

réanimation 2023

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Palais des Congrès - Paris

Évaluation des muscles respiratoires à l'extubation

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Dysfonction musculaire respiratoire

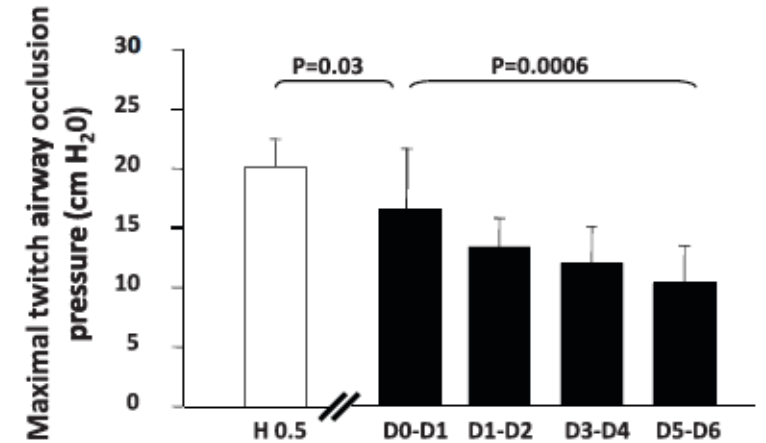
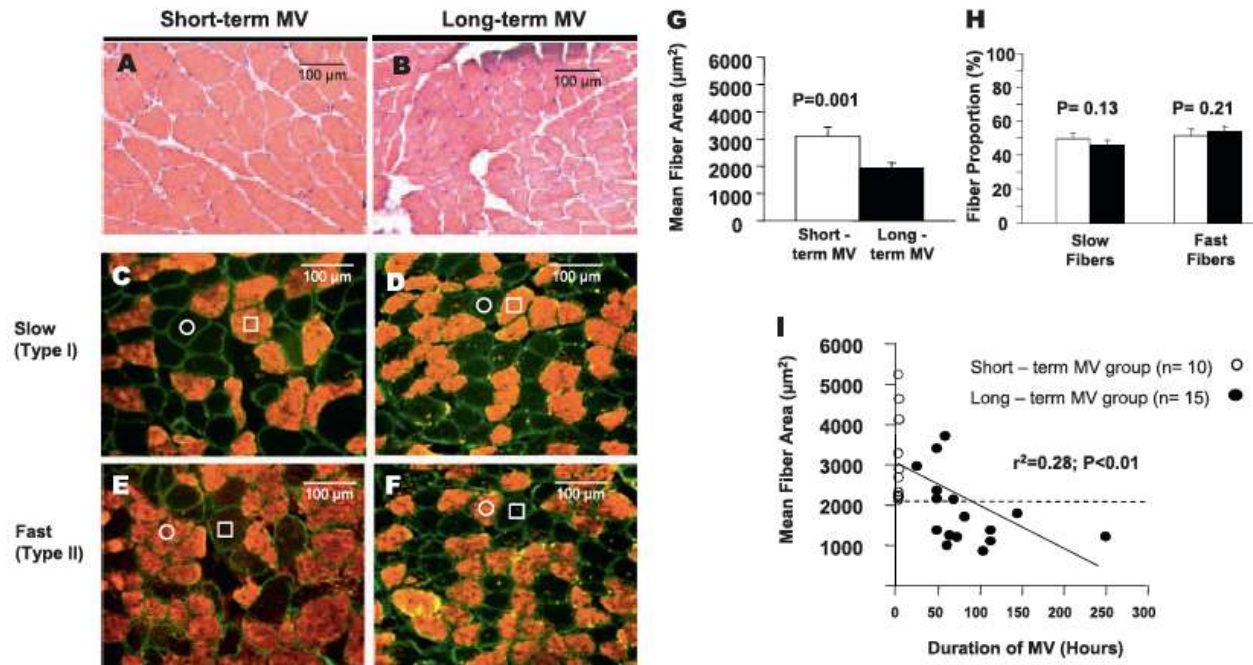
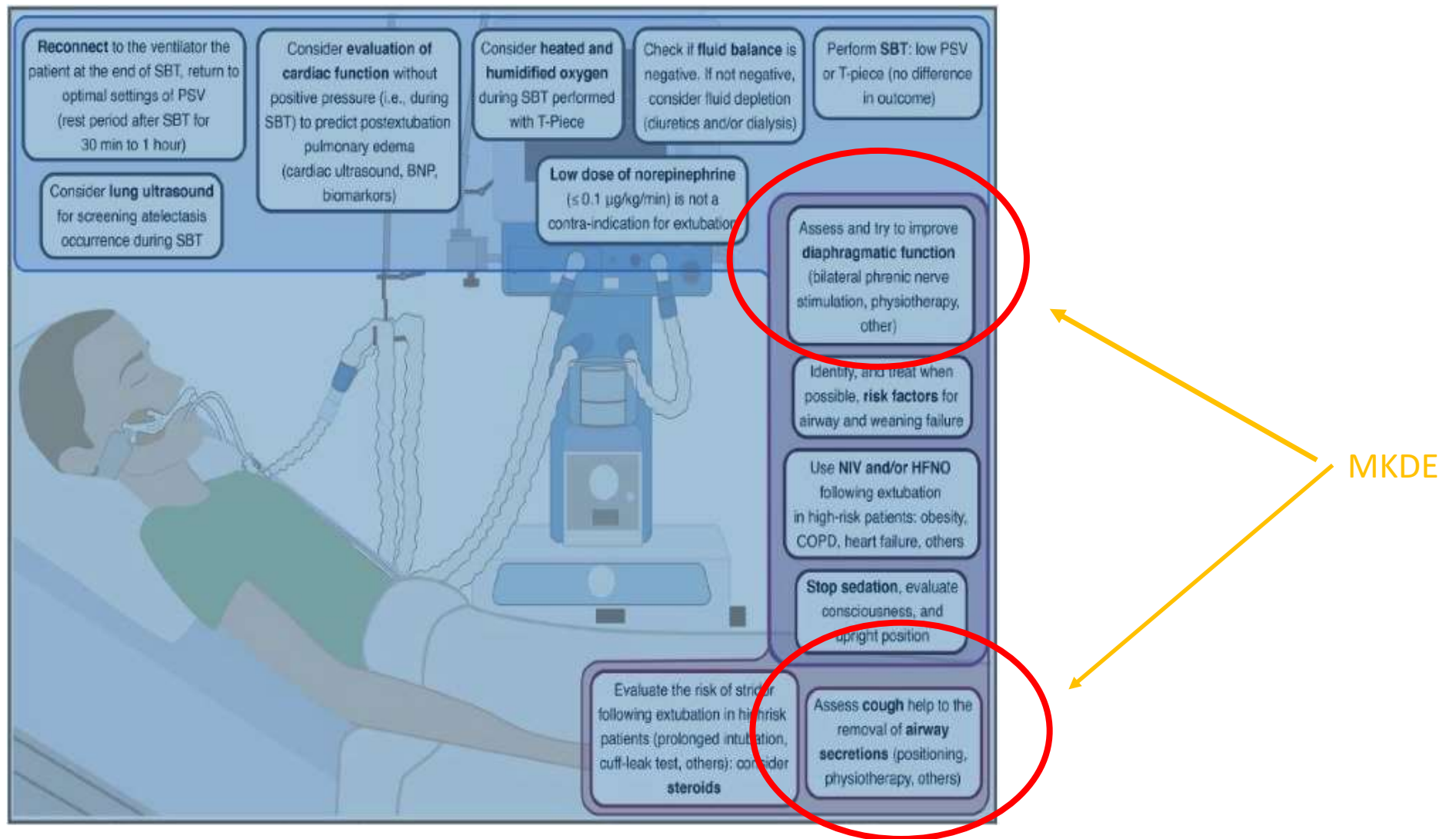


