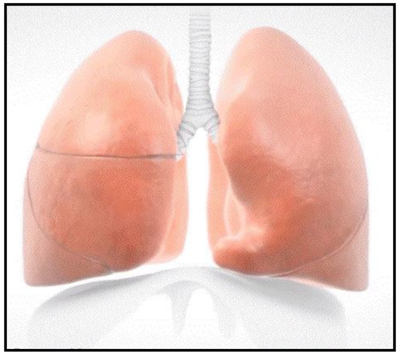
Le SDRA Asymétrique

Pr Hadrien Rozé
Anesthésie Réanimation Thoracique
SAR Sud, Hôpital Haut Leveque, CHU Bordeaux



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Conflits d’interet

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Grant for Research, Fees for Travel and Lectures

THE LANCET
Respiratory Medicine

ARTICLES | VOLUME 2, ISSUE 8, P611-620, AUGUST 01, 2014

Subphenotypes in acute respiratory distress syndrome: latent class analysis of data from two randomised controlled trials

Dr Carolyn S Calfee, MD • Prof Kevin Delucchi, PhD • Prof Polly E Parsons, MD • Prof B Taylor Thompson, MD • Prof Lorraine B Ware, MD • Prof Michael A Matthay, MD et al. Show all authors

Published: May 19, 2014 • DOI: https://doi.org/10.1016/S2213-2600(14)70097-9 • Check for updates

ARTICLES | VOLUME 7, ISSUE 10, P870-880, OCTOBER 01, 2019

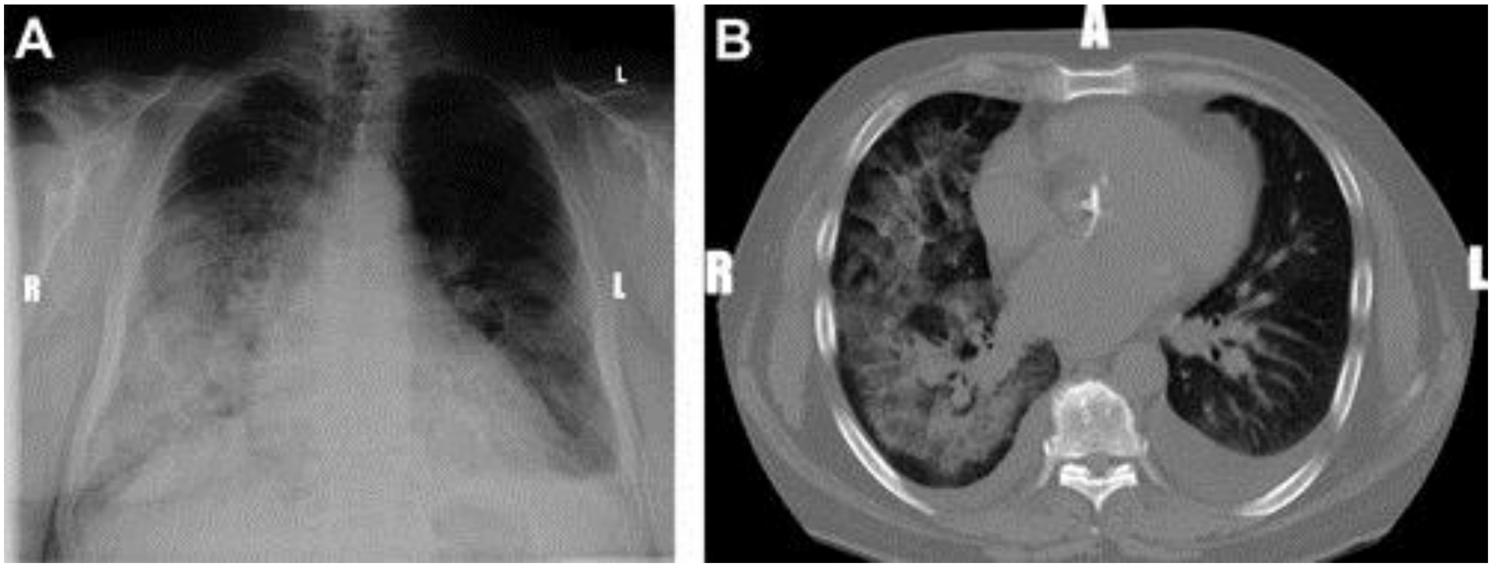
Personalised mechanical ventilation tailored to lung morphology versus low positive end-expiratory pressure for patients with acute respiratory distress syndrome in France (the LIVE study): a multicentre, single-blind, randomised controlled trial

Jean-Michel Constantin, MD • Matthieu Jabaudon, MD • Jean-Yves Lefrant, MD • Samir Jaber, MD • Jean-Pierre Quenot, MD • Olivier Langeron, MD • et al. Show all authors • Show footnotes

Published: August 06, 2019 • DOI: https://doi.org/10.1016/S2213-2600(19)30138-9 • Check for updates

Le SDRA est il symétrique ?

SDRA Asymétrique? Mais bilatéral !



Définition de Berlin

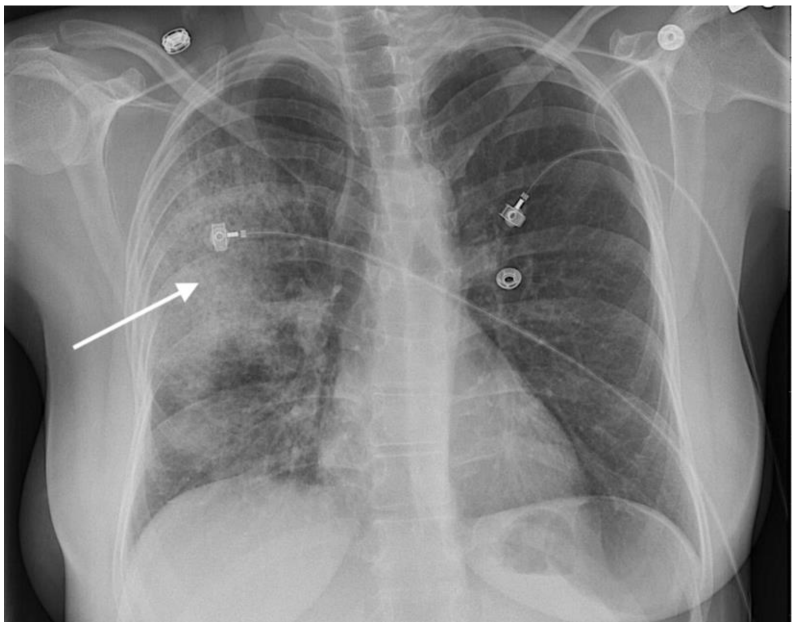
Berlin definition of ARDS (with permission from [22])

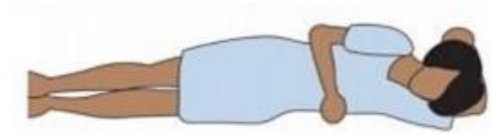
	Acute respiratory distress syndrome		
Timing	Within 1 week of a known clinical insult or new/worsening respiratory symptoms		
Chest imaging[a]	Bilateral opacities—not fully explained by effusions, lobar/lung collapse, or nodules		
Origin of Edema	Respiratory failure not fully explained by cardiac failure or fluid overload; Need objective assessment (e.g., echocardiography) to exclude hydrostatic edema if no risk factor present		
	Mild	Moderate	Severe
Oxygenation[b]	$200 < PaO_2/FiO_2 \leq 300$ with PEEP or CPAP ≥ 5 cmH_2O[c]	$100 < PaO_2/FiO_2 \leq 200$ with PEEP ≥ 5 cmH_2O	$PaO_2/FiO2 \leq 100$ with PEEP ≥ 5 cmH_2O

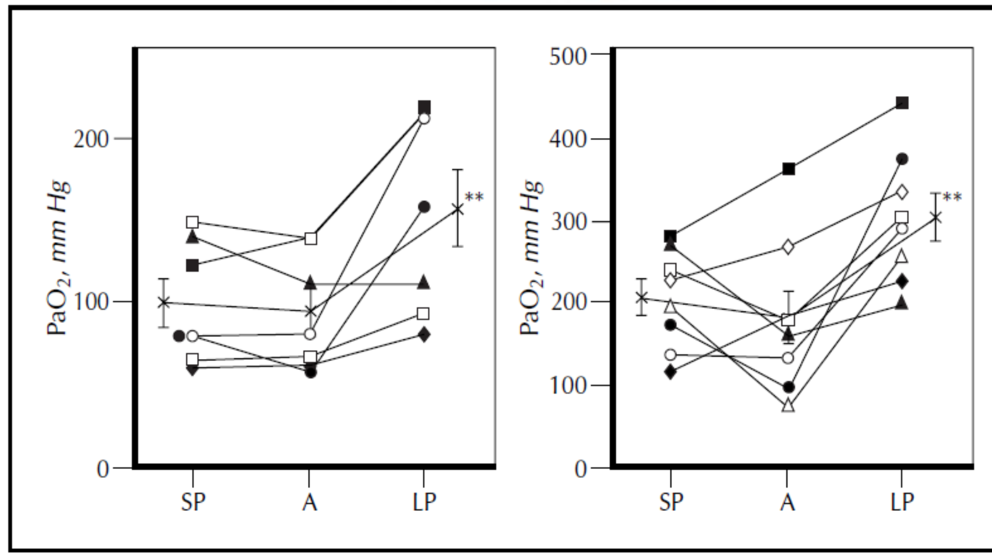
Intensive Care Med (2012) 38:1573–1582

Unilateral lung injury

Lluis Blanch, MD, Josefina López Aguilar, PhD, and Ana Villagrá, MD







Curr Opin Crit Care 9:33–38 © 2003

0090-3493/84/1205-0436$02.00/0
CRITICAL CARE MEDICINE

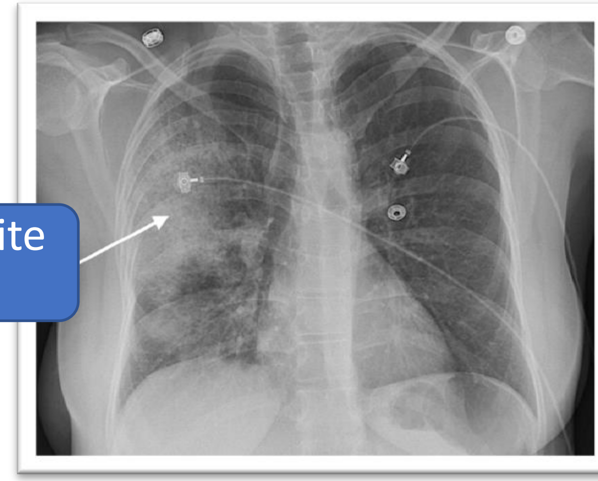
Vol. 12, No. 5
Printed in U.S.A.

