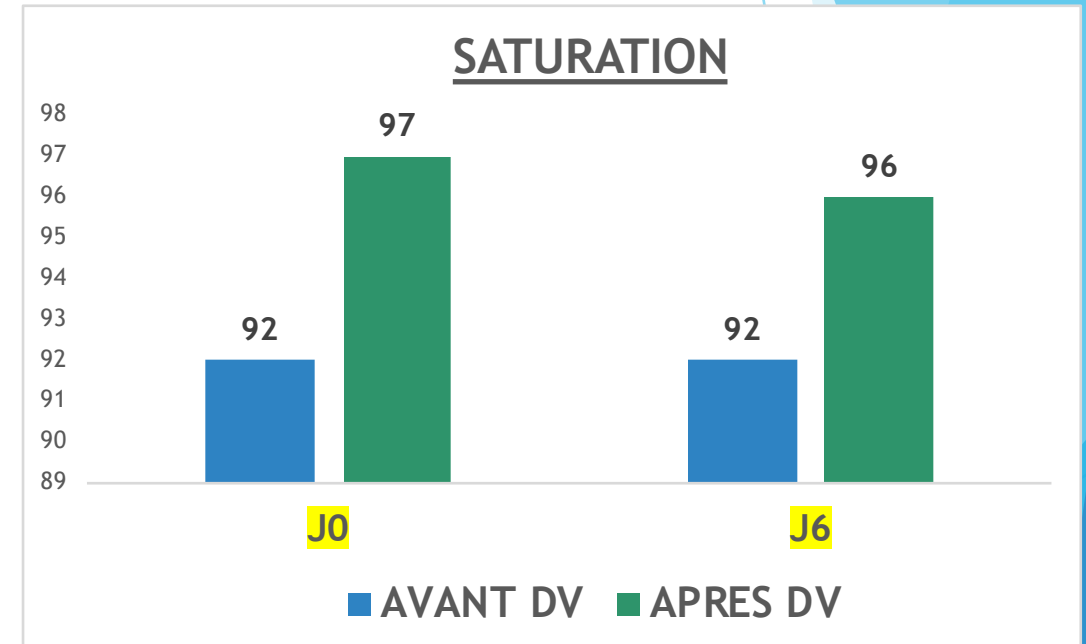
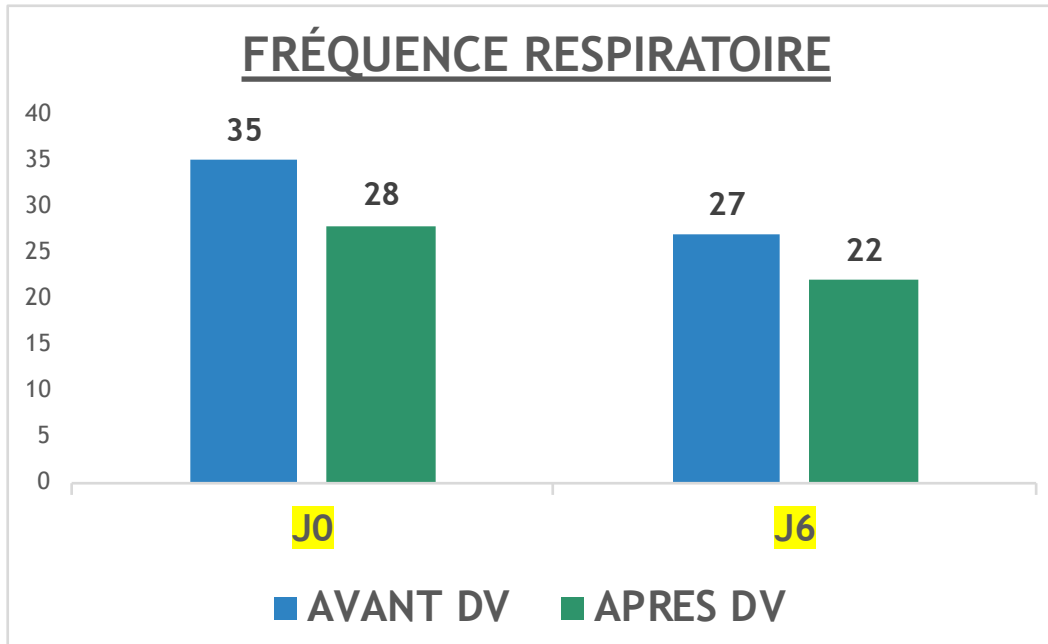
1^{er} DV VIGILE