Figure 2. Relationship between duration of mechanical ventilation (MV) and diaphragmatic function. Maximal twitch airway occlusion pressure (TwPtr) generated by magnetic stimulation of the phrenic nerves at different time points in short-term MV (open bar; n = 6) and long-term MV (solid bars; n = 6) groups. H = number of hours of MV; D = number of days of MV.

Jaber, 2011

Muscles
Respiratoires et
succès
extubation



How to optimize extubation?

Audrey de Jong, Daniel Talmor, Samir Jaber

Pourquoi ?

- Pour évaluer la possibilité de réaliser l'extubation
- Pour limiter les échecs d'extubation
- Pour anticiper les moyens post-extubation (OHD/ VNI / cough assist)
- Pour dépister les patients à haut risque d'échec

Pour qui?

- Patients à haut risque d'échec
 - Ventilés + 48H
 - ATCD cardio ou pneumo
 - IMC >30
 - Échec d'extubation antérieur
 - BES
- Patients neurologiques
- Patients avec NMPR

Muscles inspireurs



P 0,1 et PIM Pression inspiratoire maximale

- **P 0,1** : Évaluation du travail respiratoire
- normes < 2 chez patient simple et < 4 pour BPCO
- Mesure sur les tendances du respi

Fernandez, 2004

Vargas, 2008

- **PIM** : pression inspiratoire maximale
- normes -80 cmH₂O
- Zone grise - 20 cmH₂O -25 cm H₂O
- Extuable > 30 cmH₂O
- Inspiration contre valve fermée X 3
- Respi ou système externe