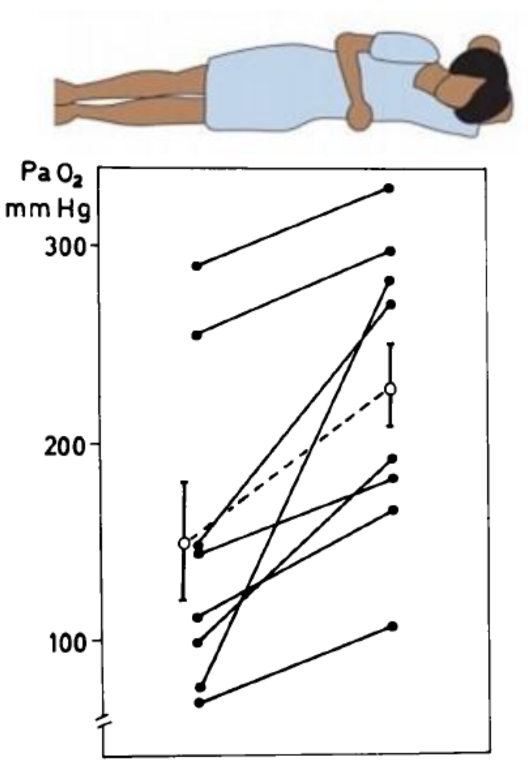
Positional hypoxemia during artificial ventilation

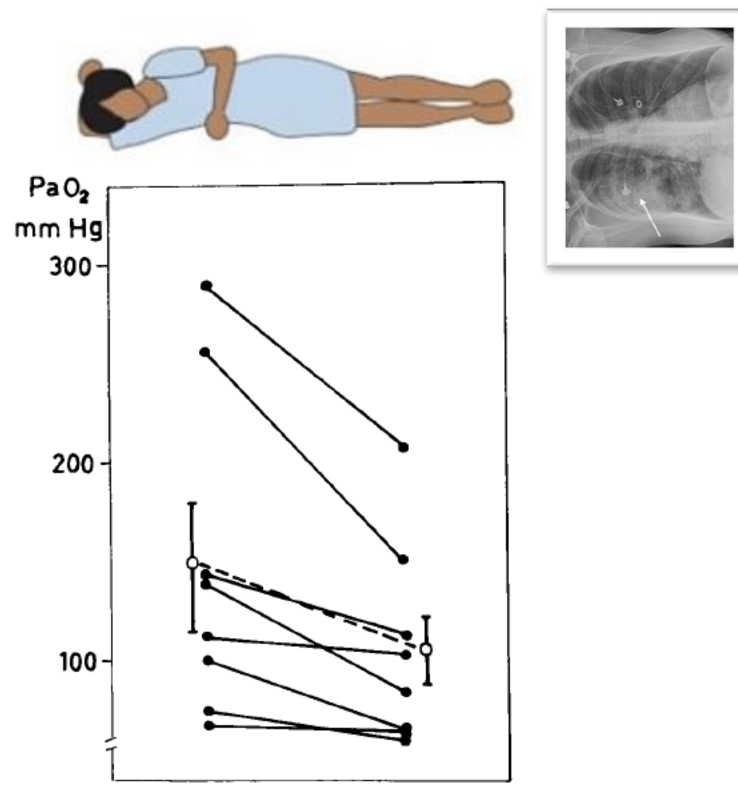
DANIEL RIVARA, MD; HERNAN ARTUCIO, MD; JOSÉ ARCOS, MD; CARLOS HIRIART, MD

CRITICAL CARE MEDICINE MAY, 1984

Pneumonie droite à SARM





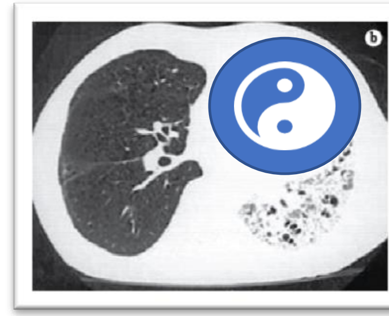


Differential Ventilation in Unilateral Lung Disease: Effects on Respiratory Mechanics and Gas Exchange

Intensive Care Medicine

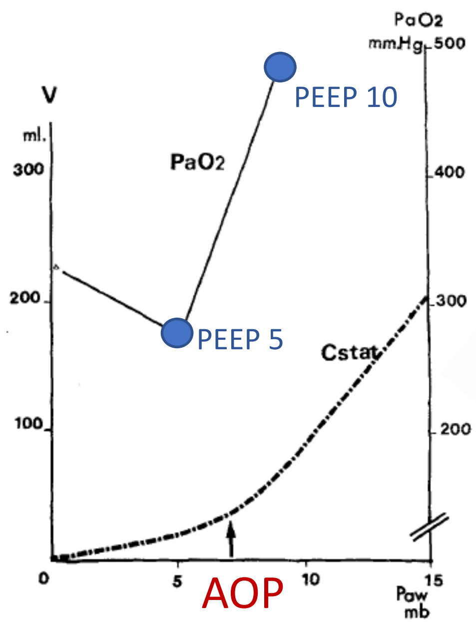
D. Rivara[1] *, J.L. Bourgain [1], P. Rieuf[2], A. Harf [3] and F. Lemaire [1]

[1] Service de Réanimation Médicale (Professeur Rapin), [2] Service de Rééducation Fonctionnelle (Pr. Ag. Hamonnet), [3] Service d'Exploration Fonctionnelle (Pr. D. Laurent), Hôpital Henri Mondor, F-94010 Créteil, France

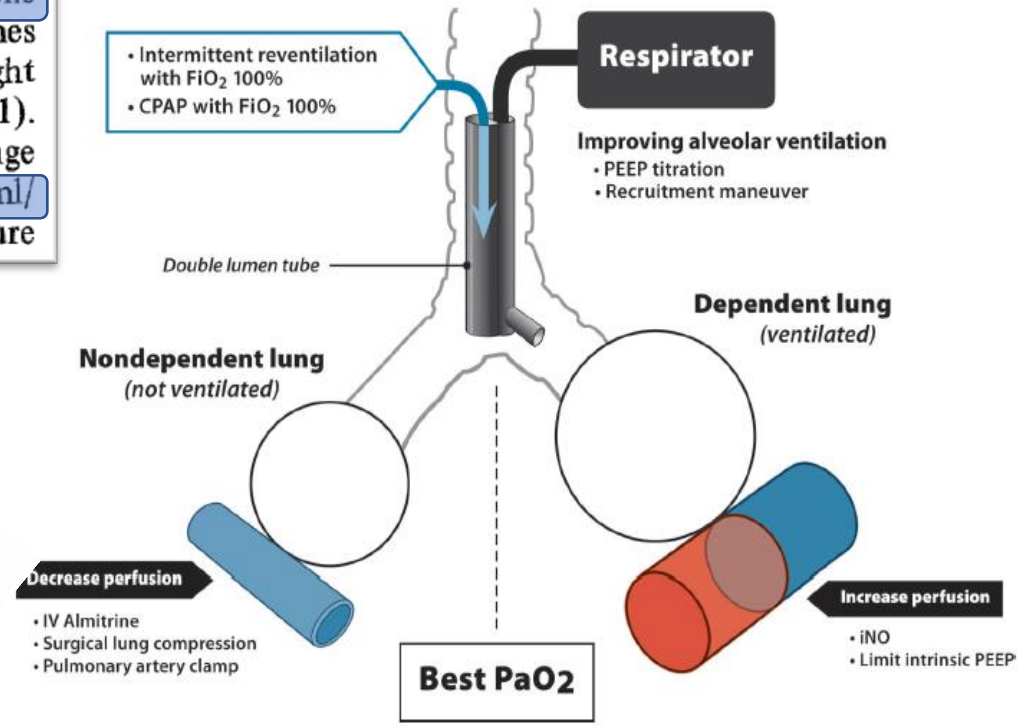


Intens. Care Med. 5, 189-191 (1979)

Even low level PEEP (+ 5) provoked an overdistension of the opposite lung and was ineffective in improving blood gases. Selective ventilation was then applied via a Carlens tube [2]. Initial measurement of separate tidal volumes showed a marked discrepancy between both lungs. Right lung V_T was 250 ml and left lung 800 ml (Table 1). Total static compliance, measured with a two litre syringe [1,7] was 13 ml/ cmH_2O for the right lung and 58 ml/ cm H_2O for the left lung. The static pulmonary pressure