Femme - 71 ans - 155 cm - 77 kg - IMC 32

DURÉE MOYENNE
DES CURES DE
DV VIGILE = 3H



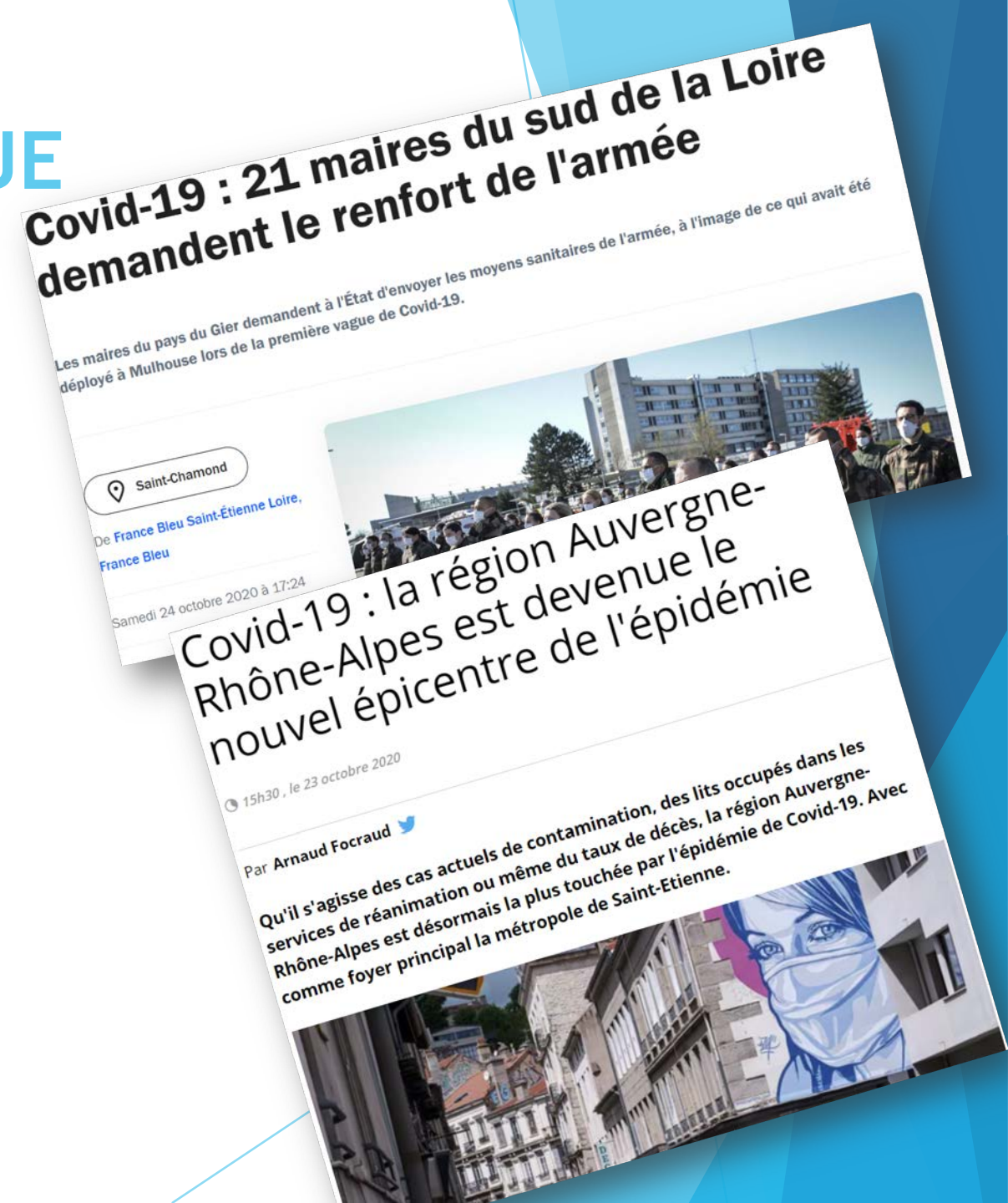
RÉSULTATS DE NOTRE 1^{ère} EXPÉRIENCE



ÉVOLUTION DE LA PRATIQUE

- ▶ 01/04 au 01/12/2020 : 144 patients COVID
- ▶ Effet incontestable du DV vigile
 - ⇒ pratique en augmentation pendant 8 mois
- ▶ Pas de présence médicale dans la chambre

PRESSIION SANITAIRE





Awake prone positioning for non-intubated oxygen dependent COVID-19 pneumonia patients.

Ng Z, Tay WC, Ho CHB.

Eur Respir J. 2020 Jul 23;56(1):2001198. doi: 10.1183/13993003.01198-2020. Print 2020 Jul.

PMID: 32457195 [Free PMC article](#).

Failure of early extubation among cases of coronavirus disease-19 respiratory failure: Case report and clinical experience.

Zhang J, He X, Hu J, Li T.

Medicine (Baltimore). 2020 Jul 2;99(27):e20843. doi: 10.1097/MD.00000000000020843.

PMID: 32629670 [Free PMC article](#).

Voluntary **Prone Position** for Acute Hypoxemic Respiratory Failure in Unintubated Patients.

Rao SV, Udhayachandar R, Rao VB, Raju NA, Nesaraj JJ, Kandasamy S, Samuel P.

Indian J Crit Care Med. 2020 Jul;24(7):557-562. doi: 10.5005/jp-journals-10071-23495.

PMID: 32963439 [Free PMC article](#).

Prone for COVID: Are You **Awake**?

