

# Insuffisance respiratoire aiguë Place de l'échographie?

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Emmanuel VIVIER



26 Novembre 2021

CENTRE HOSPITALIER  
 Saint Joseph • Saint Luc

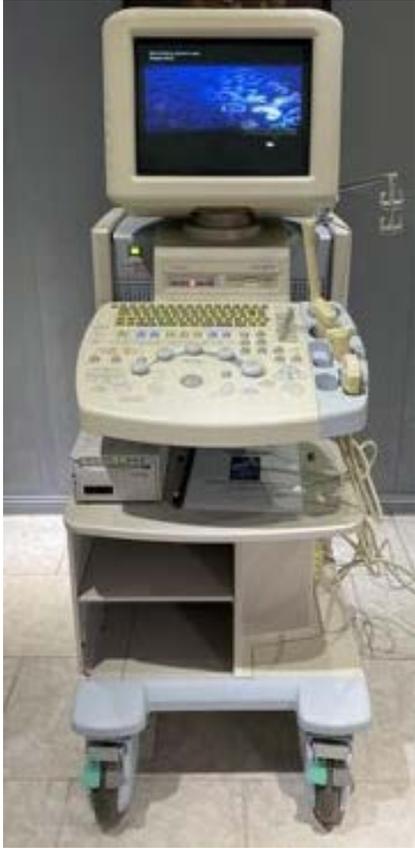
# Conflits d'intérêts



General Electric Healthcare



Philips Healthcare



1985

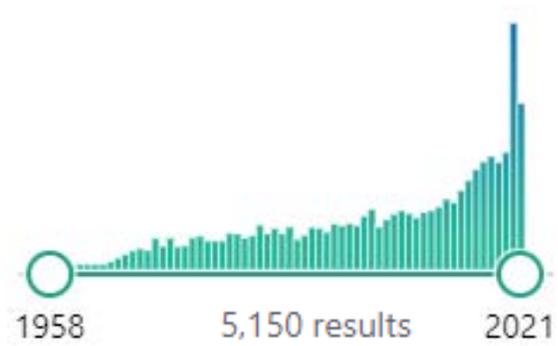
2021

acute respiratory distress and ultrasound

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Sémiologie échographique

Démarche diagnostique

Quelques limites

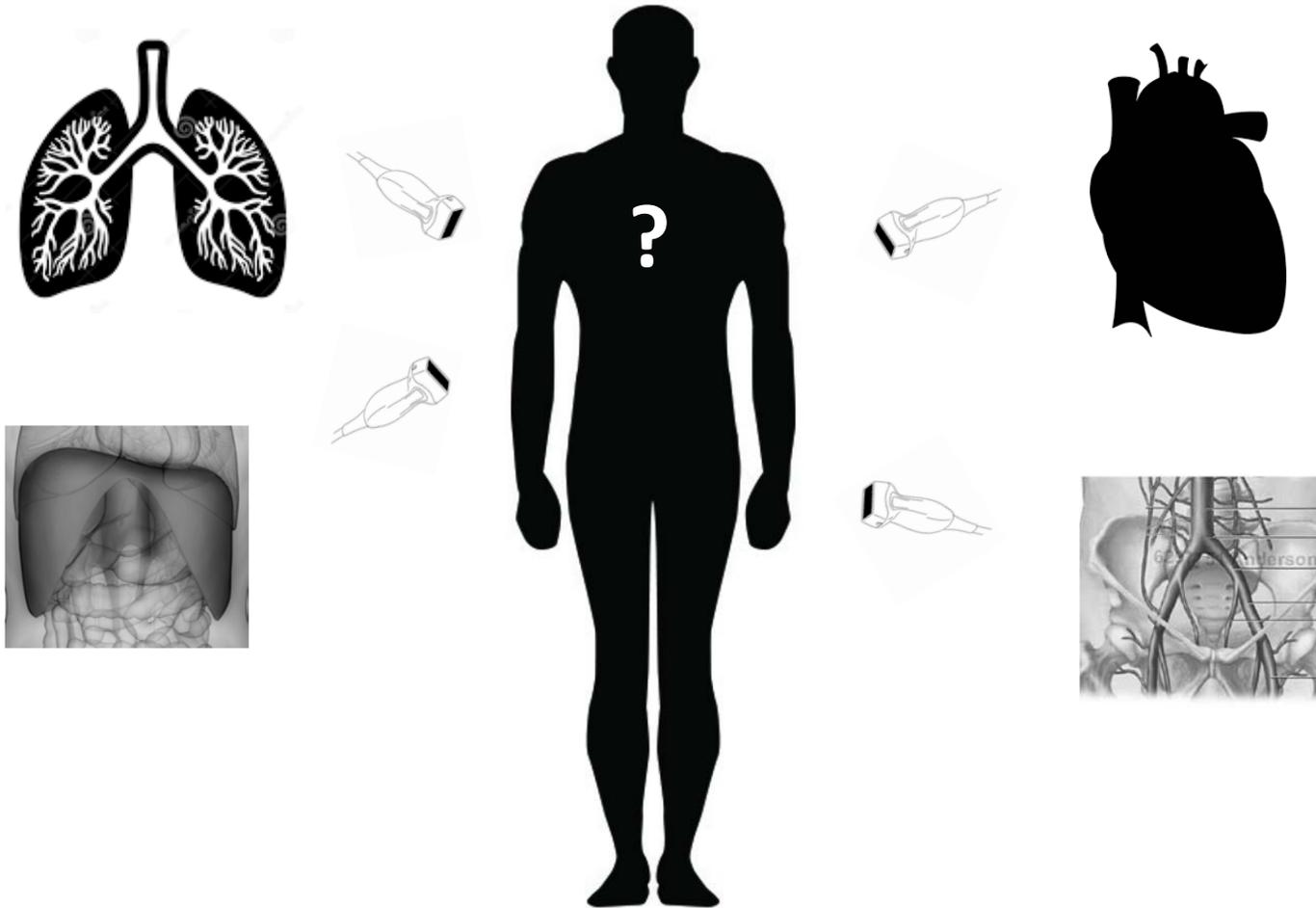


# L'échographie et IRA: que regarder?

Sémiologie échographique

Démarche diagnostique

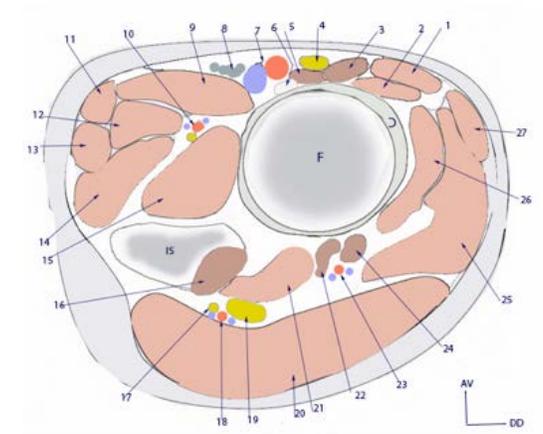
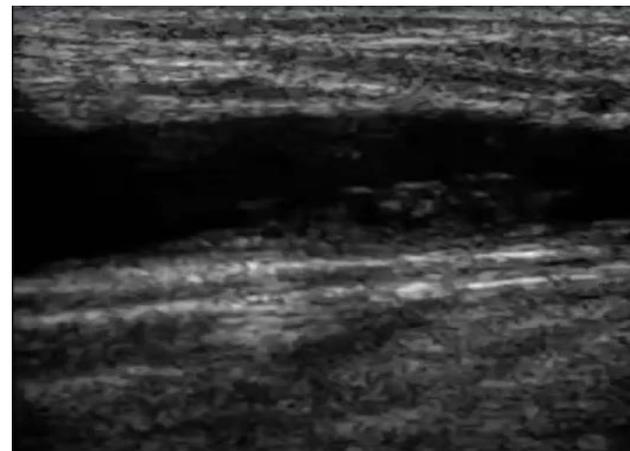
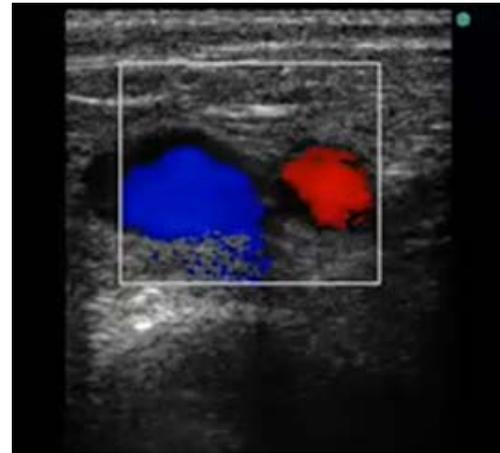
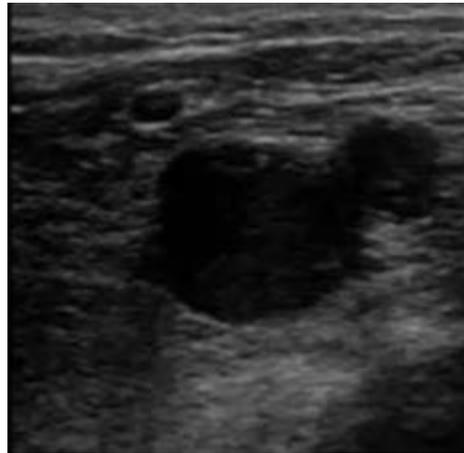
Quelques limites





# Doppler veineux iliaque

Recherche  
de thrombus



L'écho pulmonaire

Aux origines...