Ventilation unipulmonaire

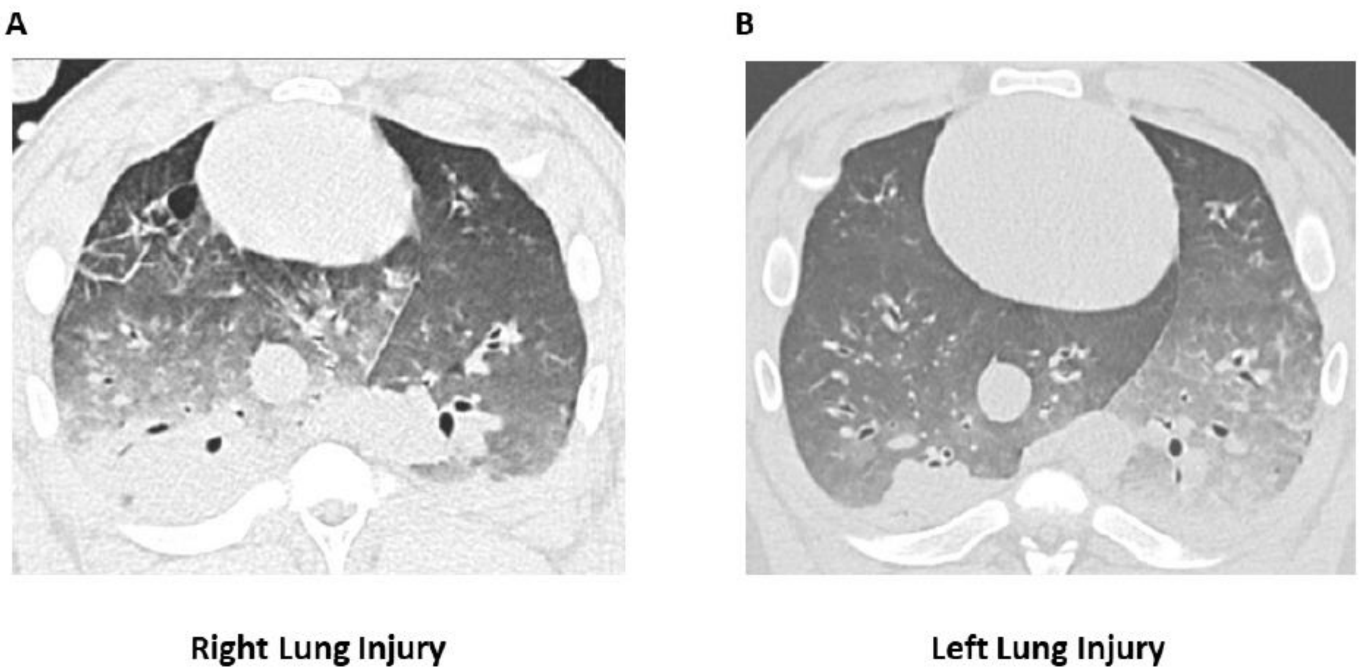


Rozé *et al.* Anesthesiology 2011; 114:167-74

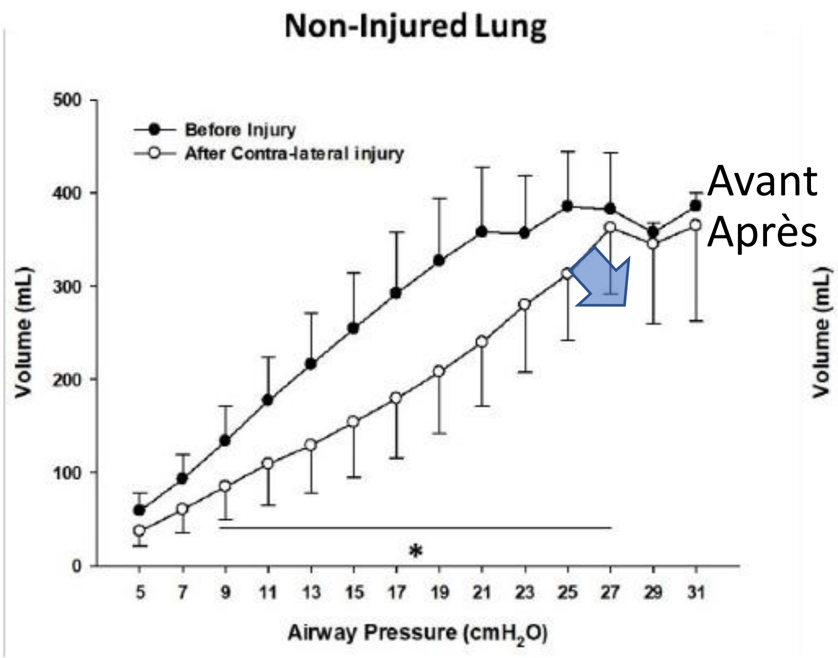
ORIGINAL ARTICLE

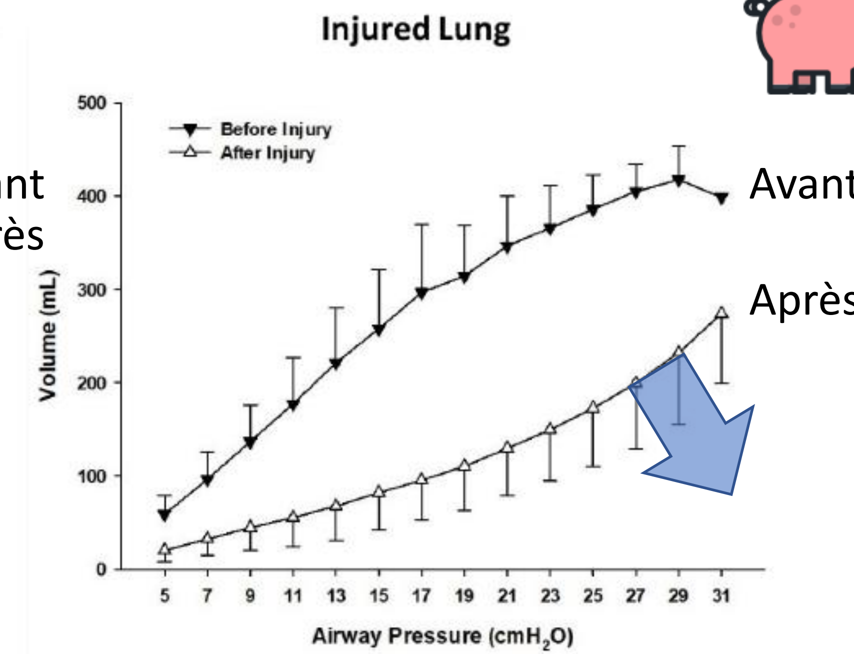
Role of Positive End-Expiratory Pressure and Regional Transpulmonary Pressure in Asymmetrical Lung Injury

Luca Bastia[1,2], Doreen Engelberts[1], Kohei Osada[1], Bhushan H. Katira[1,3,4,5], L. Felipe Damiani[1,6], Takeshi Yoshida[7], Lu Chen[4,8], Niall D. Ferguson[4,9], Marcelo B. P. Amato[10], Martin Post[1,5], Brian P. Kavanagh[1,4,5,11,12†], and Laurent Brochard[4,8*]

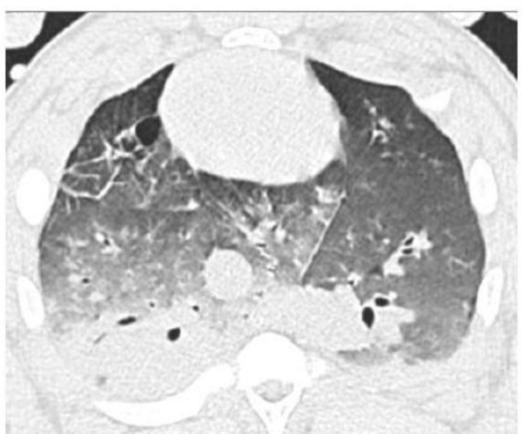


Am J Respir Crit Care Med Vol 203, Iss 8, pp 969–976, Apr 15, 2021



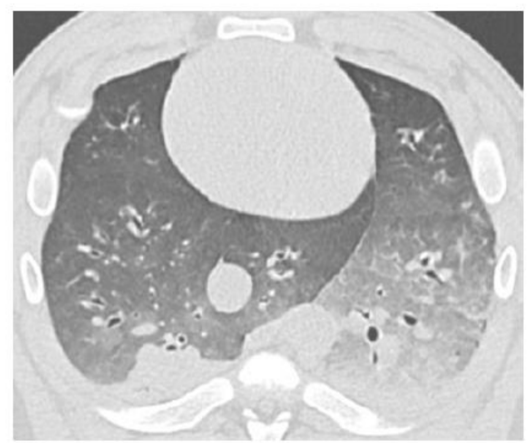


A



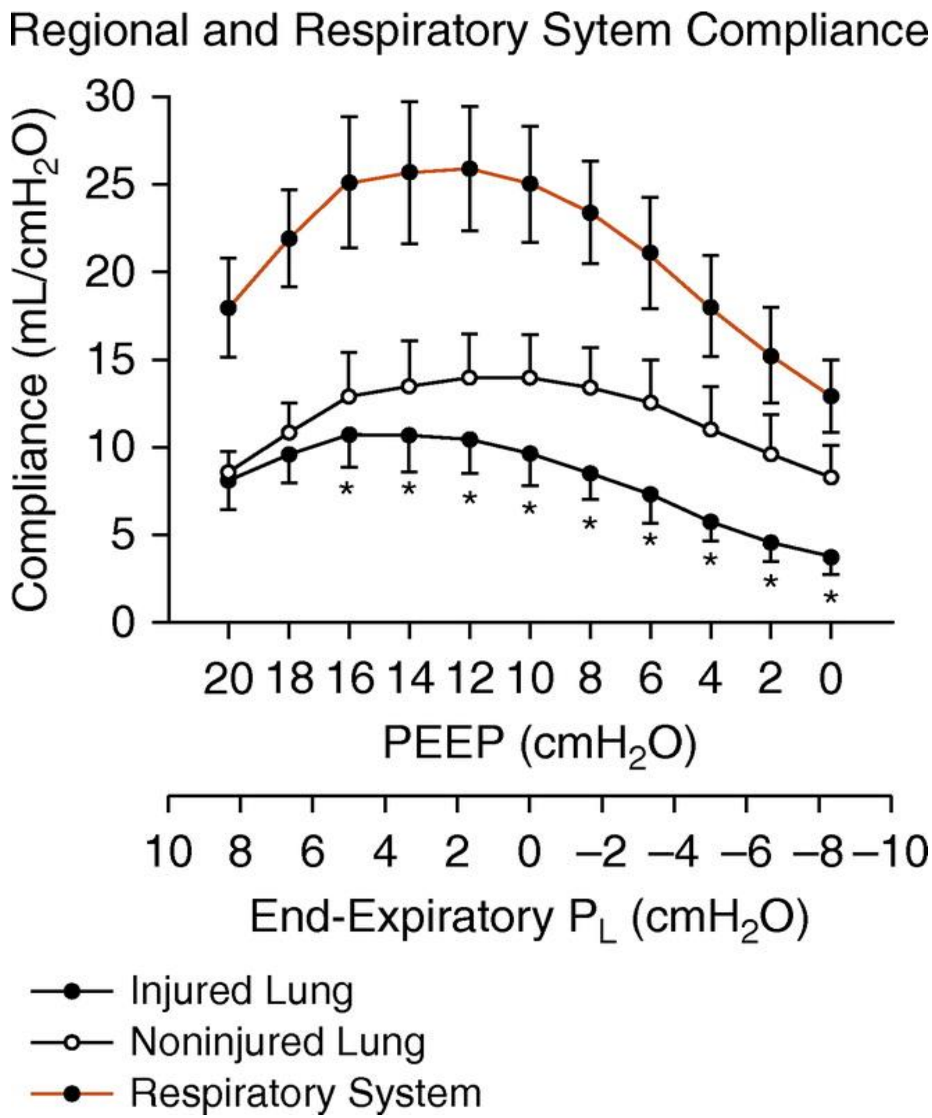
Right Lung Injury

B



Left Lung Injury

Am J Respir Crit Care Med Vol 203, Iss 8, pp 969–976, Apr 15, 2021



Am J Respir Crit Care Med, 2021
Luca Bastia et al

ORIGINAL ARTICLE

Role of Positive End-Expiratory Pressure and Regional Transpulmonary Pressure in Asymmetrical Lung Injury

Luca Bastia[1,2], Doreen Engelberts[1], Kohei Osada[1], Bhushan H. Katira[1,3,4,5], L. Felipe Damiani[1,6], Takeshi Yoshida[7], Lu Chen[4,8], Niall D. Ferguson[4,9], Marcelo B. P. Amato[10], Martin Post[1,5], Brian P. Kavanagh[1,4,5,11,12†], and Laurent Brochard[4,8*]

- La PEEP est necessaire pour redistribuer le VT
- La titration de la PEEP avec :
  - La pression mortice trans-pulmonaire optimale
  - Ou la pression transpulmonaire de fin d’expiration= 0

SDRA Asymétrique définition

- Asymétrie à l'auscultation
- Asymétrie sur la radio pulmonaire
- Asymétrie au scanner thoracique
- Asymétrie en échographie pulmonaire (LUS)
- Asymétrie à l'IRM thoracique
- Asymétrie en scintigraphie de ventilation
- Asymétrie en mécanique respiratoire

PERGAMON

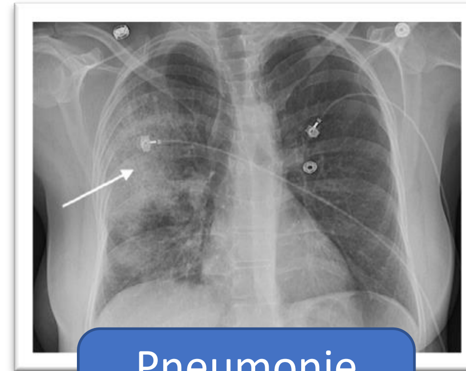
International Journal of Nursing Studies 39 (2002) 549–555

INTERNATIONAL JOURNAL OF NURSING STUDIES

www.elsevier.com/locate/ijnurstu

A randomized trial on the effects of body positions on lung function with acute respiratory failure patients

Myung J. Kim[a], Hee J. Hwang[a], Hae H. Song[b,*]



Pneumonie droite à SARM

Score radiologique entre **0% and 100%** évaluations des surfaces sur la RP.