Gupta S, Govil D.

Indian J Crit Care Med. 2020 Jul;24(7):504-505. doi: 10.5005/jp-journals-10071-23497.

PMID: 32963430 [Free PMC article](#).

Transdermal Fentanyl patch: An approach to enhance tolerance of conscious proning in COVID-19 patients.

Mammen S, Yousuf B, Shamsah M.

J Opioid Manag. 2020 Jul/Aug;16(4):237-238. doi: 10.5055/jom.2020.0576.

PMID: 32886349

Should I **prone** non-ventilated **awake** patients with COVID-19?

Prasad M, Visrodia K.

Cleve Clin J Med. 2020 Jun 30. doi: 10.3949/ccjm.87a.ccc050. Online ahead of print.

PMID: 32606051 [Free article](#).

Protocol for **awake prone positioning** in COVID-19 patients: to do it earlier, easier, and longer.

Bower G, He H.

Crit Care. 2020 Jun 23;24(1):371. doi: 10.1186/s13054-020-03096-x.

PMID: 32576235 [Free PMC article](#). No abstract available.

INTERROGATIONS ...



- ▶ Chez qui ?
- ▶ Combien de temps ?
- ▶ Quelle surveillance ?

MÉTA-TRIAL : PROTOCOLE

The following guidance is provided concerning the need for tracheal intubation to perform invasive mechanical ventilation. Intubation is recommended in case of⁷:

1. Signs of persisting or worsening respiratory failure, defined by at least two of the following criteria:
 - Respiratory rate above 40 breaths/min.