# Relevance of Lung Ultrasound in the Diagnosis of Acute Respiratory Failure\* The BLUE Protocol

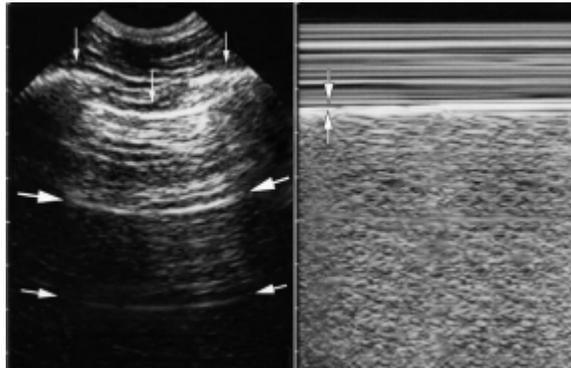
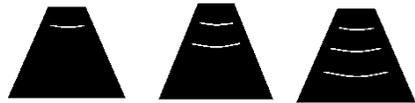
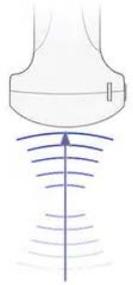
*Daniel A. Lichtenstein, MD, FCCP; and Gilbert A. Mezière, MD*

*(CHEST 2008; 134:117-125)*

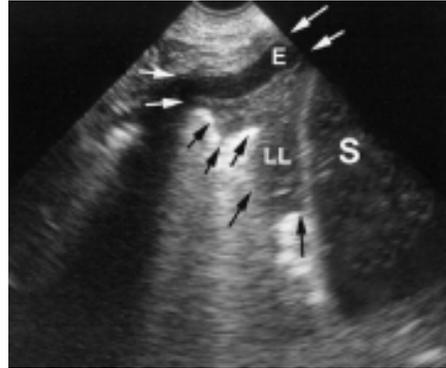
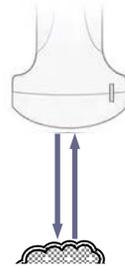
Hitachi-405 (1992)



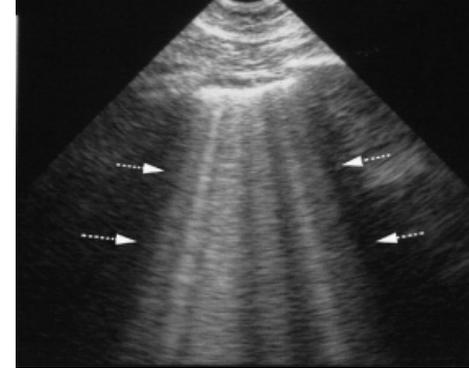
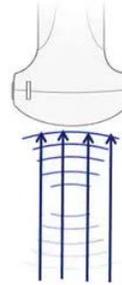
Lignes A



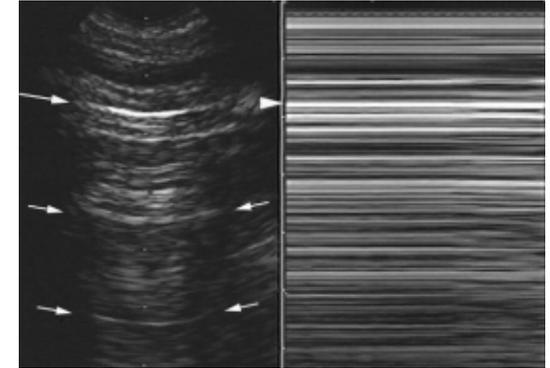
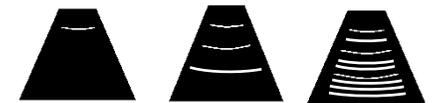
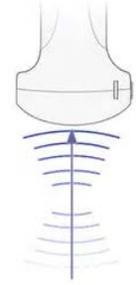
Condensation



Lignes B



Abolition Glissement



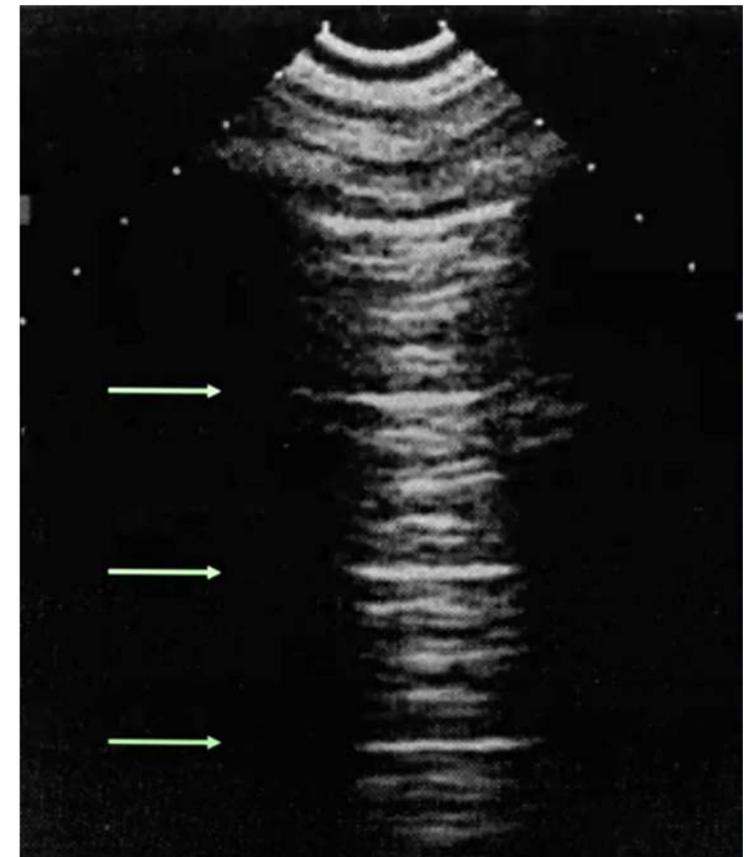
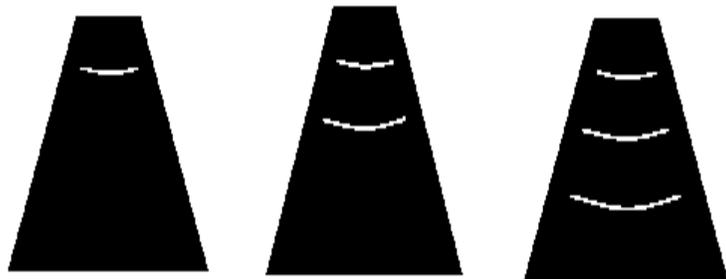
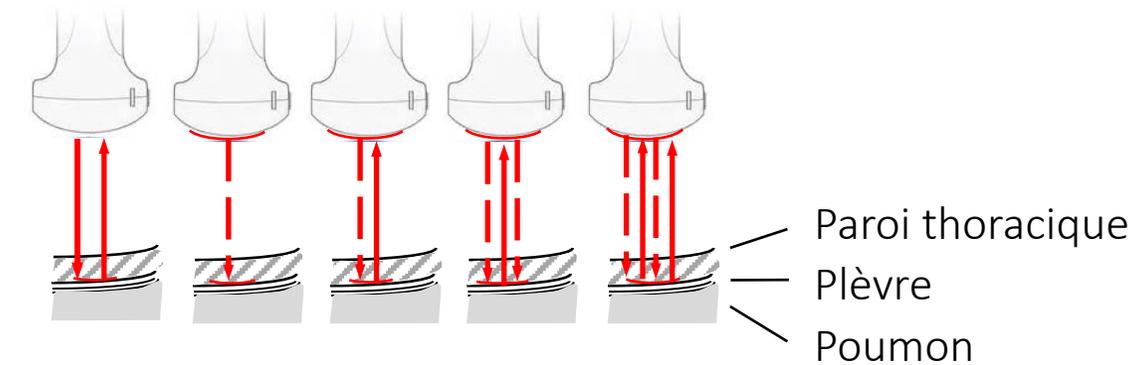
# Une sémiologie de l'artéfact