Ils trouvent **62 %** des patient en détresse respiratoire avec une atteinte **unilaterale**

[Original Research **Chest Infections**]

CHEST

Community-Acquired Pneumonia Visualized on CT Scans but Not Chest Radiographs

Pathogens, Severity, and Clinical Outcomes

Cameron P. Upchurch, MD; Carlos G. Grijalva, MD, MPH; Richard G. Wunderink, MD, FCCP; Derek J. Williams, MD, MPH; Grant W. Waterer, MBBS, PhD; Evan J. Anderson, MD; Yuwei Zhu, MD; Eric M. Hart, MD; Frank Carroll, MD; Anna M. Bramley, MPH; Seema Jain, MD; Kathryn M. Edwards, MD; and Wesley H. Self, MD, MPH

PODCAST

CHEST 2018; 153(3):601-610

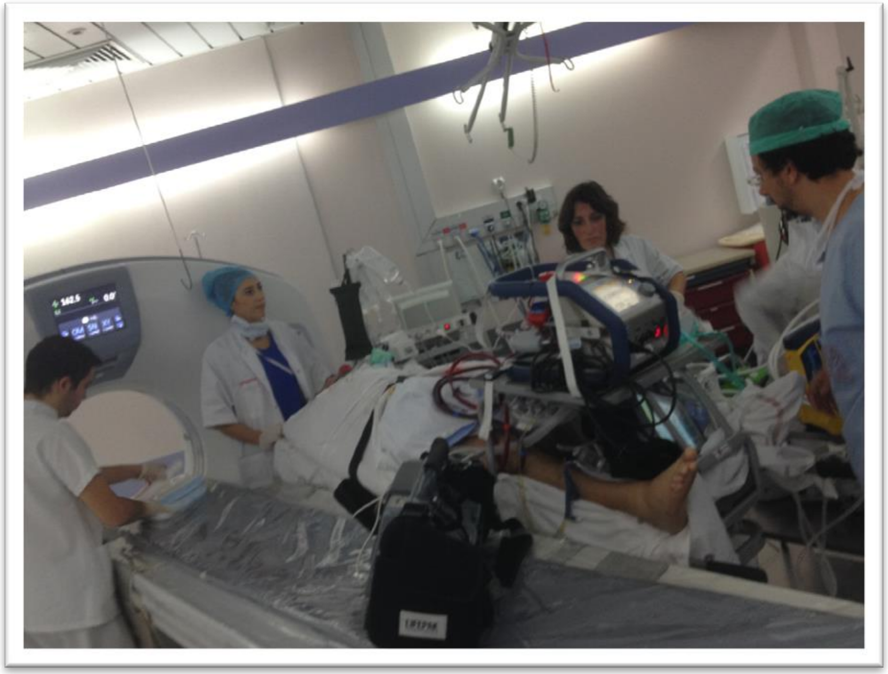
Ils trouvent **9 %** de lésions de pneumonie uniquement au scanner

Am J Emerg Med. 2013 August ; 31(8): 1268–1273. doi:10.1016/j.ajem.2013.04.021.

What is the clinical significance of chest computed tomography when the chest x-ray is normal in blunt trauma patients?

Bory Kea, MD,
Department of Emergency Medicine, UCSF School of Medicine, San Francisco General Hospital, San Francisco, CA borykea@gmail.com

Ils trouvent **20 %** de lésions de contusion en plus au scanner

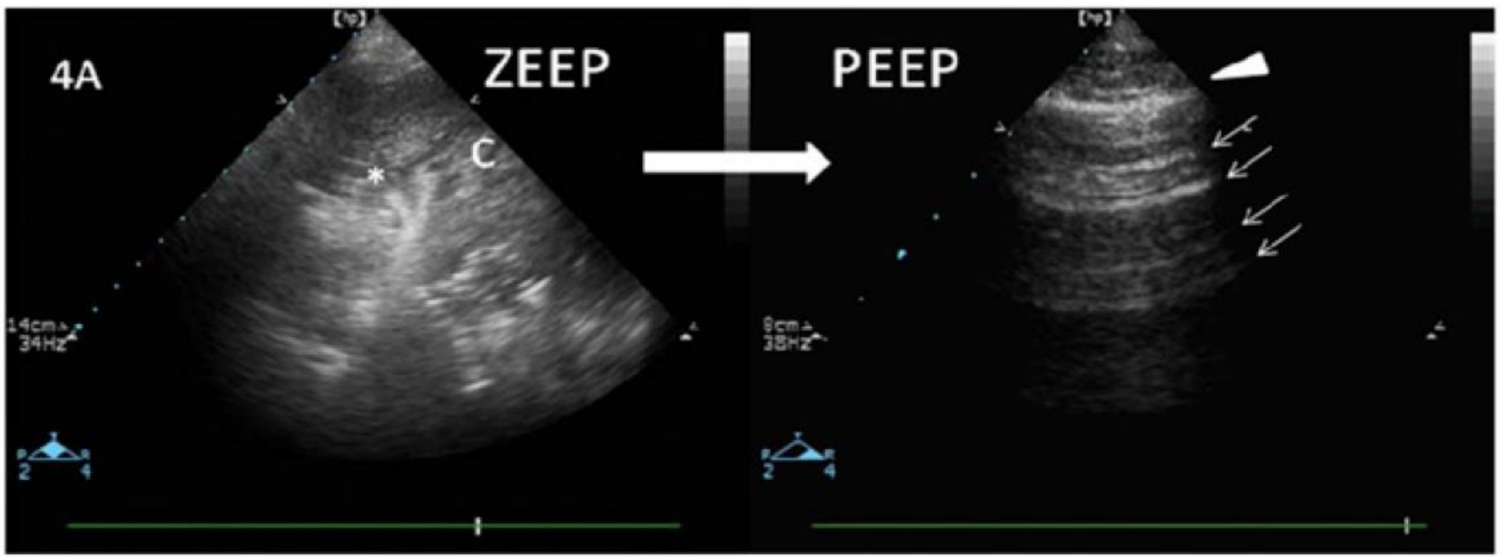


Bedside Ultrasound Assessment of Positive End-Expiratory Pressure–induced Lung Recruitment

Belaïd Bouhemad[1], Hélène Brisson[1], Morgan Le-Guen[1], Charlotte Arbelot[1], Qin Lu[1], and Jean-Jacques Rouby[1]

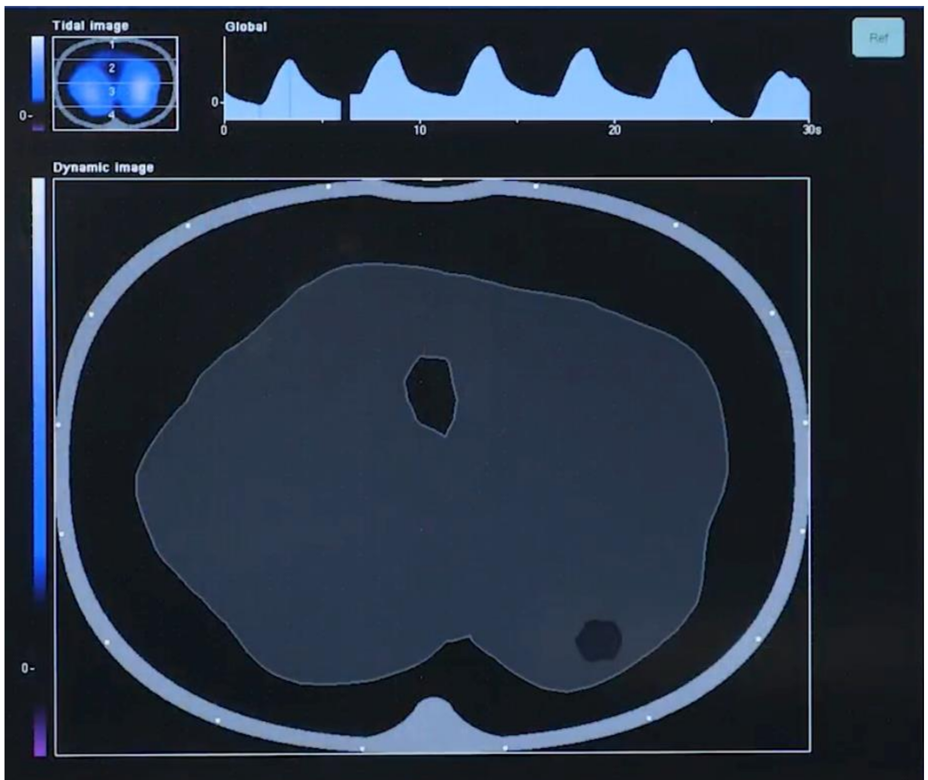
[1]Multidisciplinary Intensive Care Unit Pierre Viars, Assistance Publique Hôpitaux de Paris, UPMC (Université Pierre et Marie Curie) Paris-6, Department of Anesthesiology and Critical Care Medicine, La Pitié-Salpêtrière Hospital, Paris, France

Am J Respir Crit Care Med Vol 183. pp 341–347, 2011



Chest electrical impedance tomography examination, data analysis, terminology, clinical use and recommendations: consensus statement of the TRanslational EIT developmeNt stuDy group

Inéz Frerichs,[1] Marcelo B P Amato,[2] Anton H van Kaam,[3] David G Tingay,[4] Zhanqi Zhao,[5] Bartłomiej Grychtol,[6] Marc Bodenstein,[7] Hervé Gagnon,[8] Stephan H Böhm,[9] Eckhard Teschner,[10] Ola Stenqvist,[11] Tommaso Mauri,[12] Vinicius Torsani,[2] Luigi Camporota,[13] Andreas Schibler,[14] Gerhard K Wolf,[15] Diederik Gommers,[16] Steffen Leonhardt,[17] Andy Adler,[8] TREND study group



Thorax 2017;**72**:83–93.