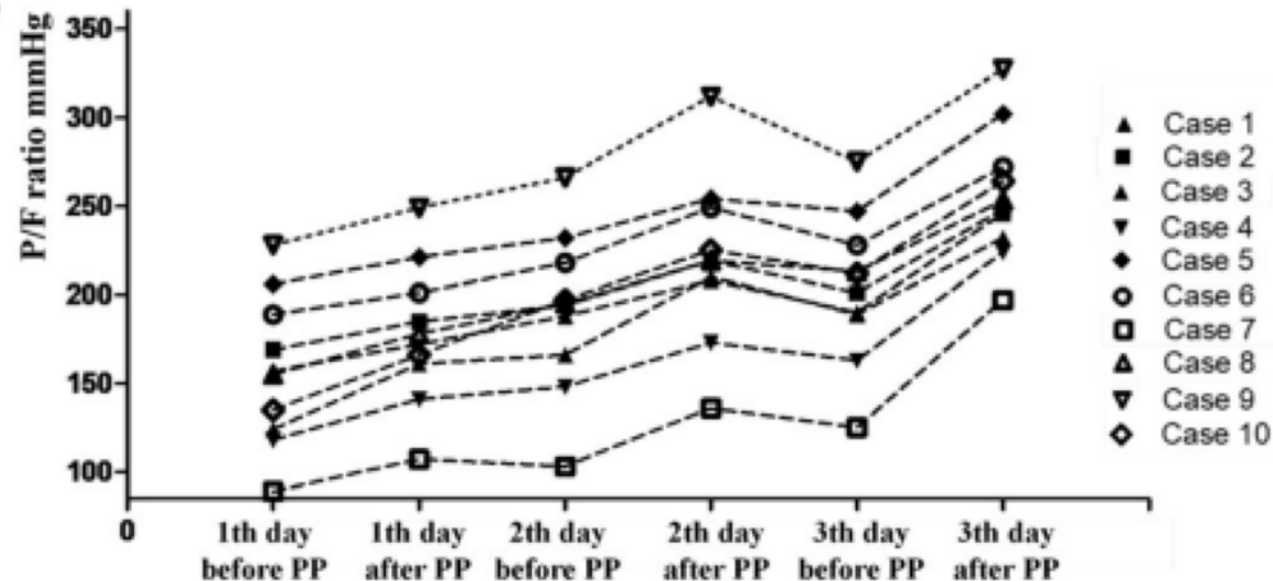
- Lack of improvement of signs of respiratory muscle fatigue.
- Development of copious tracheal secretions.
- Hypercapnic respiratory acidosis with a pH below 7.25.

INTERROGATIONS ...



- ▶ Chez qui ?
- ▶ Combien de temps ?
- ▶ Quelle surveillance ?

QUELLE DURÉE ?



Méthode :

10 patients => DV vigile imposé 16H/24

Résultats :

Amélioration continue du P/F sur 3 jours

Questions :

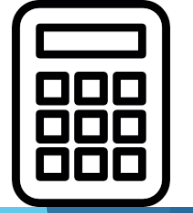
- 1/ Amélioration indépendante du DV ?
- 2/ Tolérance ?

INTERROGATIONS ...



- ▶ Chez qui ?
- ▶ Combien de temps ?
- ▶ Quelle surveillance ?

ROX (Respiratory rate - OXygenation)



- ▶ Index ROX =
$$\frac{\text{SpO}_2 / \text{FiO}_2}{\text{Freq Respi}}$$
- ▶ Outil :
 - Surveillance des patients
 - Identification des patients qui s'aggravent
 - Décision d'intubation
- ▶ Paramètre inscrit sur les feuilles de surveillance
 - $\text{Rox} > 4,88$ = moindre risque d'IOT
 - $\text{Rox} < 3,47$ = risque accru d'IOT

ORIGINAL ARTICLE

An Index Combining Respiratory Rate and Oxygenation to Predict Outcome of Nasal High-Flow Therapy

Oriol Roca^{1,2}, Berta Caralt^{1,3}, Jonathan Messika^{4,5,6}, Manuel Samper⁷, Benjamin Sztrymf^{8,9}, Gonzalo Hernández¹⁰, Marina García-de-Acila¹, Jean-Pierre Frat^{11,12,13}, Joan R. Masclans^{2,3,7}, and Jean-Damien Ricard^{4,5,6}

Surveillance ROX / 4h
Allo IDG si ROX < 4

PROTOCOLE



ADMISSION

- Explication de la prise en charge
- OHDN
- Cathéter artériel
- DV vigile proposé



QUELS PATIENTS ?

- Insuffisance respiratoire aiguë grave avec risque d'IOT
- Capable d'intégrer et de respecter des consignes
- Volontaire (après mise en avant des bénéfices)
- Contre-indications relatives : grossesse avancée, rotation cervicale difficile, obésité abdominale

PROTOCOLE



QUAND ?