Lignes A = lignes horizontales équidistantes,  
artéfacts de répétition de l'interface pariéto-pulmonaire

Sémiologie échographique

Démarche diagnostique

Quelques limites



# Epanchement pleural

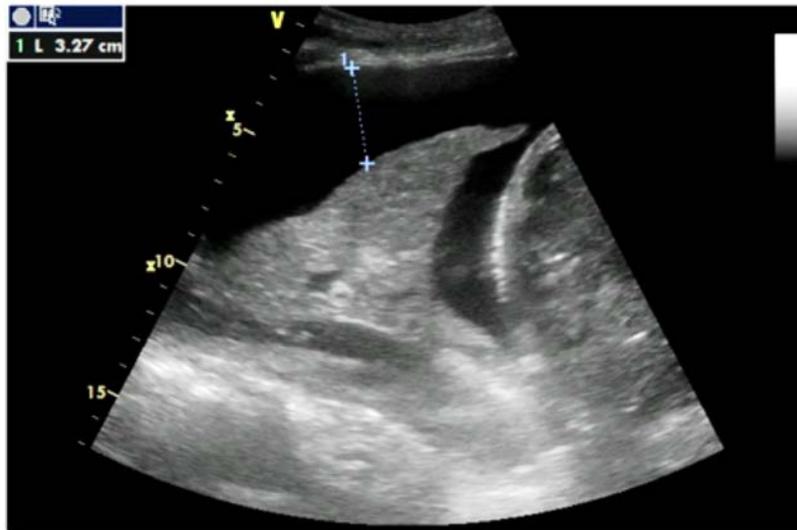
Echogenicité

Mesure de la distance interpleurale

Sémiologie échographique

Démarche diagnostique

Quelques limites



longitudinal



axial

Interpleural distance	Kappa value	95 % CI
>10 mm	0.48	0.19–0.77
>15 mm	0.51	0.31–0.72
>20 mm	0.71	0.56–0.86
>50 mm (left-sided effusions) <sup>a</sup>	0.73	0.37–1.0
>45 mm (right-sided effusions) <sup>a</sup>	0.77	0.51–1.0

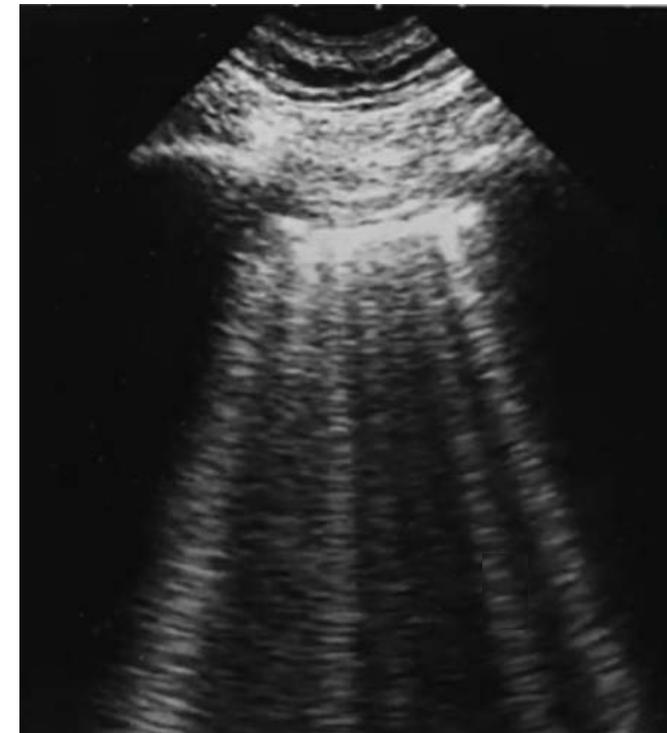
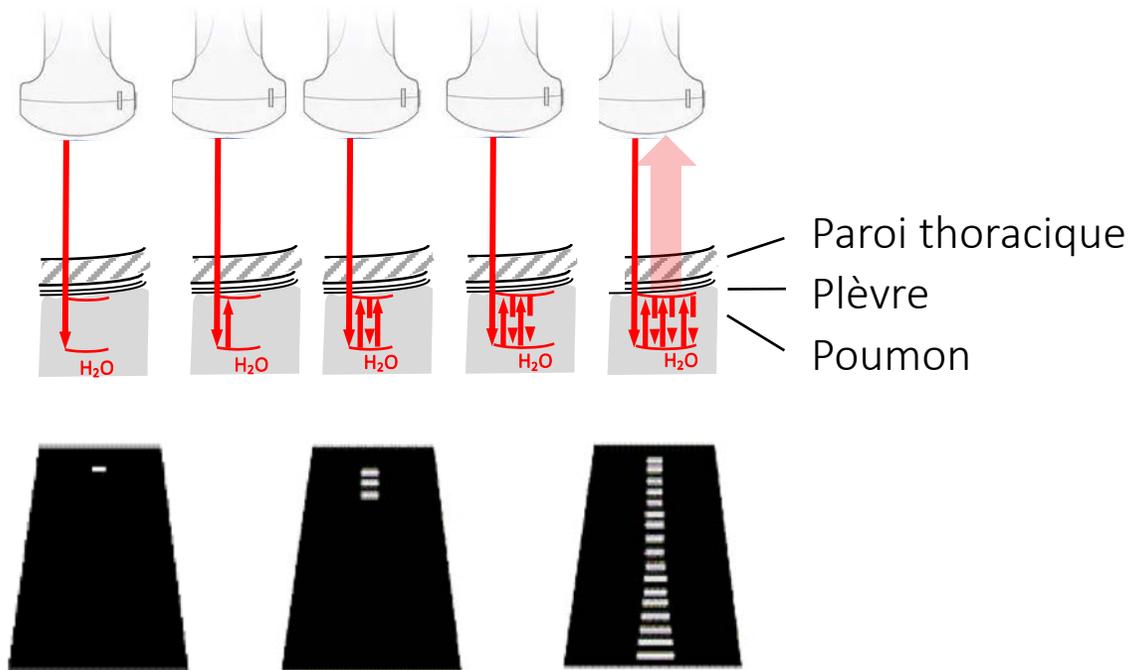
# Une sémiologie de l'artéfact

Sémiologie échographique

Démarche diagnostique

Quelques limites

Lignes B = lignes **verticales** naissant de la **ligne pleurale**, mobile et se prolongeant sans épaissement  
artéfact de résonance au contact d'une interface Air/H<sub>2</sub>O



# Une sémiologie de l'artéfact

Lignes B = lignes **verticales** naissant de la ligne pleurale, mobile et se prolongeant sans épuisement  
artéfact de résonance au contact d'une structure riche en H<sub>2</sub>O

Sémiologie échographique

Démarche diagnostique

Quelques limites

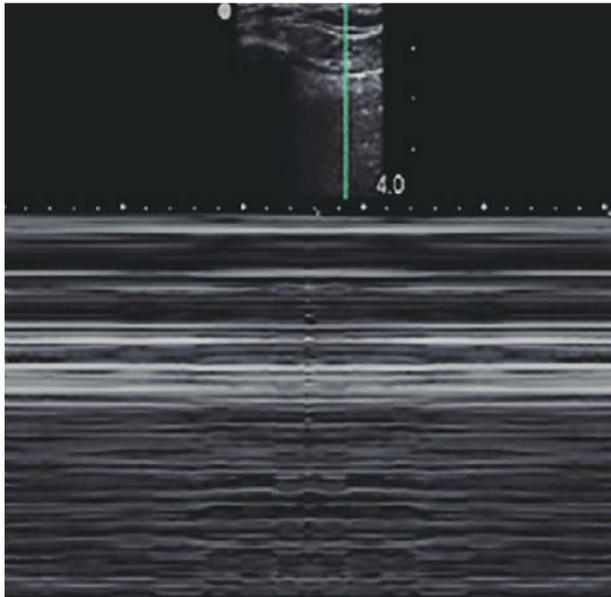


# Pneumothorax

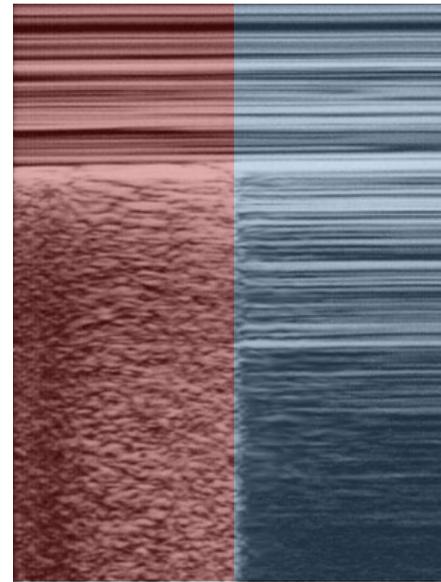
Sémiologie échographique

Démarche diagnostique

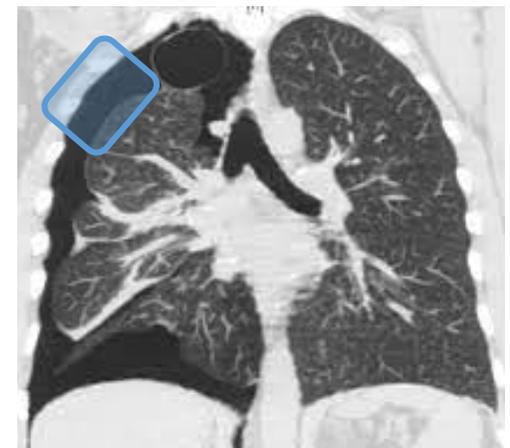
Quelques limites



Abolition du glissement pleural



Point poumon



L'écho pulmonaire

Aux origines...