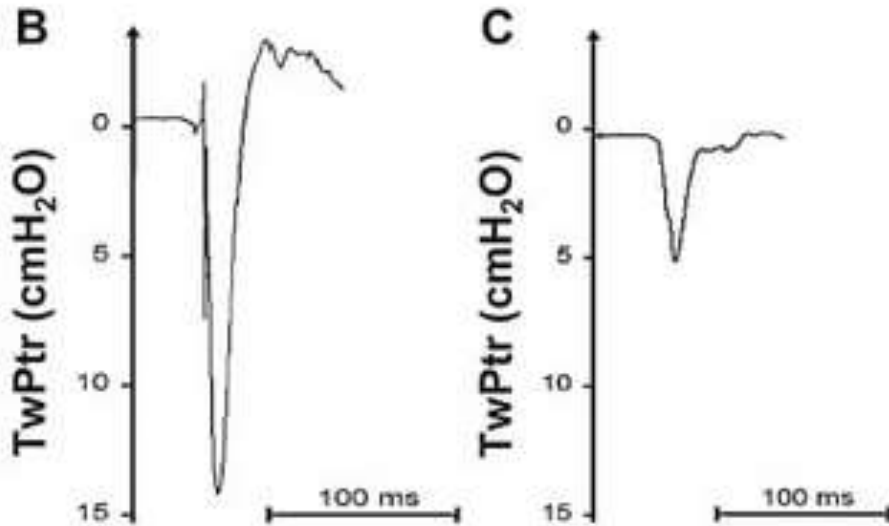
Boles, 2007

De jonghe, 2008

Stimulation phrénique

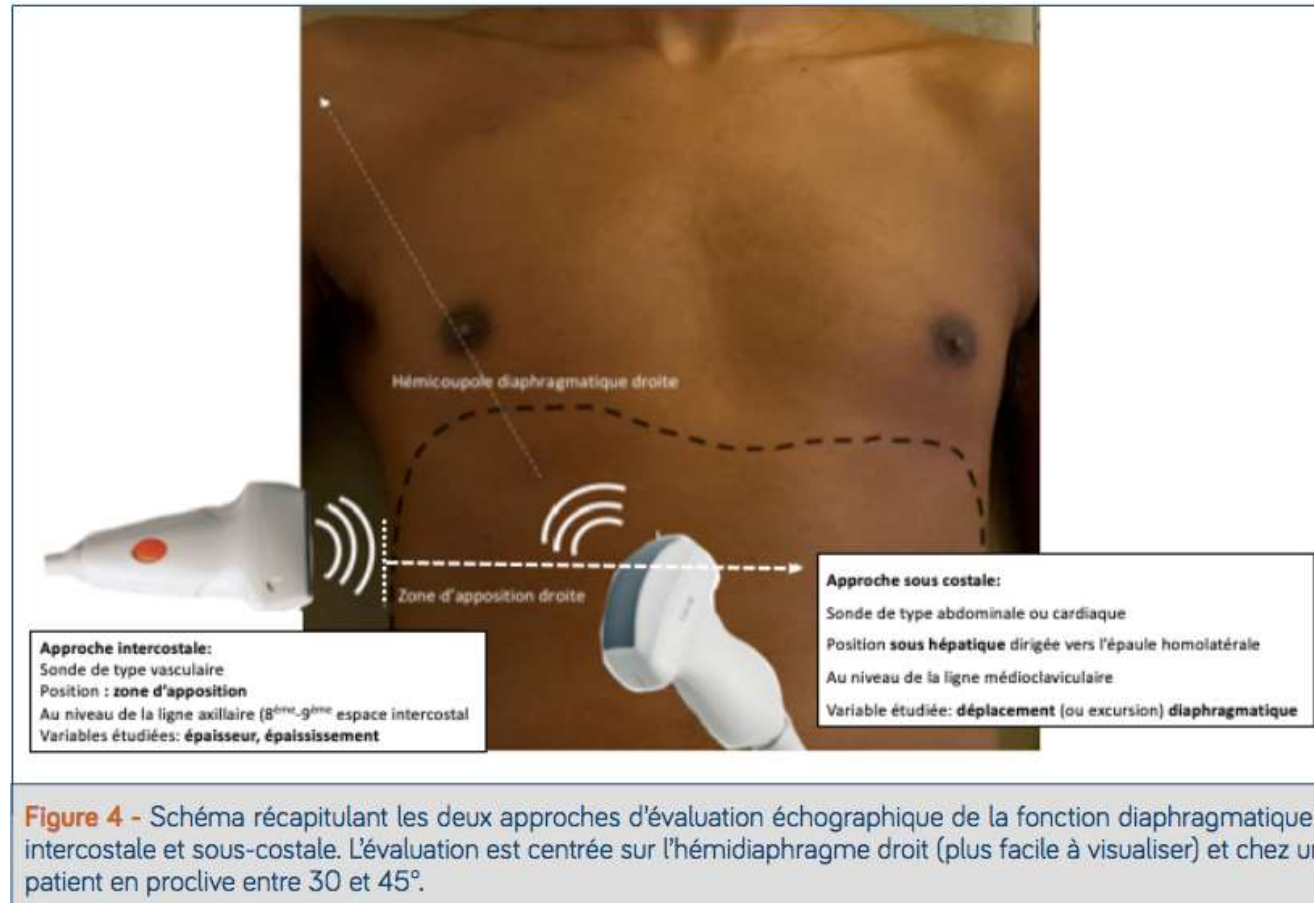


Sevrage très complexe
Patient conscient ou non

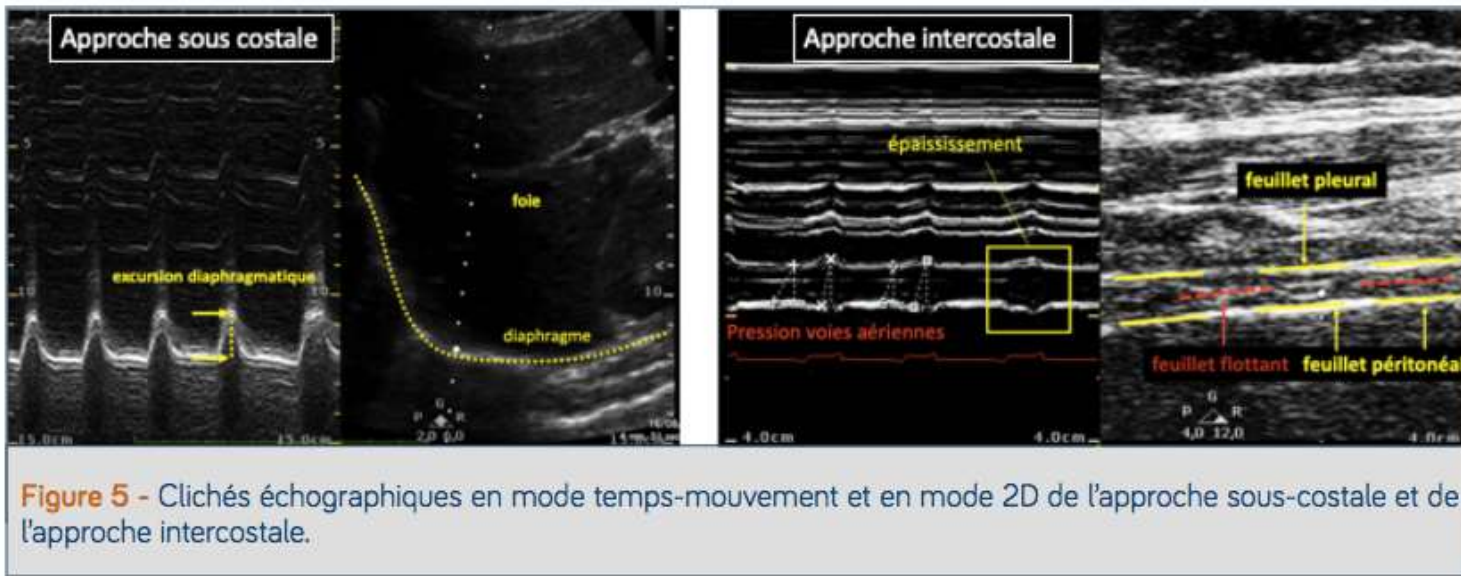


Laveneziana, 2019

Évaluation diaphragme par écho



Fossé, 2019



Épaisseur inspi – Épaisseur expi

Épaisseur expi

- Fraction d'épaississement < 20 % : dysfonction diaphragmatique
- > 25% - 35 % pour un succès de l'extubation