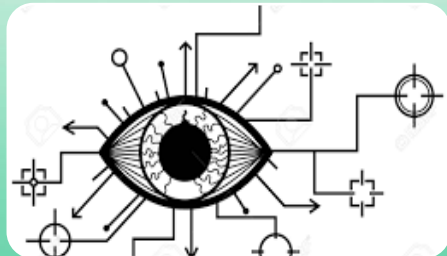
- Rapidement après l'admission
- Cure la plus longue possible en fonction de la tolérance mais jamais sous la contrainte
- Répétitions des cures jour ET nuit
- Si mauvaise tolérance : fauteuil +++++
- Adaptation et diminution des cures en fonction de l'amélioration (baisse O_2 ...)

COMMENT ?



- Environnement calme
- Besoins satisfaits
- Installation confortable
- Propos rassurants et encourageants

SURVEILLANCE



- Clinique du patient
- FR et SpO2
- Index ROX
- Gazométries



DV VIGILE : DANS QUELLES CONDITIONS ?

1 IDE pour 2 patients
1 AS pour 4 patients

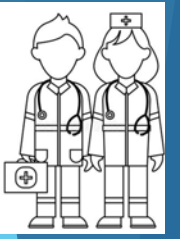
Patient monitoré

**CONTEXTE
SÉCURISÉ**

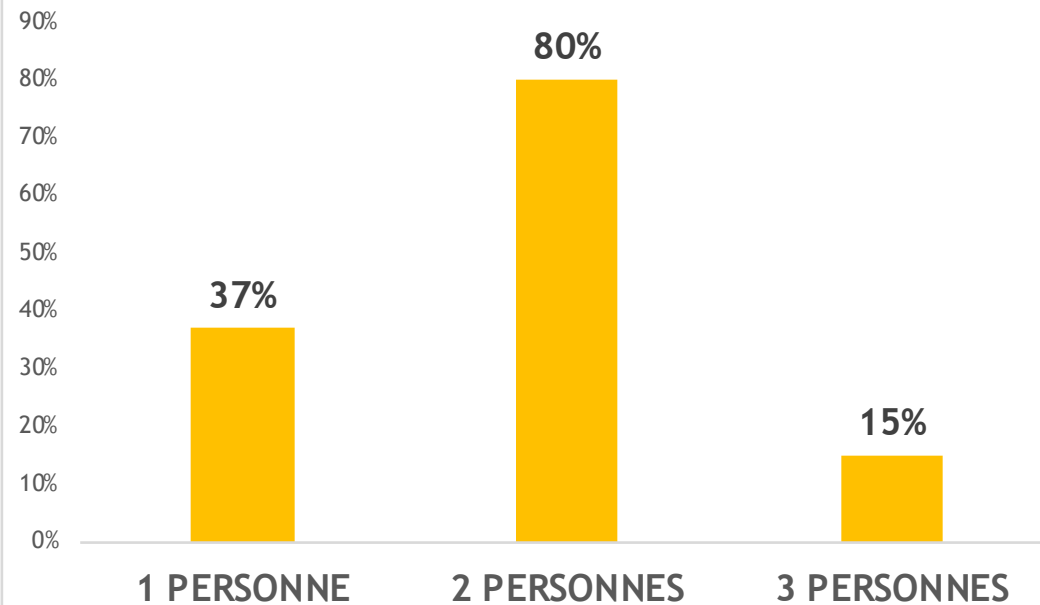
Réanimateur disponible
dans le service

Équipe paramédicale
expérimentée
Présence > 5 ans en Réa G :
50 % des IDE ; 40 % des AS