## Relevance of Lung Ultrasound in the Diagnosis of Acute Respiratory Failure\* The BLUE Protocol

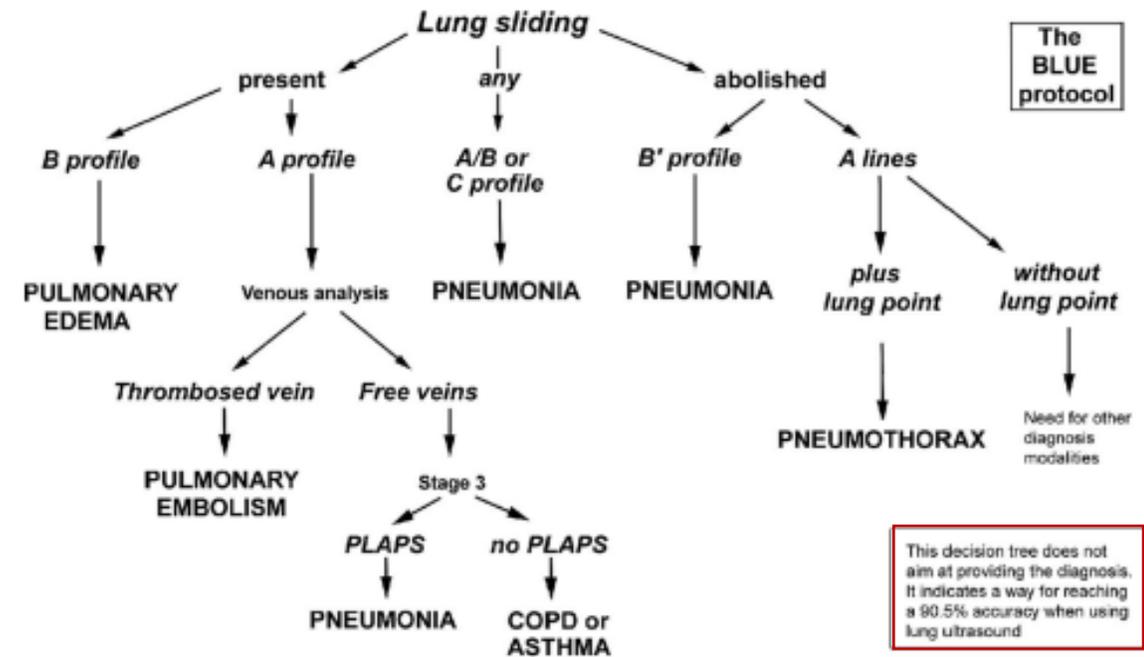
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(CHEST 2008; 134:117-125)

Hitachi-405 (1992)



Maladie	Signes US	Sensibilité (%)	Spécificité (%)
OAP	Lignes B antérieures + glissement pleural	97	95
BPCO ou Asthme	Lignes A antérieures + glissement pleural	89	97
Embolie pulmonaire	Lignes A antérieures + Thrombose veineuse	81	99
Pneumothorax	∅ lignes B, ∅ glissement pleural Point poumon	88	100
Pneumonie	Condensation Lignes B antérieures Epanchement	89	94



Etude observationnelle 206 patients

Sémiologie échographique

Démarche diagnostique

Quelques limites

# Acute respiratory failure in the elderly: etiology, emergency diagnosis and prognosis

Patrick Ray<sup>1</sup>, Sophie Birolleau<sup>2</sup>, Yannick Lefort<sup>2</sup>, Marie-Hélène Becquemin<sup>3</sup>, Catherine Beigelman<sup>4</sup>, Richard Isnard<sup>5</sup>, Antonio Teixeira<sup>6</sup>, Martine Arthaud<sup>7</sup>, Bruno Riou<sup>1</sup> and Jacques Boddaert<sup>8</sup>

Critical Care 2006, 10:R82

Sémiologie échographique

Démarche diagnostique

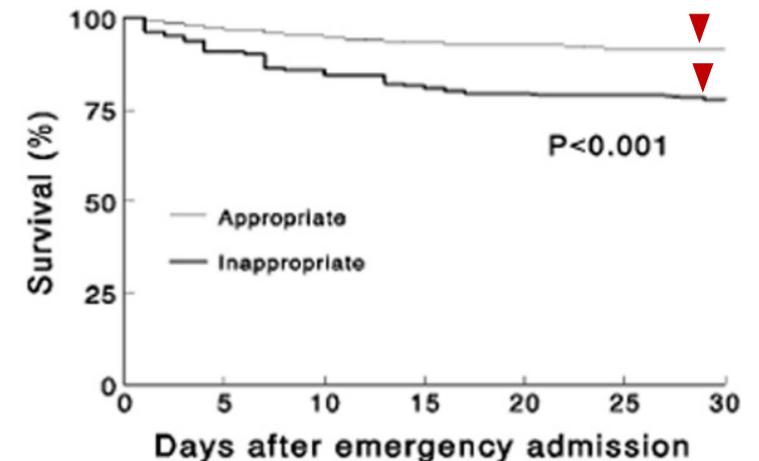
Quelques limites

574 patients > 65 ans

Diagnosis of causes of acute respiratory failure by experts, and mortality

Diagnosis	Number of patients (%)	Mortality <sup>a</sup> , %
Cardiogenic Pulmonary Edema	219 (43)	21 [16-27]
Community-acquired pneumonia	181 (35)	17 [12-23]
Exacerbation of chronic respiratory disease	164 (32)	12 [8-18]
Pulmonary embolism	93 (18)	15 [9-24]
Bronchitis	23 (4)	4 [0-21]
Acute asthma	15 (3)	0 [0-20]
Others	78 (15)	24 [16-34]
No diagnosis	8 (2)	0 [0-32]

Ranges in square brackets are 95% confidence intervals. Because several causes could occur in the same patient, the percentages do not total 100%. <sup>a</sup>Percentages represent mortality in each diagnostic category.



Traitement inadapté dans 32 % des cas → Mortalité 25% vs. 11%

# Point-of-care ultrasonography in patients admitted with respiratory symptoms: a single-blind, randomised controlled trial

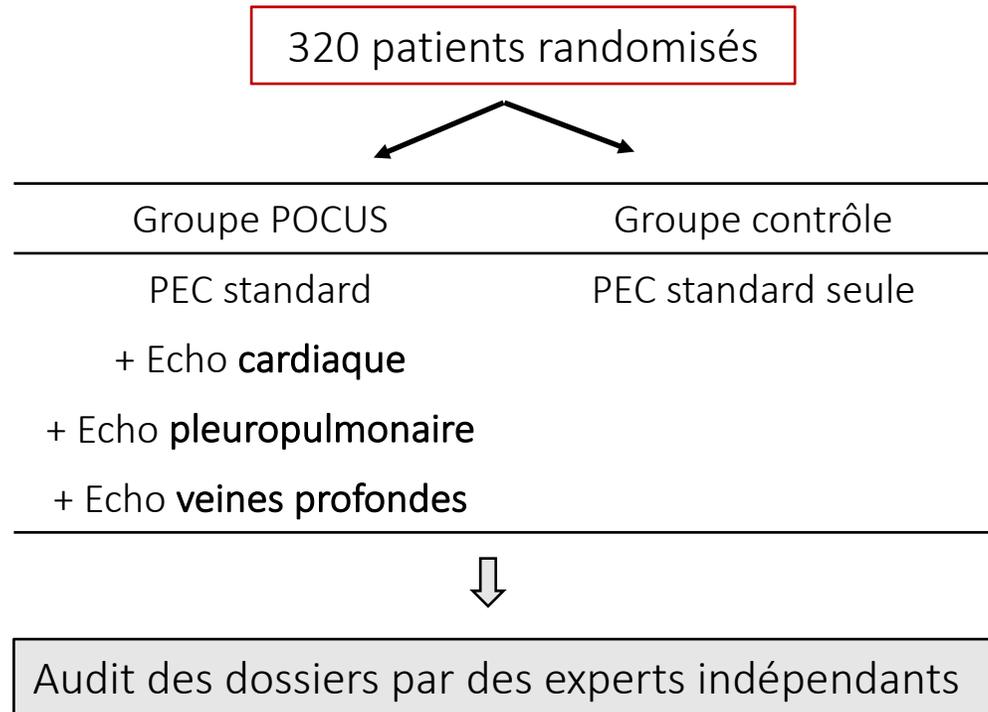
Christian B Laursen, Erik Sloth, Annmarie Touborg Lassen, René dePont Christensen, Jess Lambrechtsen, Poul Henning Madsen, Daniel Pilsgaard Henriksen, Jesper Rømhild Davidsen, Finn Rasmussen