SDRA Asymétrique etiologies

Lung (2021) 199:29–35
https://doi.org/10.1007/s00408-020-00417-3

LUNG TRANSPLANTATION

Check for updates

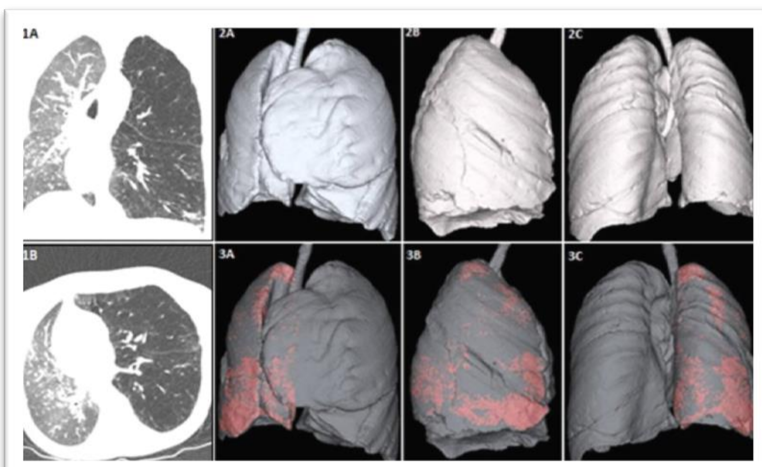
Utilization of Quantitative Computed Tomography Assessment to Identify Bronchiolitis Obliterans Syndrome After Single Lung Transplantation

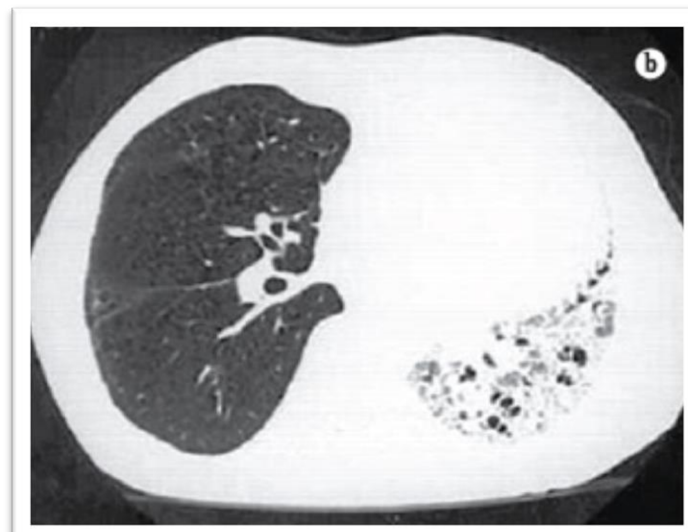
Douglas Zaione Nascimento[1] · Guilherme Watte[2] · Felipe Soares Torres[3] · Sadi Marcelo Schio[1] · Leticia Sanchez[1] · Jackeline Larissa Mendes de Sousa[1] · Fabiola Adelia Perin[1] · Nupur Verma[4] · Tan-Lucien H. Mohammed[4] · Bruno Hochhegger[2]

Computed tomography findings of postoperative complications in lung transplantation*, **

Achados tomográficos nas complicações pós-operatórias do transplante pulmonar

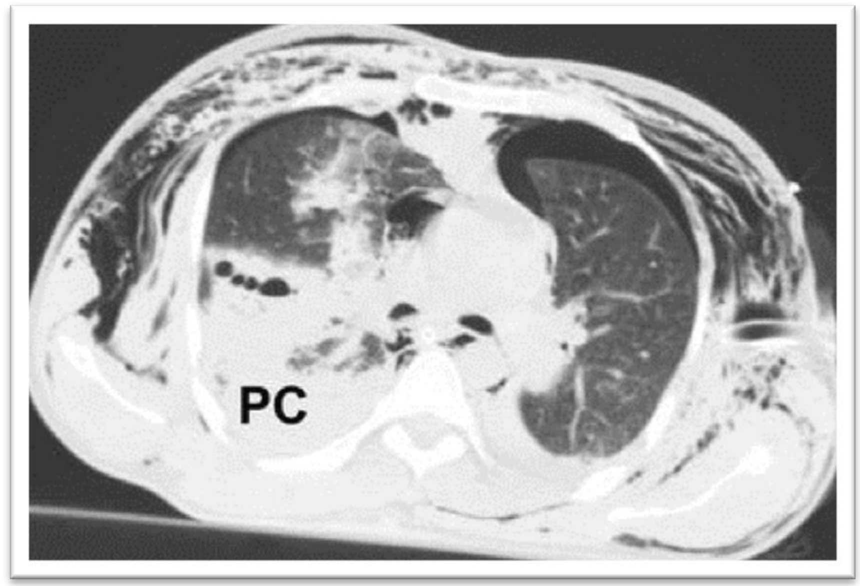
Bruno Hochhegger, Klaus Loureiro Irion, Edson Marchiori, Rodrigo Bello, José Moreira, José Jesus Camargo

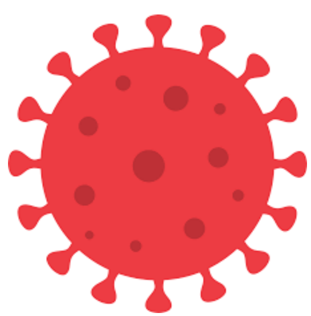




Chirurgie pulmonaire et transplantation unipulmonaire

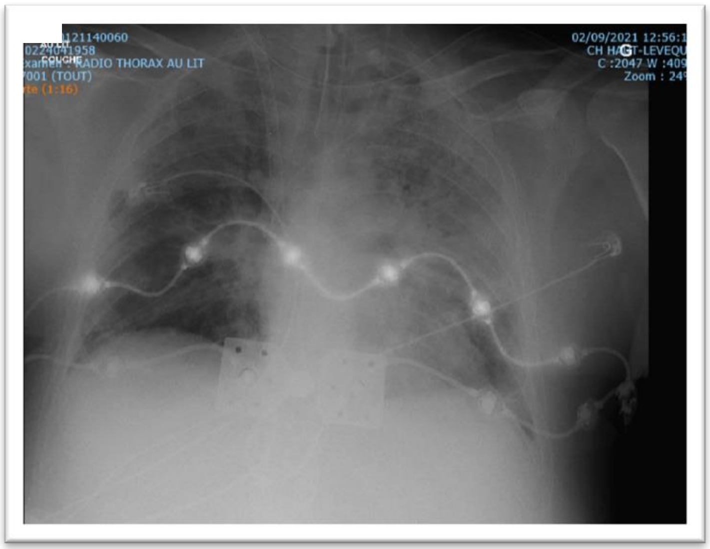
SDRA Asymétrique etiologies



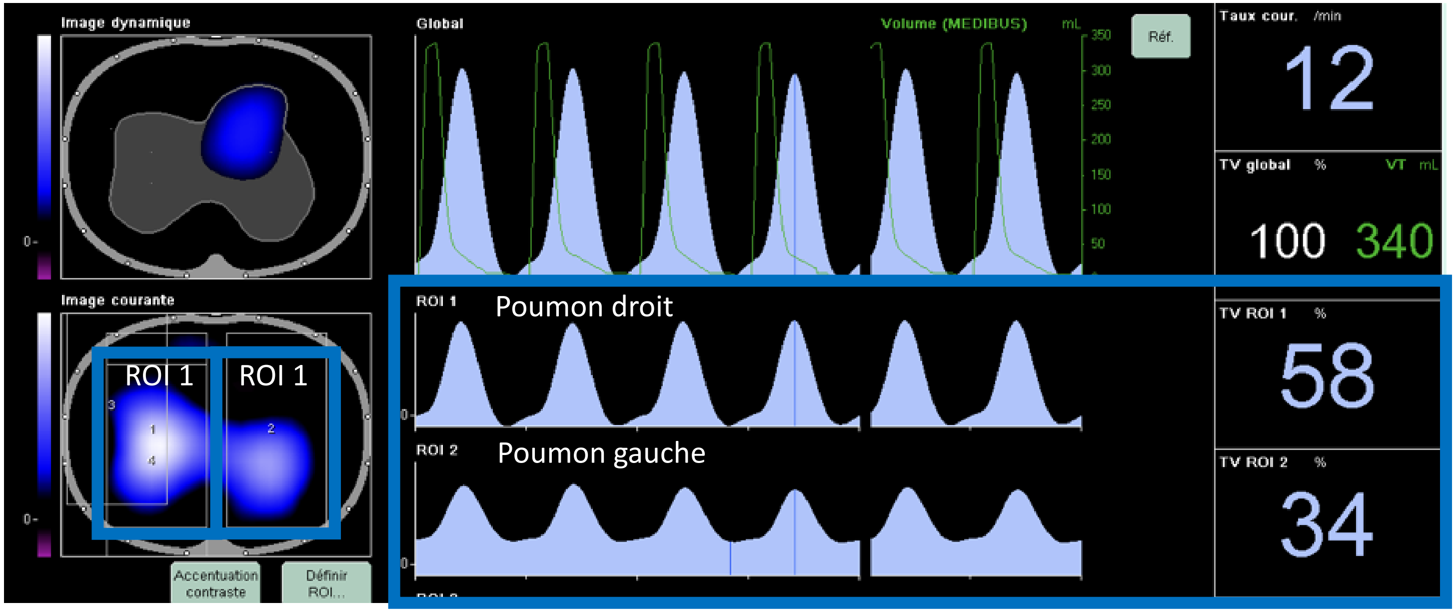


SDRA Asymétrique implications

- Si **SDRA asymétrique**
  - Evaluer la mécanique respiratoire séparément
    - Ventilation unipulmonaire
    - EIT couplée au ventilateur



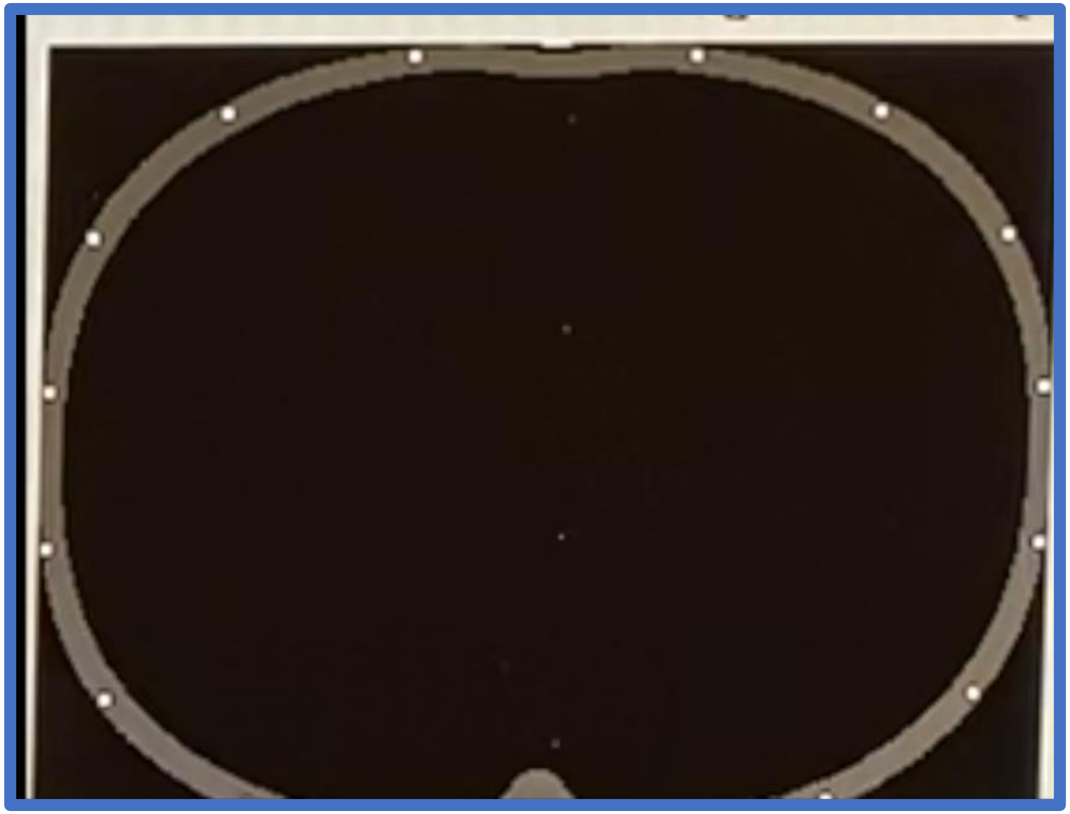
SDRA % ventilation EIT (D vs G)