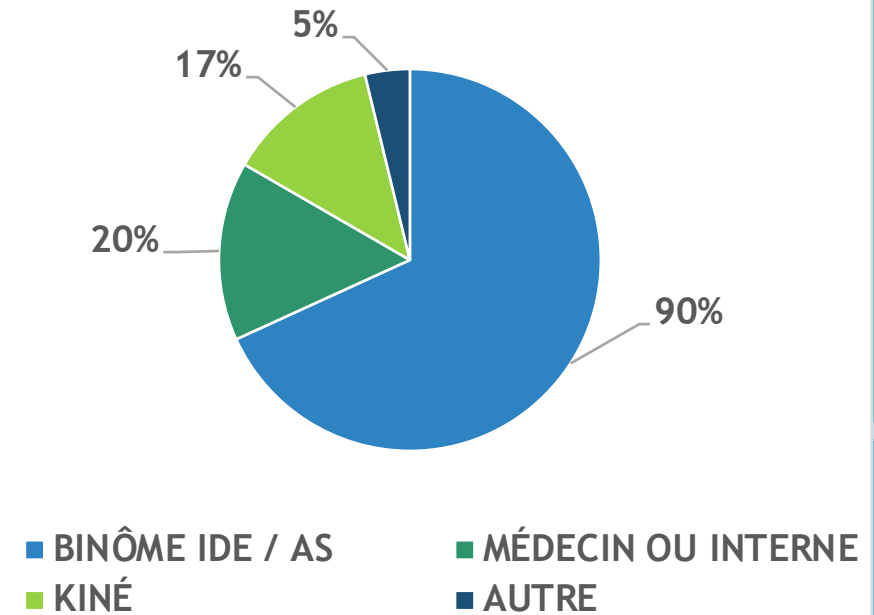
RETOUR DES ÉQUIPES (40 réponses)



NOMBRE DE PERSONNES
NECESSAIRE AU DV VIGILE



QUELS SOIGNANTS NÉCESSAIRE
LORS DU DV VIGILE



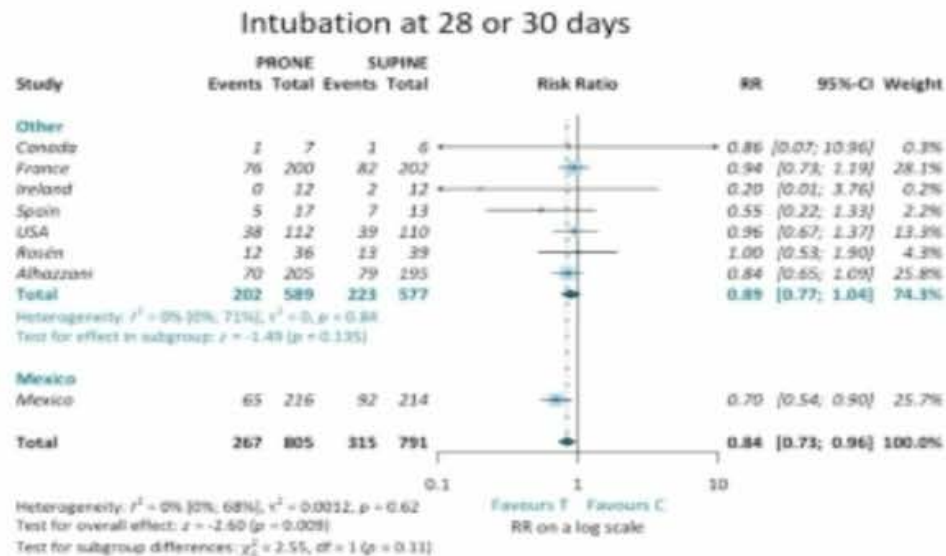


DV VIGILE : RECOMMENDATION

10:26

ESICM guidelines on the management of ARDS

PICO Question #3: In patients receiving HFNC for AHRF, does *awake prone positioning* as compared to *supine positioning* reduce intubation or mortality?

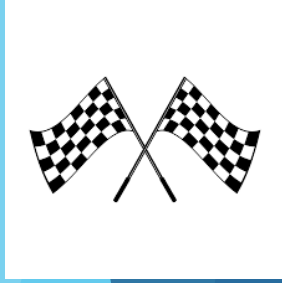


Recommendation Statement #3:

We suggest prone positioning as compared to supine positioning for non-intubated patients being treated with HFNC for COVID-19 AHRF to reduce intubation (weak recommendation; low level of evidence).