Lancet Respir Med 2014;  
2: 638-46

Sémiologie échographique

Démarche diagnostique

Quelques limites



	Point-of-care ultrasonography group (n=158)	Control group (n=157)	p value
4 h after admission to emergency department			
Patients with correct presumptive diagnoses	139 (88.0%; 82.8 to 93.1)	100 (63.7%; 56.1 to 71.3)	<0.0001
Appropriate treatment ordered*	123 (78%; 71.3 to 84.4)	89 (56.7%; 48.9 to 64.5)	<0.0001
After primary assessment in emergency department			
Patients with correct presumptive diagnoses	84 (53.2%; 45.3 to 61.0)	86 (54.8%; 46.9 to 62.6)	0.77
Appropriate treatment ordered*	81 (51.3%; 43.4 to 59.1)	73 (46.5%; 38.6 to 54.4)	0.40
Treatment ordered 4 h after admission to emergency department			
Intravenous fluids	45 (28.5%; 21.4 to 35.6)	21 (13.4%; 8.0 to 18.8)	0.001
Antibiotics	90 (57.0%; 49.2 to 64.8)	71 (45.2%; 37.4 to 53.1)	0.04
Diuretics	28 (17.7%; 11.7 to 23.7)	16 (10.2%; 5.4 to 15.0)	0.05
Anticoagulants	13 (8.2%; 3.9 to 12.6)	4 (2.6%; 0.1 to 5.0)	0.03
Bronchodilators	62 (39.2%; 31.5 to 46.9)	60 (38.2%; 30.5 to 45.9)	0.85
Systemic steroids	51 (32.3%; 24.9 to 39.6)	47 (29.9%; 22.7 to 37.2)	0.65

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Sémiologie échographique

Démarche diagnostique

Quelques limites

	Specific audit diagnosis in point-of-care ultrasonography group (n=158)	Diagnosis established at 4-h assessment in point-of-care ultrasonography group	Specific audit diagnosis in control group (n=157)	Diagnosis established at 4-h assessment in control group
<b>Lungs</b>				
Exacerbation of chronic obstructive pulmonary disease	60 (38%)	49 (82%)	62 (39%)	50 (81%)
Exacerbation of asthma	2 (1%)	2 (100%)	13 (8%)	7 (54%)
Interstitial lung disease	3 (2%)	1 (33%)	6 (4%)	4 (67%)
Pneumothorax	0	..	2 (1%)	1 (50%)
Pleural effusion	27 (17%)	24 (89%)	22 (14%)	4 (18%)
<b>Heart</b>				
Pericardial effusion	2 (1%)	2 (100%)	2 (1%)	0
Systolic heart failure	11 (7%)	10 (91%)	11 (7%)	5 (45%)
Non-systolic heart failure	3 (2%)	3 (100%)	2 (1%)	0
Pulmonary oedema	19 (12%)	15 (79%)	29 (18%)	11 (38%)
Acute myocardial infarction	2 (1%)	2 (100%)	1 (<1%)	1 (100%)

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Sémiologie échographique

Démarche diagnostique

Quelques limites

	Specific audit diagnosis in point-of-care ultrasonography group (n=158)	Diagnosis established at 4-h assessment in point-of-care ultrasonography group	Specific audit diagnosis in control group (n=157)	Diagnosis established at 4-h assessment in control group
<b>Infection</b>				
Pneumonia	52 (33%)	48 (92%)	60 (38%)	50 (83%)
Parapneumonic effusion	9 (6%)	7 (78%)	10 (6%)	1 (10%)
Empyema	3 (2%)	3 (100%)	2 (1%)	1 (50%)
<b>Thromboembolic disease</b>				
Pulmonary embolism	8 (5%)	8 (100%)	5 (3%)	4 (80%)
Deep vein thrombosis	2 (1%)	2 (100%)	0	..
<b>Miscellaneous</b>				
Moderate anaemia	8 (5%)	7 (88%)	6 (4%)	3 (50%)
Severe anaemia	0	..	1 (<1%)	1 (100%)
Malignancy	15 (9%)	12 (80%)	8 (5%)	3 (38%)

# Point-of-Care Ultrasonography for Evaluation of Acute Dyspnea in the ED

Maurizio Zanobetti, MD; Margherita Scorpiniti, MD; Chiara Gigli, MD; Peiman Nazerian, MD; Simone Vanni, MD; Francesca Innocenti, MD; Valerio T. Stefanone, MD; Caterina Savinelli, MD; Alessandro Coppa, MD; Sofia Bigiarini, MD; Francesca Caldi, MD; Irene Tassinari, MD; Alberto Conti, MD; Stefano Grifoni, MD; and Riccardo Pini, MD



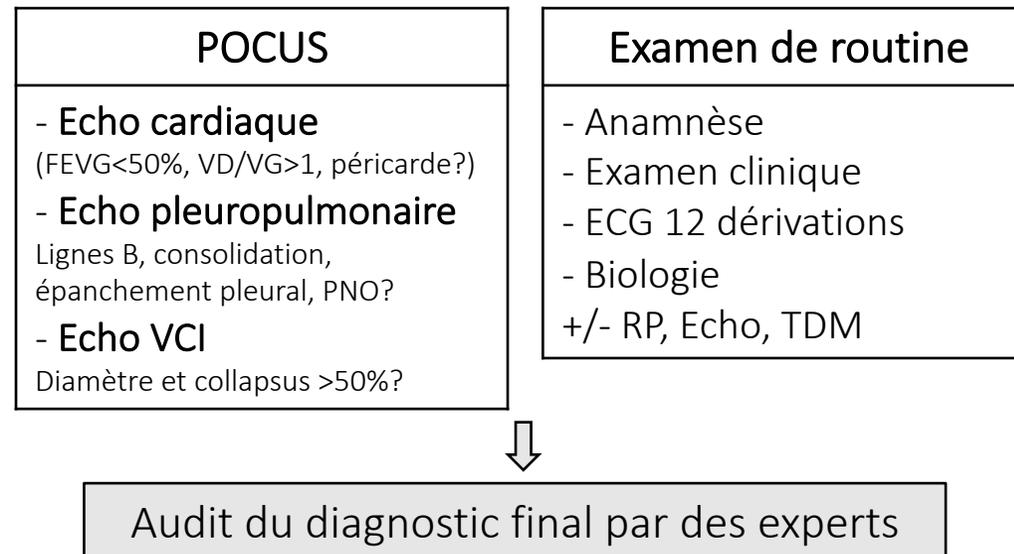
CHEST 2017; 151(6):1295-1301

Sémiologie échographique

Démarche diagnostique

Quelques limites

2683 patients avec 2 évaluations en parallèle



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Sémiologie échographique

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POCUS

24 ± 10 min

Examen de routine

186 ± 72 min

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Diagnosis	$\kappa$
Heart failure	0.810
Acute coronary syndrome	0.706
Pneumonia	0.788
Pleural effusion	0.730
Pericardial effusion	0.858
COPD/asthma	0.845
Pulmonary embolism	0.549
Pneumothorax	0.903
ARDS/ALI	0.294
Other	0.628
Total	0.711

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Pathologie	Diagnostic final n (%)
Insuffisance cardiaque	585 (20)
Syndrome coronarien aigu	42 (1)
Pneumonie	1086 (37)
Pleurésie	98 (3)
Epanchement péricardique	44 (1)
BPCO / Asthme	759 (26)
Embolie pulmonaire	95 (3)
Pneumothorax	44 (1)
SDRA	16 (0.1)
Autre	121 (4)
Total	2890

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Sémiologie échographique

Démarche diagnostique

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2683 patients avec 2 évaluations en parallèle