Différence de ventilation droite - gauche > 20%

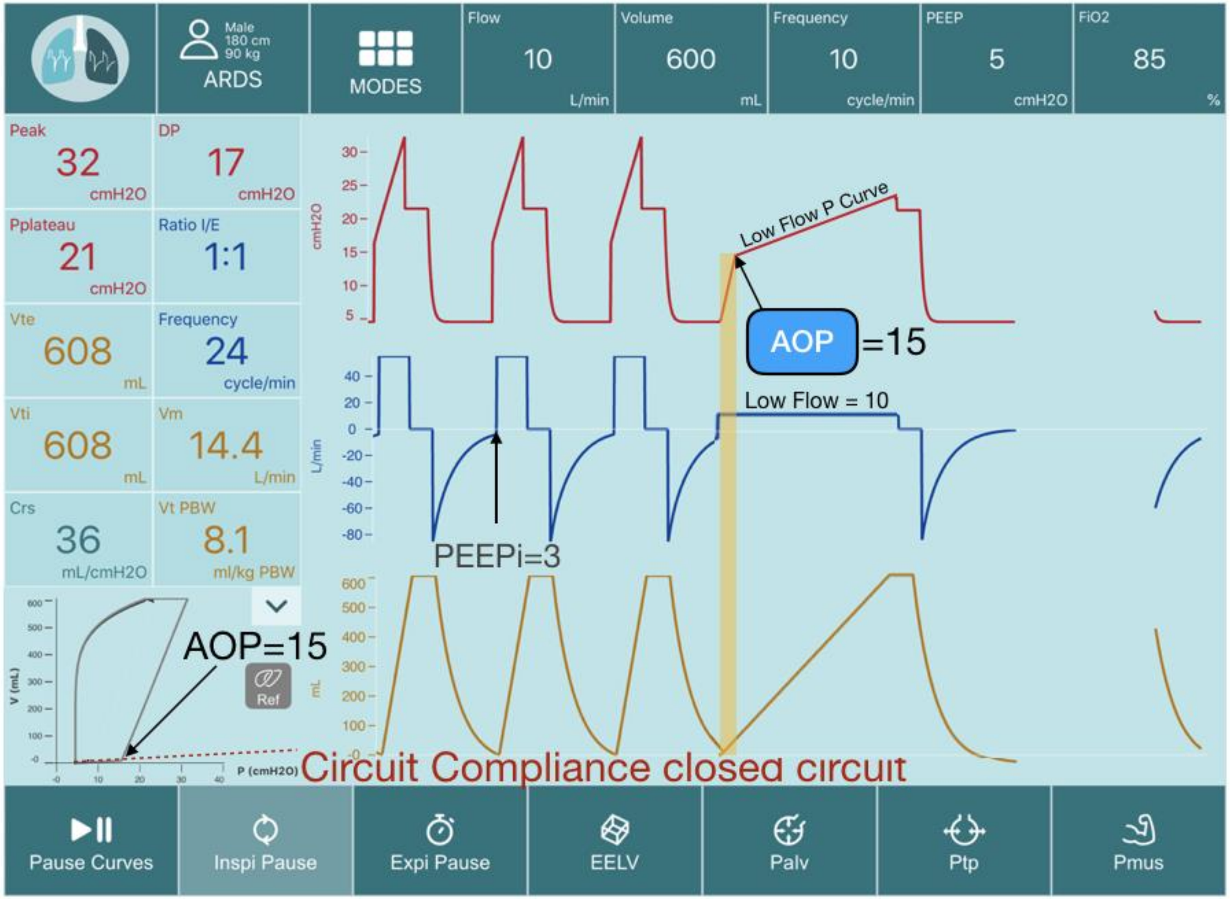
Rozé H, et al. Am J Respir Crit Care Med. 2021

SDRA asymetrie de ventilation EIT



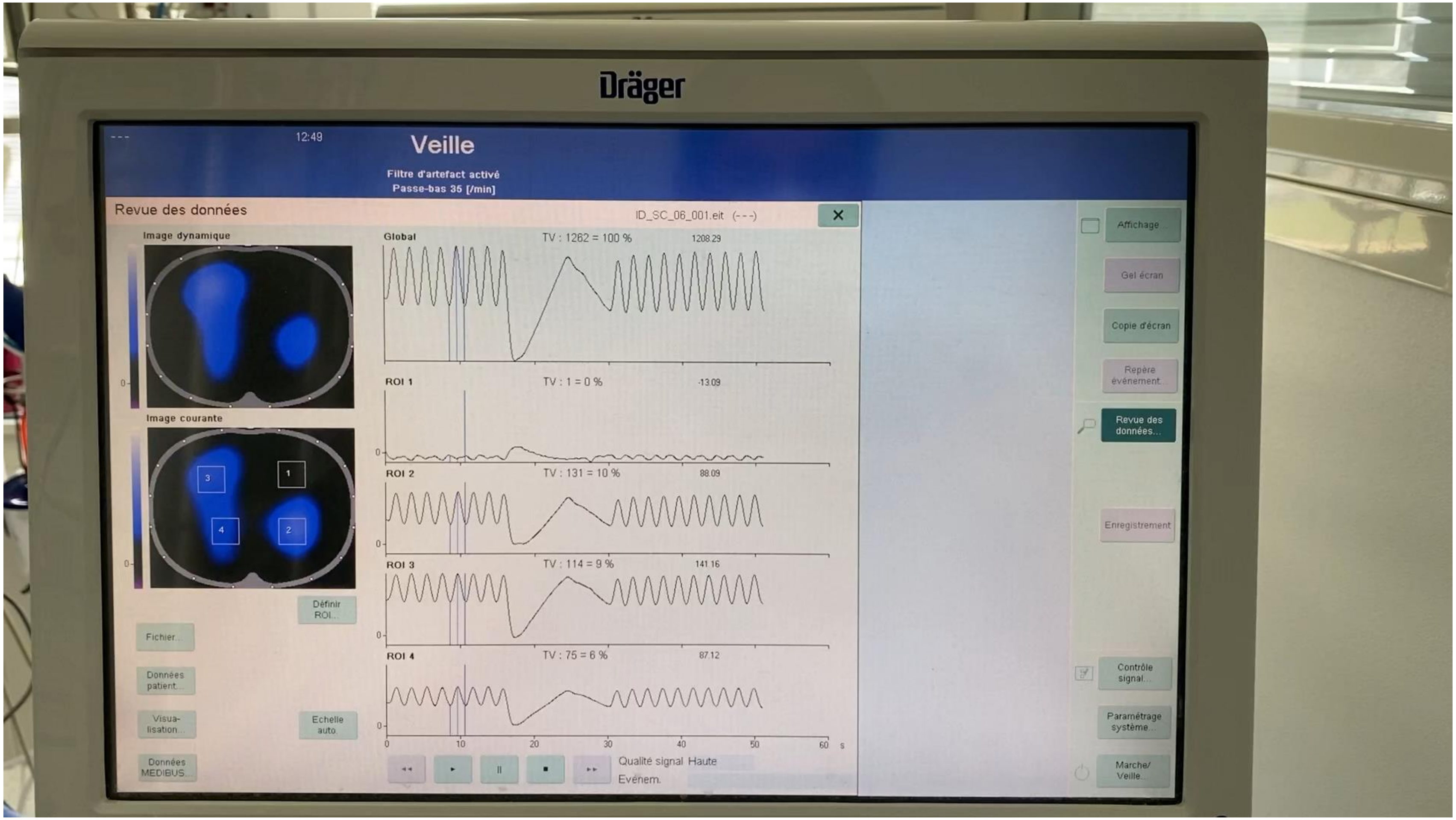
Asymétrie et Airway closure

Courbe PV débit lent en ZEEP



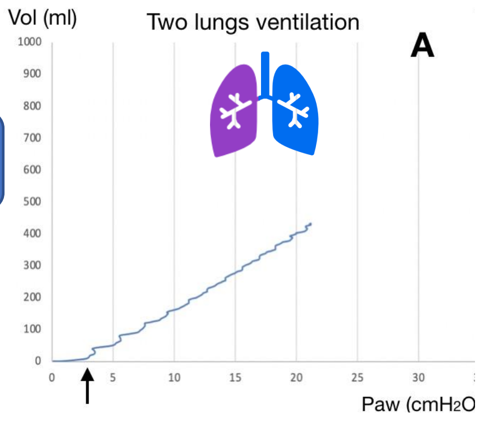
En VAC $Paw_{(t)} = PEEP_{tot} + \cancel{Q} \times R + V_{T\,(t)} / C_{rs}$

Courbe PV débit lent en ZEEP



SDRA airway closure EIT (D vs G)