Gottesman, 1997

Goligher , 2018
Dres, 2018

Force de toux

- Cough Peak Flow (CPF) sur respi = CPF externe
- Cut-off CPF : 60 L/min

Ferreira, 2021

Study	Cutoff (L/min)
Smailes et al. ^[18]	60.0
Smina et al. ^[18]	60.0
Beuret et al. ^[19]	35.0
Salam et al. ^[20]	60.0
Duan et al. ^[23]	70.0
Su et al. ^[24]	58.5
Duan et al. ^{[25]*}	62.4
Duan et al. ^{[25]†}	49.8
Duan et al. ^[26]	62.4
Kutchak et al. ^[27]	80.0
Bai et al. ^{[28]‡}	56.4
Bai et al. ^{[28]§}	56.0
Gobert et al. ^[29]	60.0
Xiao et al. ^[40]	60.0

AUC - area under the curve. *Voluntary cough; †



Fig. 1. The electronic peak flow meter is connected to the proximal tip of the endotracheal tube via a bacterial/viral filter.

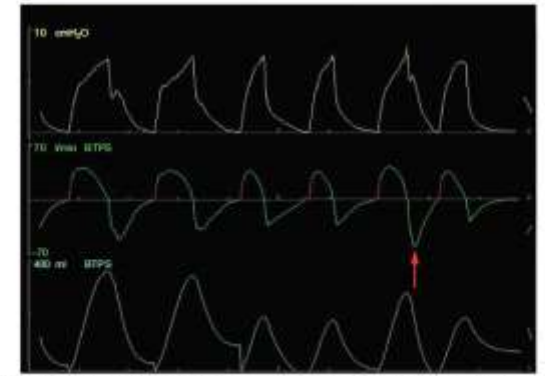
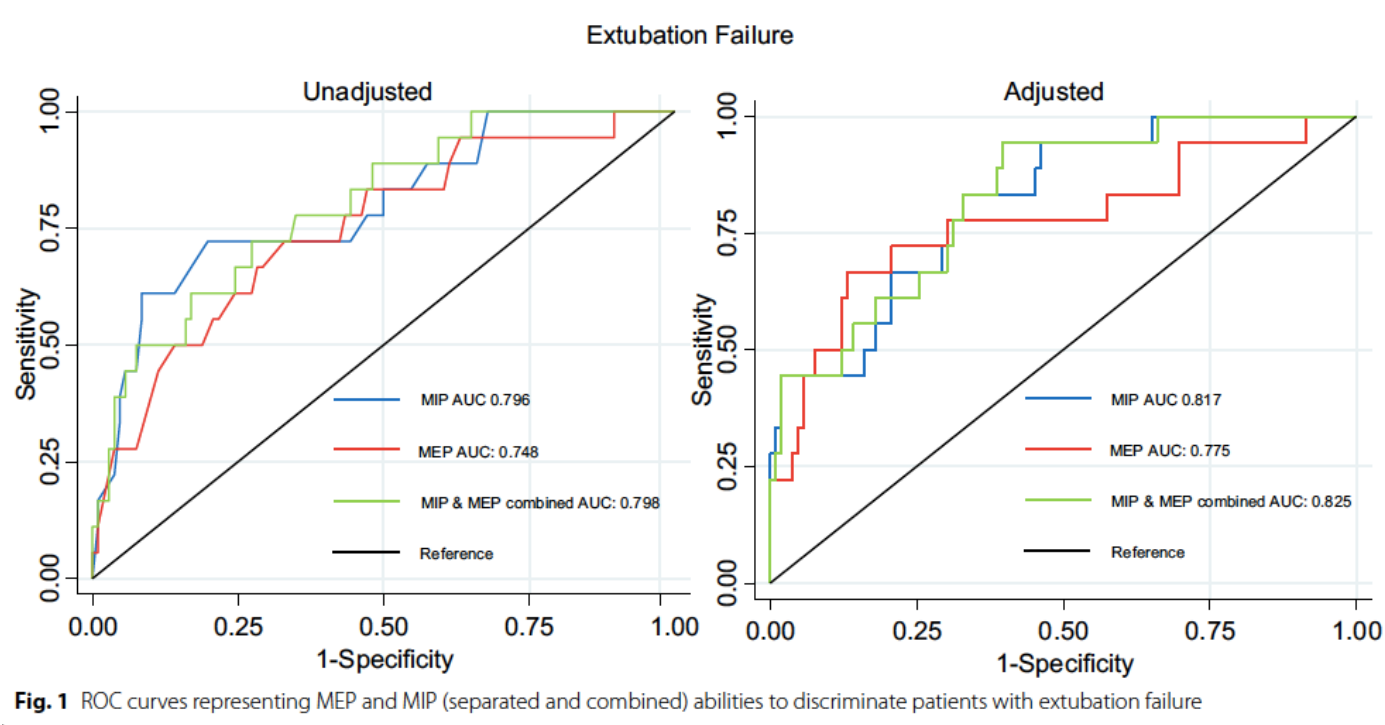