TABLE 5 ] Diagnostic Accuracy of ED Diagnosis

Variable	Sensitivity, % (95% CI)	Specificity, % (95% CI)
Heart failure	77.3 (73.7-80.6)	97.6 (96.8-98.2)
Acute coronary syndrome	52.4 (36.4-68)	99.7 (99.4-99.9)
Pneumonia	89.8 (87.8-91.5)	92.7 (91.4-94)
Pleural effusion	86.7 (78.4-92.7)	99 (98.5-99.3)
Pericardial effusion	93.2 (81.3-98.6)	99.7 (99.5-99.9)
COPD/asthma	92.2 (90.1-94)	95.7 (94.7-96.6)
Pulmonary embolism	90.5 (82.8-95.6)	99.7 (99.3-99.8)
Pneumothorax	95.5 (84.5-99.4)	99.9 (99.7-100)
ARDS	37.5 (15.2-64.6)	99.9 (99.8-100)
Other diagnoses	54.6 (45.2-63.6)	99.2 (98.8-99.5)

TABLE 4 ] Diagnostic Accuracy of Ultrasound Diagnoses

Variable	Sensitivity, % (95% CI)	Specificity, % (95% CI)
Heart failure	88 (85.1-90.6)	96 (95-96.8)
Acute coronary syndrome	47.6 (32-63.6)	99.6 (99.2-99.8)
Pneumonia	88.5 (86.4-90.3)	91.6 (90.1-92.9)
Pleural effusion	77.6 (68-85.4)	99.2 (98.8-99.5)
Pericardial effusion	86.4 (72.7-94.8)	99.7 (99.5-99.9)
COPD/asthma	86.8 (84.2-89.2)	96.1 (95.1-96.9)
Pulmonary embolism	40 (30.1-50.6)	99.9 (99.7-100)
Pneumothorax	87.8 (75.2-94.5)	100 (99.8-100)
ARDS/ALI	43.8 (19.8-70.1)	99.5 (99.2-99.7)
Other causes	45.5 (36.4-54.8)	98.8 (98.3-99.2)

# Point-of-Care Ultrasonography for Evaluation of Acute Dyspnea in the ED

Maurizio Zanobetti, MD; Margherita Scorpiniti, MD; Chiara Gigli, MD; Peiman Nazerian, MD; Simone Vanni, MD; Francesca Innocenti, MD; Valerio T. Stefanone, MD; Caterina Savinelli, MD; Alessandro Coppa, MD; Sofia Bigiarini, MD; Francesca Caldi, MD; Irene Tassinari, MD; Alberto Conti, MD; Stefano Grifoni, MD; and Riccardo Pini, MD



CHEST 2017; 151(6):1295-1301

Sémiologie échographique

Démarche diagnostique

Quelques limites

2683 patients avec 2 évaluations en parallèle

TABLE 5 ] Diagnostic Accuracy of ED Diagnosis

Variable	Sensitivity, % (95% CI)	Specificity, % (95% CI)
Heart failure	77.3 (73.7-80.6)	97.6 (96.8-98.2)
Acute coronary syndrome	52.4 (36.4-68)	99.7 (99.4-99.9)
Pneumonia	89.8 (87.8-91.5)	92.7 (91.4-94)
Pleural effusion	86.7 (78.4-92.7)	99 (98.5-99.3)
Pericardial effusion	93.2 (81.3-98.6)	99.7 (99.5-99.9)
COPD/asthma	92.2 (90.1-94)	95.7 (94.7-96.6)
Pulmonary embolism	90.5 (82.8-95.6)	99.7 (99.3-99.8)
Pneumothorax	95.5 (84.5-99.4)	99.9 (99.7-100)
ARDS	37.5 (15.2-64.6)	99.9 (99.8-100)
Other diagnoses	54.6 (45.2-63.6)	99.2 (98.8-99.5)

TABLE 4 ] Diagnostic Accuracy of Ultrasound Diagnoses

Variable	Sensitivity, % (95% CI)	Specificity, % (95% CI)
Heart failure	88 (85.1-90.6)	96 (95-96.8)
Acute coronary syndrome	47.6 (32-63.6)	99.6 (99.2-99.8)
Pneumonia	88.5 (86.4-90.3)	91.6 (90.1-92.9)
Pleural effusion	77.6 (68-85.4)	99.2 (98.8-99.5)
Pericardial effusion	86.4 (72.7-94.8)	99.7 (99.5-99.9)
COPD/asthma	86.8 (84.2-89.2)	96.1 (95.1-96.9)
Pulmonary embolism	40 (30.1-50.6)	99.9 (99.7-100)
Pneumothorax	87.8 (75.2-94.5)	100 (99.8-100)
ARDS/ALI	43.8 (19.8-70.1)	99.5 (99.2-99.7)
Other causes	45.5 (36.4-54.8)	98.8 (98.3-99.2)

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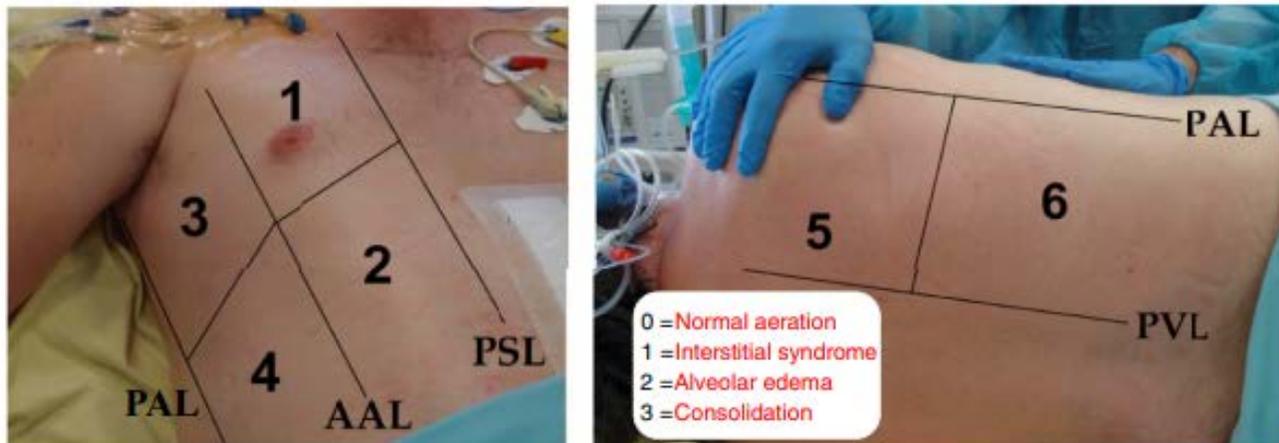
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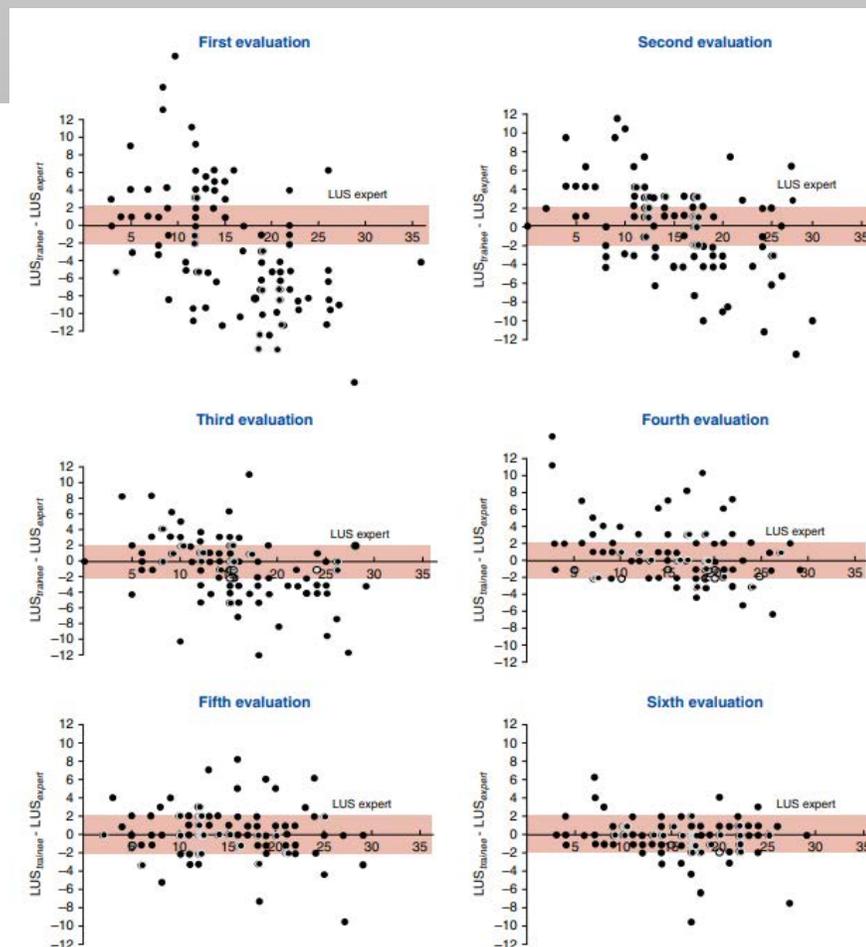
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# Score LUS