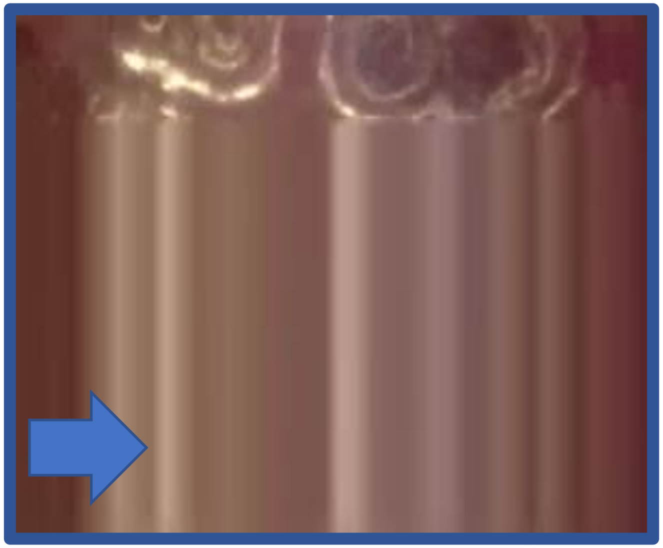
Spiro

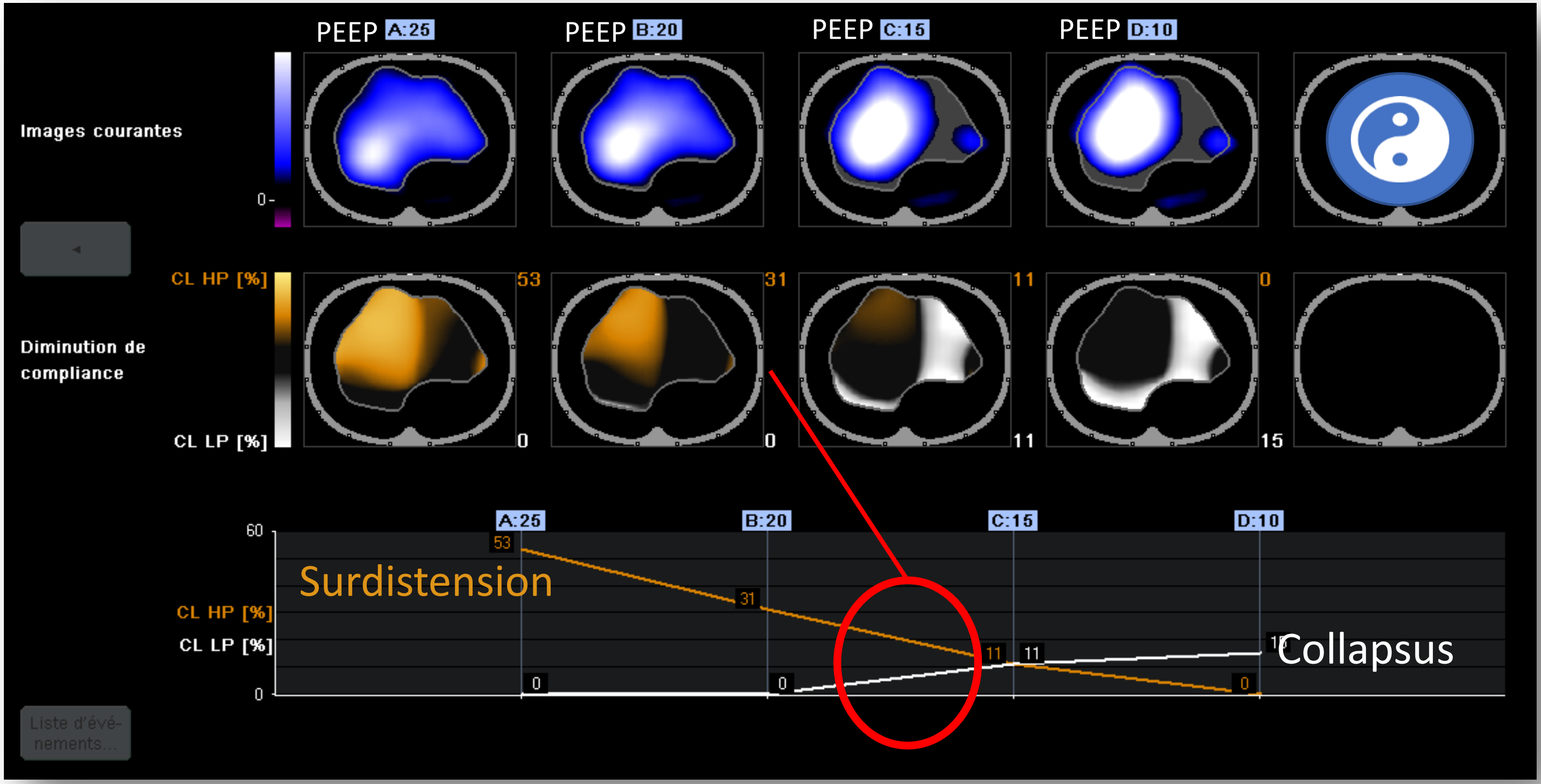


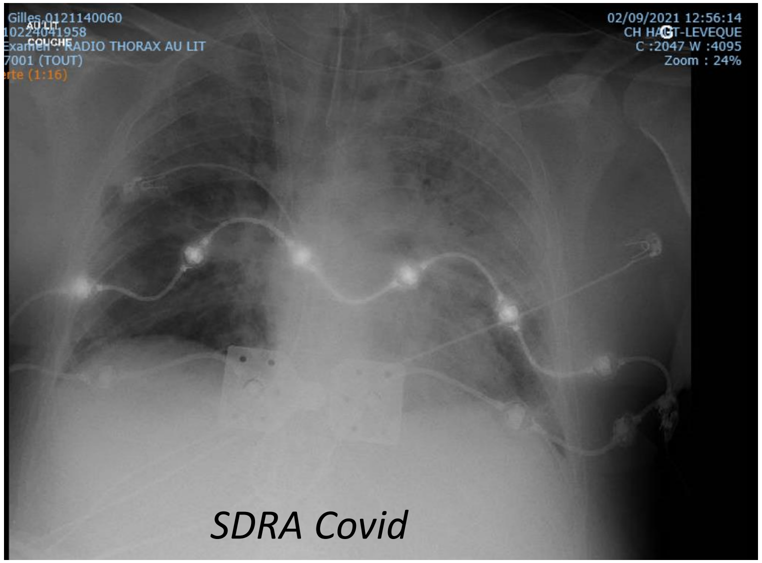
EIT

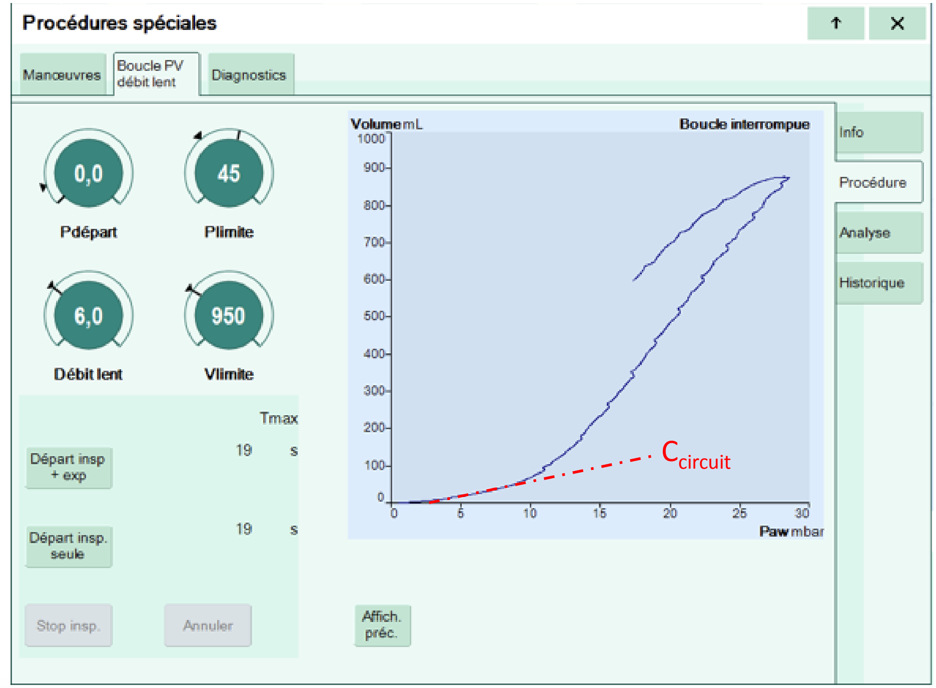
Rozé H, et al. Am J Respir Crit Care Med. 2021

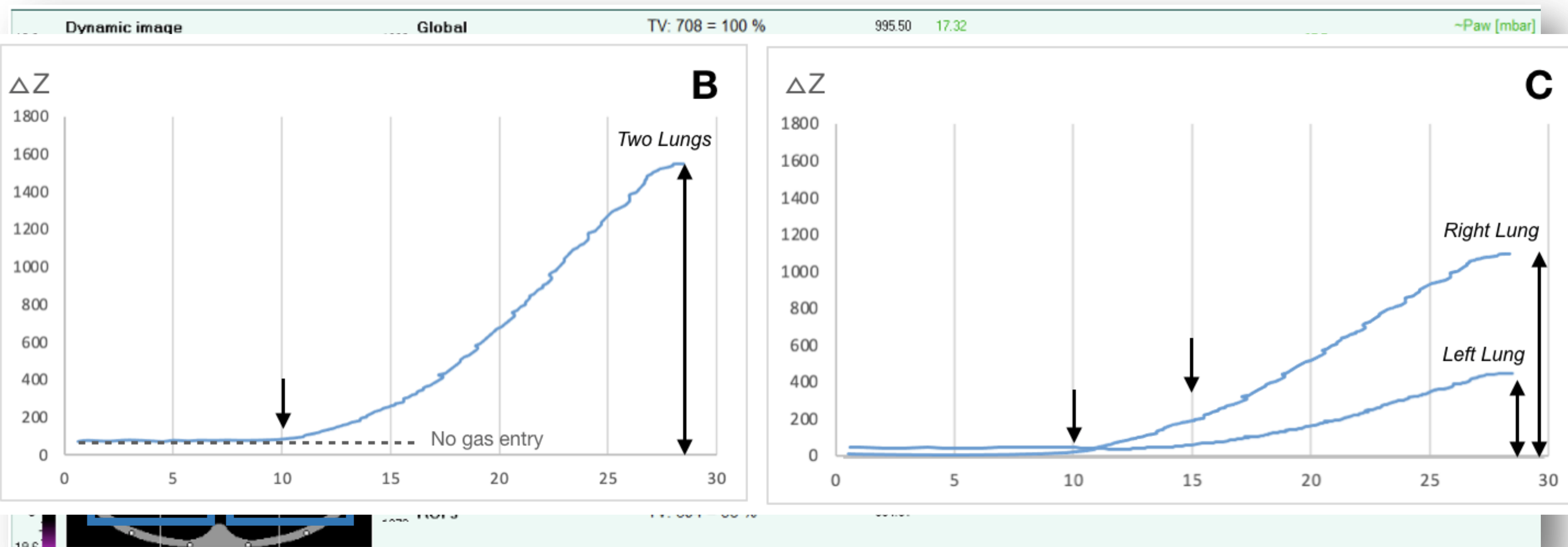
Réglages




PEEP A:25
PEEP B:20
PEEP C:15
PEEP D:10
Images courantes
Diminution de compliance
CL HP [%]
CL LP [%]
53
31
11
0
0
0
11
15
60
A:25
B:20
C:15
D:10
Surdistension
Collapsus
Liste d'évé-nements...


02/09/2021 12:56:14
Zoom : 24%
SDRA Covid


Procédures spéciales
Manœuvres
Boucle PV débit lent
Diagnostics
0,0
Pdépart
45
Plimite
6,0
Débit lent
950
Vlimite
Tmax
Départ insp + exp
19 s
Départ insp. seule
19 s
Stop insp.
Annuler
Affich. préc.
Volume mL
Boucle interrompue
Paw mbar
$C_{circuit}$
Info
Procédure
Analyse
Historique


Dynamic image
Global
TV: 708 = 100 %
995.50
17.32
~Paw [mbar]
△Z
B
Two Lungs
No gas entry
△Z
C
Right Lung
Left Lung

	Age (*yr*)	BMI (*kg/m²*)	Cause of ARDS	SOFA	F_{IO_2} (%)	Pa_{O_2}/F_{IO_2} $PEEP_{baseline}$	Pa_{O_2}/F_{IO_2} $PEEP_{Final}$	$PEEP_{baseline}/PEEP_{Final}$ (*cm H_2O*)	$Crs_{baseline}$ (*ml/cm H_2O*)	Crs $PEEP_{Final}$ (*ml/cm H_2O*)	AOP PV Curve (*cm H_2O*)	AOP EITglobal (*cm H_2O*)	AOP EIT Low Side A/B/C/D (*cm H_2O*)	AOP EIT High Side A/B/C/D (*cm H_2O*)
Patient no.														
1	78	27	Pneumoniae thymectomy	35	100	67	170	12/15	36	34	9	9	**11** 11/11/11	**17** 16/NGE
2	43	17	Pleuro-pneumoniae	40	55	140	332	8/17	23	30	3	3	**3** 3/3/NGE	**17** 17/NGE
3	60	20	Pneumoniae lung resection	39	75	75	107	5/7	29	29	2	3	**4** 1/4/4	**7** 7/7/7
4	67	35	Pneumoniae pneumonectomy	60	70	91	118	6/10	33	40	9	9	—	**9** 9/9/9
5	45	27	SARS-CoV-2	55	30	248	245	8/8	15	19	2	2	**3** 3/3/[illegible]	**7** NGE/8/7
6	50	28	SARS-CoV-2	50	45	212	257	8/10	19	19	10	9	**11** 11/11/11	**12** 12/12/12
7	63	31	Pneumoniae esophagectomy	55	40	150	174	10/12	21	24	7	8	**6** 6/6/6	**12** 12/12/14
Median (IQR)	**[illegible] (45–67)**	**27 (20–31)**	—	**45 (38–56)**	**55 (40–75)**	**140 (75–212)**	**174 (118–257)**	**8/10 (6–10)/(8–15)**	**23 (19–33)**	**29 (19–34)**	**7 (2–9)**	**8 (3–9)**	**5 (3–11)**	**12 (7–17)**