Fig. 2. On this ventilator screen, the central curve displays the inspiratory and expiratory flow. The red arrow shows the peak expiratory flow.

Fossat, 2023

Combret, 2021



- Étude observationnelle
- Mesure de MEP, MIP
- Après test de sevrage réussi avant extubation
- Corrélation entre MEP et échec extubation

Table 3 Univariate analyses

Parameters	No NIV or mechanical cough assistance after extubation (<i>n</i> = 81) Mean ± SD or <i>n</i> (%)	NIV or mechanical cough assistance after extubation			<i>P</i> value*
		All patients (<i>n</i> = 44) Mean ± SD or <i>n</i> (%)	Patients who required NIV (<i>n</i> = 36) Mean ± SD or <i>n</i> (%)	Patients who required Mechanical cough assistance (<i>n</i> = 8) Mean ± SD or <i>n</i> (%)	
FVC (mL) before extubation	1571 ± 520	1146 ± 457	1121 ± 464	1257 ± 439	0.00002
MIP (cmH ₂ O) before extubation	37 ± 15	31 ± 15	32 ± 15	26 ± 12	0.025
MEP (cmH ₂ O) before extubation	53 ± 28	41 ± 24	44 ± 25	30 ± 16	0.021
PEF (L/min) before extubation	80 ± 32	62 ± 30	60 ± 29	71 ± 36	0.004
PCEF (L/min) before extubation	97 ± 36	72 ± 33	71 ± 33	75 ± 36	0.0003
VC (mL) after extubation	1838 ± 637	1364 ± 499	1343 ± 511	1463 ± 464	0.00017
FVC (mL) after extubation	1766 ± 554	1284 ± 433	1284 ± 440	1282 ± 441	0.00003
MIP (cmH ₂ O) after extubation	28 ± 13	23 ± 11	23 ± 11	22 ± 10	0.07
MEP (cmH ₂ O) after extubation	43 ± 22	29 ± 17	31 ± 17	21 ± 12	0.002
PEF (L/min) after extubation	142 ± 77	107 ± 63	109 ± 66	95 ± 47	0.02
PCEF (L/min) after extubation	166 ± 76	107 ± 66	110 ± 72	94 ± 39	0.0001