0	Poumon normal	Lignes A	
1	Perte d'aération partielle	< 50% lignes B	
2	Perte d'aération totale	> 50% lignes B	
3	Consolidation	Condensation	

Temps de recueil = 8 (3-14) min



# Score LUS

- Détection des atélectasies per opératoire - chirurgie abdominale

*Monastesse - Anesth Analgesia - 2017*

- Corrélation LUS et sévérité du SDRA

*Liahuna Li - Zhonghua Wei Zhong Bing Ji Jiu Yi Xue - 2015*

## Score LUS

- Monitoring de l'aération pulmonaire régionale
  - pendant une séance de DV *Haddam - ICM - 2016*
  - Au cours d'un remplissage *Caltabeloti - Crit Care - 2014*
  - Sous l'effet d'une augmentation de PEP *Bouhemad - AJRCCM - 2011*
  - Au décours d'un drainage pleural *Chinardet - Acta Anæsthesiol Belg - 2016*
- Évalue l'efficacité d'une antibiothérapie dans la PAVM *Bouhemad - CCM - 2010*
- Prédit l'échec d'extubation *Soummer - CCM - 2012*

Et la COVID 19?



scientific reports

# Point-of-care lung ultrasound in COVID-19 patients: inter- and intra-observer agreement in a prospective observational study

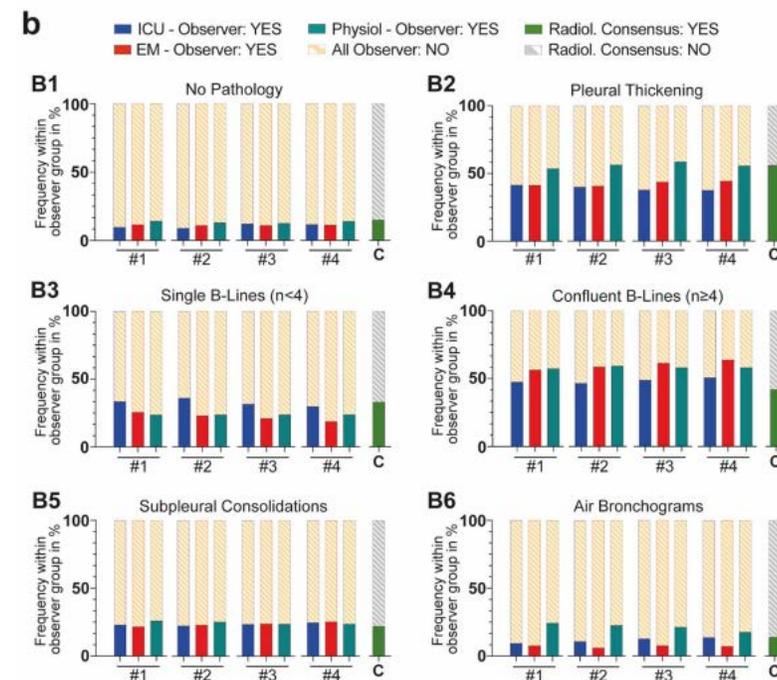
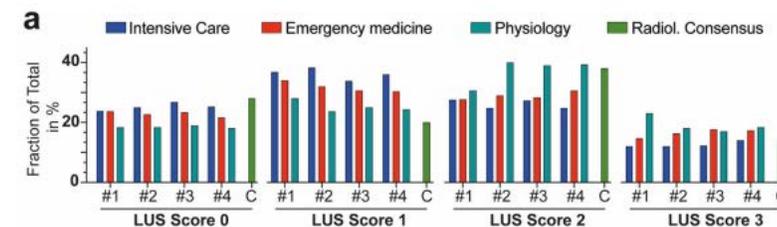
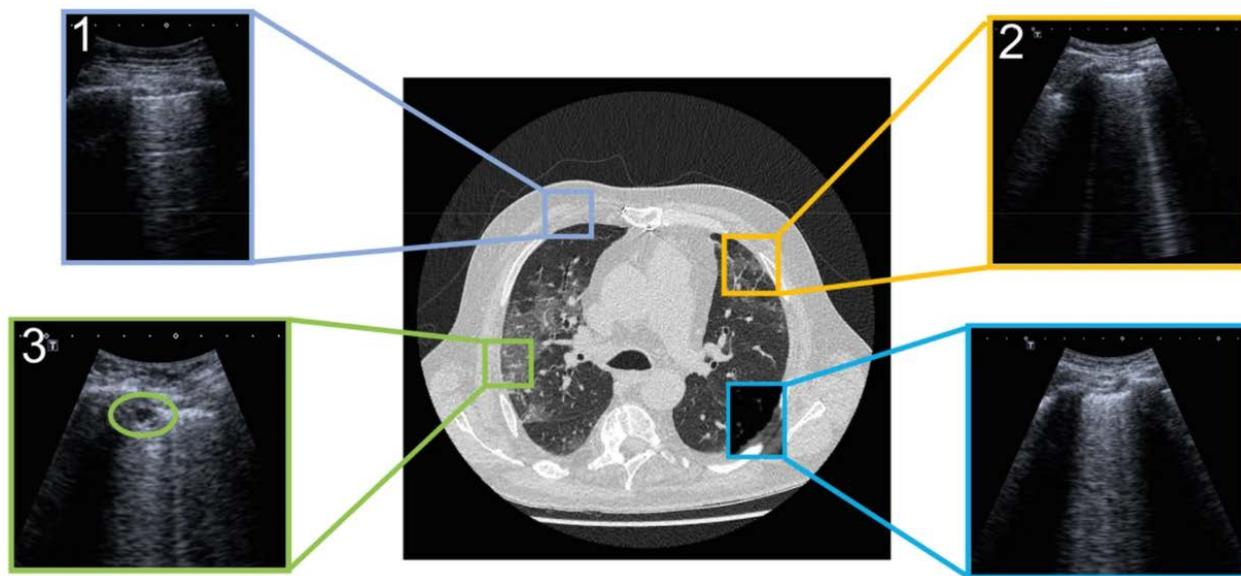
Markus H. Lerchbaumer, Jonathan H. Lauryn, Ulrike Bachmann, Philipp Enghard, Thomas Fischer, Jana Grune, Niklas Hegemann, Dmytro Khadzhynov, Jan Matthias Kruse, Lukas J. Lehner, Tobias Lindner, Timur Oezkan, Daniel Zickler, Wolfgang M. Kuebler, Bernd Hamm, Kai-Uwe Eckardt & Frédéric Muench

Sémiologie échographique

Démarche diagnostique

Quelques limites

Analyses de concordance de 100 boucles vidéos de patients en soins intensifs



Et la COVID 19?



scientific reports

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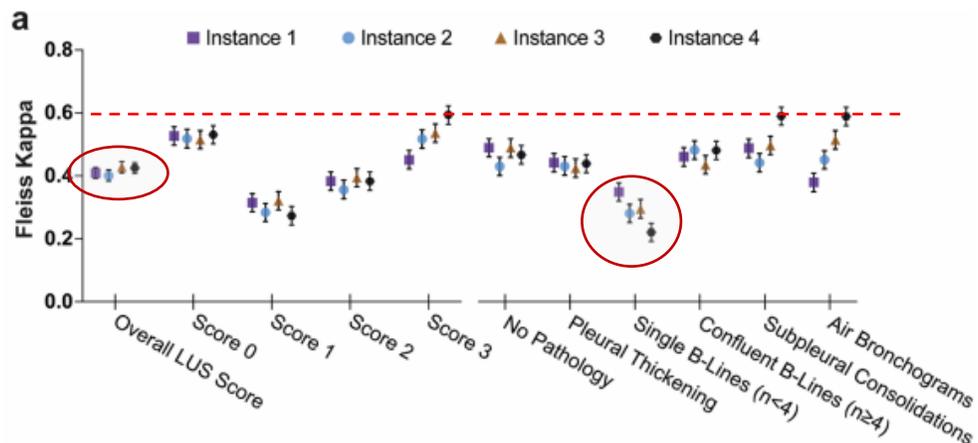
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Sémiologie échographique