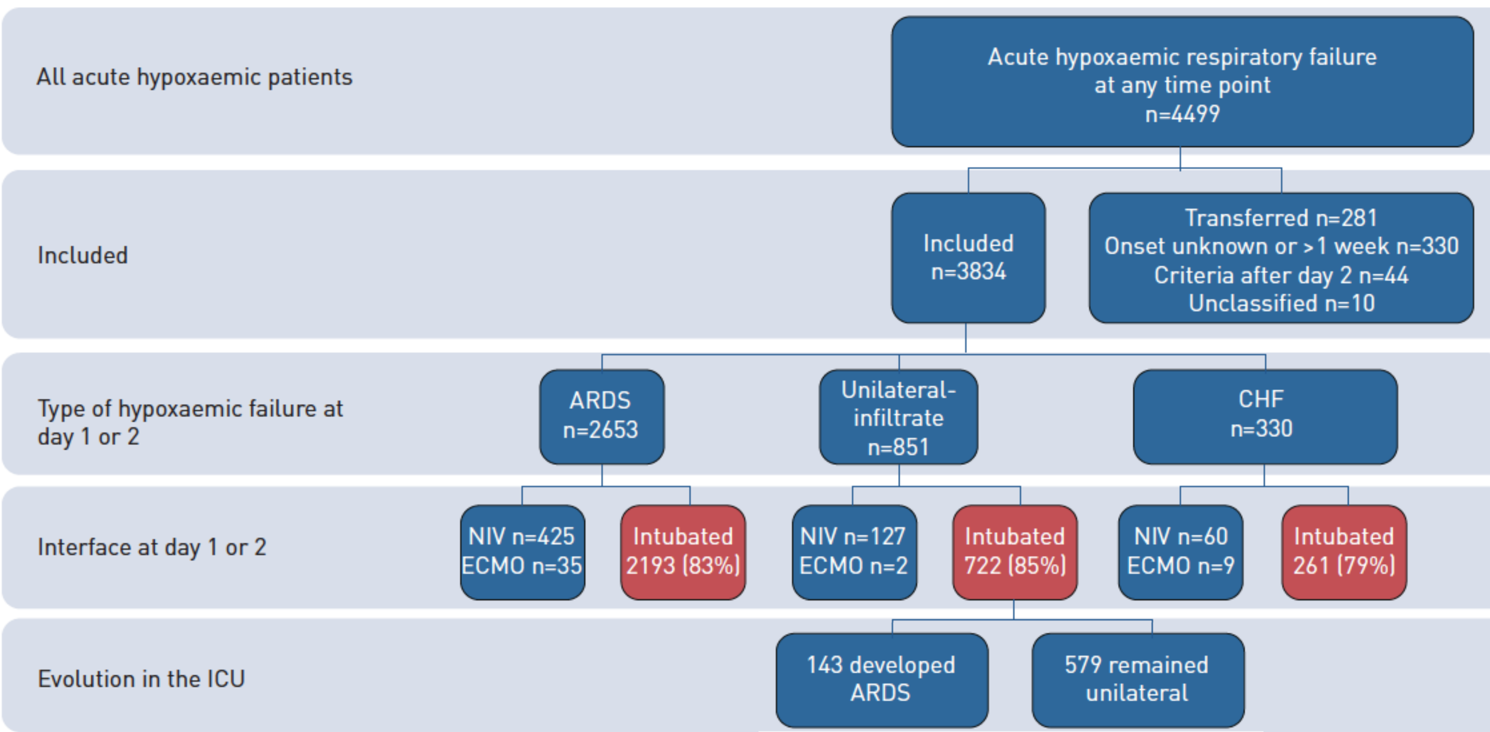
Definition of abbreviations: AOP = airway opening pressure; ARDS = acute respiratory distress syndrome; BMI = body mass index; Crs = respiratory system compliance; EIP = electrical impedance tomography; EIT = electrical impedance tomography; F_{IO_2} = fraction of inspired oxygen; IQR = interquartile range; NGE = no gas entry; PEEP = positive end-expiratory pressure; PV = pressure–volume; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2; SOFA = Sequential Organ Failure Assessment.
Region of interest of AOPs: **A = A** global one lung; B/C/D: B upper nondependent / C middle lung / D lower dependent.

Rozé H, et al. Am J Respir Crit Care Med. 2021

Outcome of acute hypoxaemic respiratory failure: insights from the LUNG SAFE Study

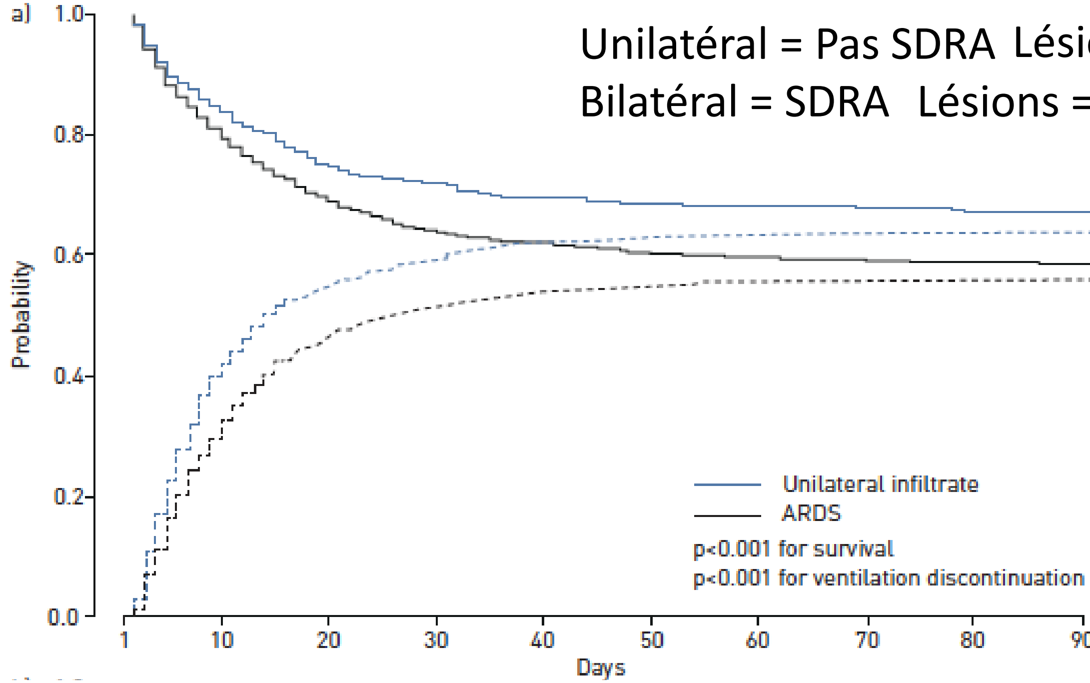
EUROPEAN RESPIRATORY *journal*
FLAGSHIP SCIENTIFIC JOURNAL OF ERS

Tài Pham[1,2,3,4], Antonio Pesenti[5,6], Giacomo Bellani[7,8], Gordon Rubenfeld[9], Eddy Fan[10,11], Guillermo Bugedo[12], José Angel Lorente[13,14,15], Antero do Vale Fernandes[16], Frank Van Haren[17,18,19], Alejandro Bruhn[12], Fernando Rios[20], Andres Esteban[21], Luciano Gattinoni[22], Anders Larsson[23], Daniel F. McAuley[24,25], Marco Ranieri[26], B. Taylor Thompson[27], Hermann Wrigge[28,29], Laurent J. Brochard[1,2,32] and John G. Laffey[1,2,30,31,32], on behalf of the LUNG SAFE Investigators and the European Society of Intensive Care Medicine Trials Group



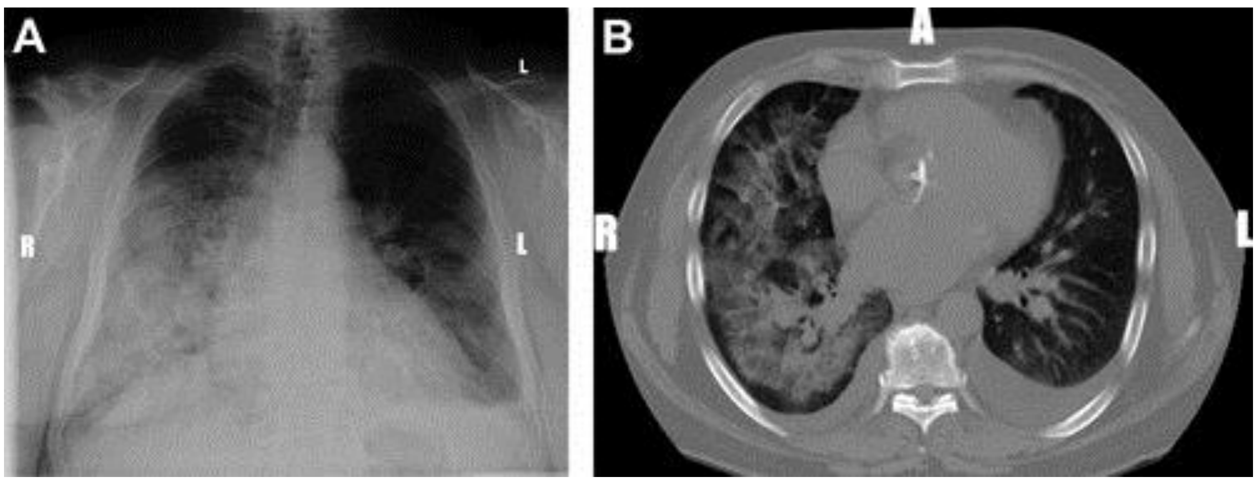
Unilatéral = Pas SDRA Lésions = 1-2 quadrants

Bilatéral = SDRA Lésions = 2, 3, 4 quadrants



Nouvelle définition du SDRA

- Faut-il garder INFILTRATS BILATEREAUX ?



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Messages de fin pour la maison/réa

- Airway closure et airway opening pressure peuvent être différents sur chaque poumon
- Le point d'inflexion de la courbe PV globale représente le poumon le moins lésé
- Une PEEP supérieure au point d' inflexion permet de maintenir les voies aériennes ouvertes et tout le poumon ventilé.
- Une diminution du V_T diminue le risque de surdistension du poumon moins malade.

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