We are **unable to make a recommendation** for or against awake prone positioning to reduce mortality (no recommendation; low level of evidence). We are unable to make a recommendation for patients with AHRF not due to COVID-19 (no recommendation; no evidence)

CONCLUSION



- ▶ Pratique facilement réalisable
- ▶ Compétence de l'équipe paramédicale
- ▶ Identification des bons patients
- ▶ Surveillance adaptée
- ▶ Adhésion du patient



MERCI DE VOTRE ATTENTION

secretariat.reanimation.g@chu-st-etienne.fr

celine.charra@chu-st-etienne.fr

magali.direz@chu-st-etienne.fr

sophie.perinel-ragey@chu-st-etienne.fr

EFFETS PHYSIOLOGIQUES

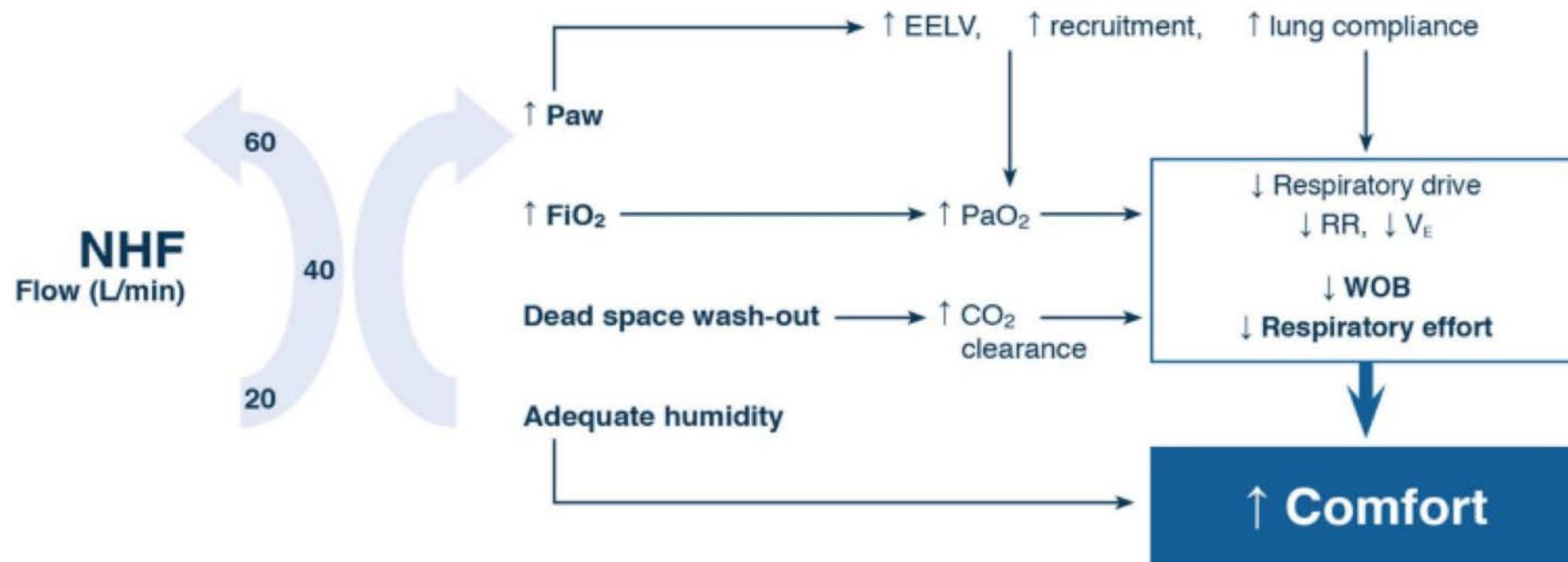


Fig. 1 Schematic representation of the physiologic effects of Nasal High Flow (NHF) and possible impact of the flow. Increase in airway pressure and FiO_2 improve oxygenation by different mechanisms and may be optimal at higher flows. Most of dead-space wash-out-related effects (increased CO_2 clearance, decrease respiratory drive, respiratory rate and effort to breathe) may be obtained for lower flows. All these physiological effects probably explain the improved comfort in patients with respiratory failure and possibly the outcomes. *NHF* nasal high flow, *Paw* airway pressure; *FiO₂* fraction of inspired oxygen, *EELV* end-expiratory lung volume, *RR* respiratory rate, *V_E* minute volume, *WOB* work of breathing