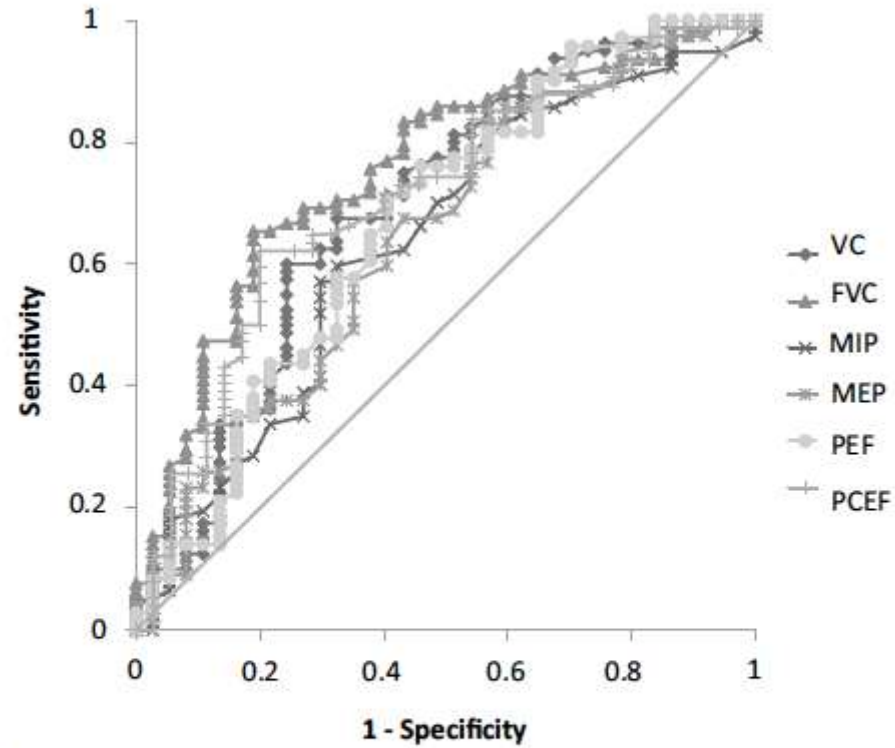


Fig. 2 Receiver operating characteristic (ROC) curves for data recorded before extubation: peak cough expiratory flow (PCEF), peak expiratory flow (PEF), forced vital capacity (FVC), slow VC, and maximal inspiratory (MIP) and expiratory (MEP) mouth pressures. AUC, area under the ROC curve

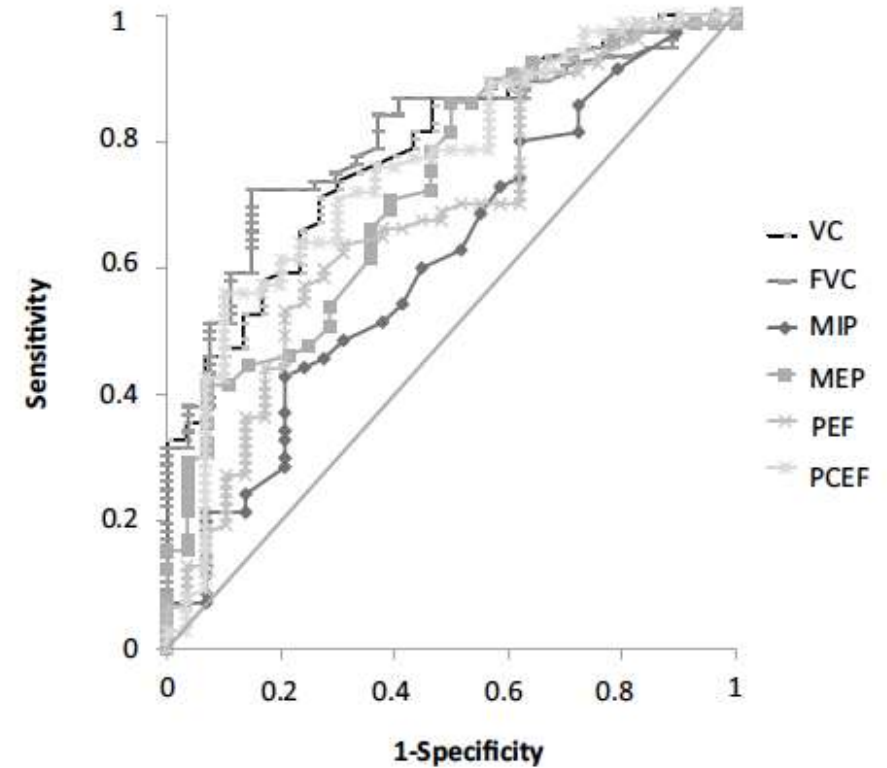


Fig. 3 Receiver operating characteristic (ROC) curves for data recorded after extubation: peak cough expiratory flow (PCEF), peak expiratory flow (PEF), forced vital capacity (FVC), slow VC, and maximal inspiratory (MIP) and expiratory (MEP) mouth pressures AUC, area under the ROC curve

Take-home message

- $p_{0,1} < 2$ ou 4 (BPCO)
- PIM > -30 cm H₂O
- Échographie : Fraction épaissement $> 25-35$ %
- CPF > 60 L/min / 75 L/min
- Toux cliniquement efficace
- CVF < 1420 mL pour recours à la VNI et aide à la toux