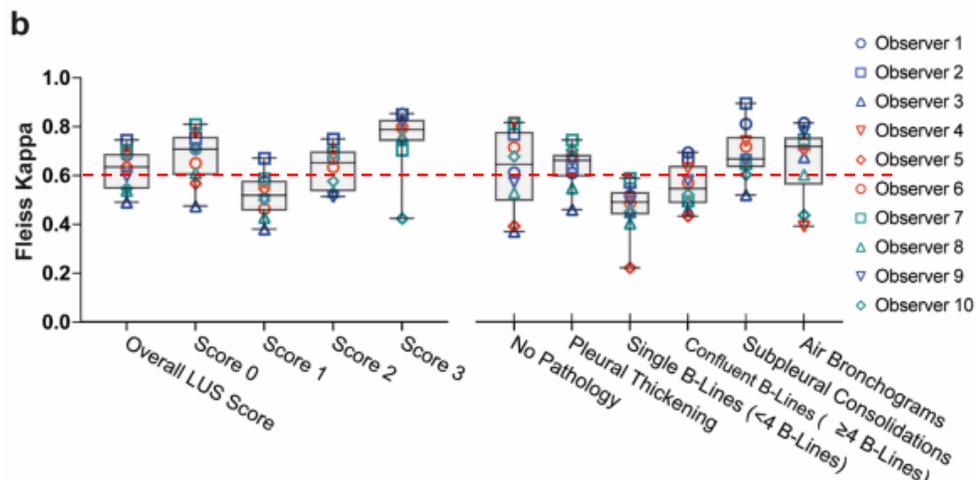
Démarche diagnostique

Quelques limites

Inter-observateur



Intra-observateur



Coefficient  $\kappa$  de Fleiss

$\kappa$	Interpretation
< 0	Désaccord
0.0 — 0.20	Accord très faible
0.21 — 0.40	Accord faible
0.41 — 0.60	Accord modéré
0.61 — 0.80	Accord fort
0.81 — 1.00	Accord presque parfait



Et la COVID 19?



Intensive Care Med (2020) 46:1707–1713

ORIGINAL

## Comparative study of lung ultrasound and chest computed tomography scan in the assessment of severity of confirmed COVID-19 pneumonia



Laurent Zieleskiewicz<sup>1,2\*</sup>, Thibaut Markarian<sup>3</sup>, Alexandre Lopez<sup>1</sup>, Chloé Taguet<sup>3</sup>, Neyla Mohammadi<sup>1</sup>, Mohamed Boucekine<sup>4</sup>, Karine Baumstarck<sup>4</sup>, Guillaume Besch<sup>5</sup>, Gautier Mathon<sup>6</sup>, Gary Duclos<sup>1</sup>, Lionel Bouvet<sup>7,8,9</sup>, Pierre Michelet<sup>3</sup>, Bernard Allaouchiche<sup>6,8,9</sup>, Kathia Chaumoitre<sup>10</sup>, Mathieu Di Bisceglie<sup>10</sup> and Marc Leone<sup>1</sup> on behalf of the AZUREA Network

Sémiologie échographique

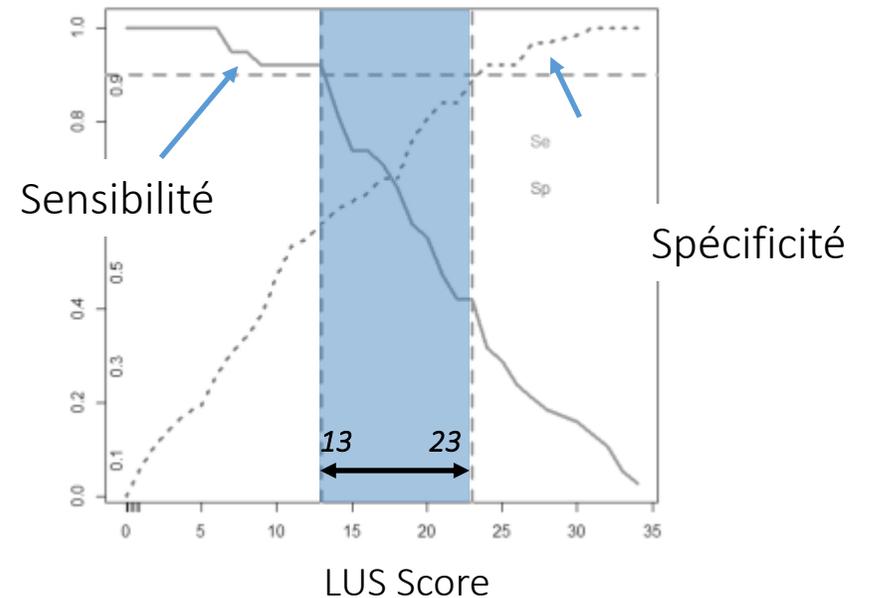
Démarche diagnostique

Quelques limites

100 patients (77 aux urgences, 23 en réanimation)

Findings	CT n = 100	LUS n = 100	P value
<b>Interstitial syndrome</b>			
Absent	8 (8)	4 (4)	0.134
Unilateral	5 (5)	11 (11)	
Bilateral	87 (87)	85 (85)	
<b>Consolidation</b>			
Absent	48 (48)	68 (68)	0.002
Unilateral	16 (16)	17 (17)	
Bilateral	36 (36)	15 (15)	
<b>Pleural effusion</b>			
Absent	89 (89)	94 (94)	0.122
Unilateral	7 (7)	6 (6)	
Bilateral	4 (4)	0	
<b>Pneumothorax</b>			
	0	0	-
<b>Pleural irregularity</b>	15 (15)	32 (32)	0.005

Chest CT scan severity	Patients	LUS score mean ± SD	95% CI for Mean		LUS score min	LUS score max	P value
			Lower bound	Upper bound			
Minimal damage	18	8 ± 7	4	11	0	22	<0.0001
Moderate damage	43	14 ± 8	11	16	0	30	
Severe damage	39	20 ± 8	18	23	5	34	



Et la COVID 19?



Annals of Intensive Care

# Lung ultrasound score predicts outcomes in COVID-19 patients admitted to the emergency department

Julio Cesar Garcia de Alencar<sup>1\*</sup>, Julio Flavio Meirelles Marchini<sup>1</sup>, Lucas Oliveira Marino<sup>1</sup>, Sabrina Correa da Costa Ribeiro<sup>1</sup>, Cauê Gasparotto Bueno<sup>1</sup>, Victor Paro da Cunha<sup>1</sup>, Felipe Lazar Neto<sup>1</sup>, Rodrigo Antonio Brandão Neto<sup>1</sup>, Heraldo Possolo Souza<sup>1</sup> and the COVID U. S. P. Registry Team<sup>2</sup>

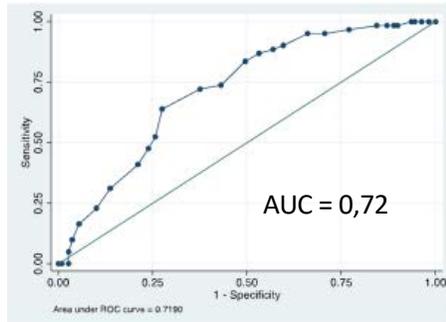
Sémiologie échographique

Démarche diagnostique

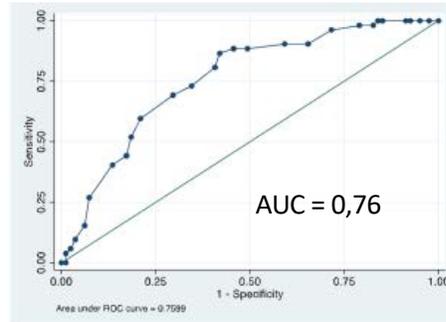
Quelques limites

180 patients aux urgences

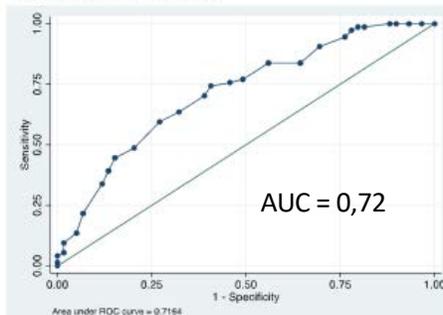
Mortalité



Intubation



c ROC curve for LUS vs. ICU admission



Réanimation

	LUS cutoff	Sensitivity	Specificity
Discharged alive	< 16	40%	90%
Deceased	≥ 26	23%	90%
Not intubated during hospital stay	< 15	41%	90%
Intubated during hospital stay	≥ 25	27%	93%
Not admitted to ICU	< 13	31%	91%
Admitted to ICU	≥ 25	22%	93%

Sémiologie échographique

Démarche diagnostique

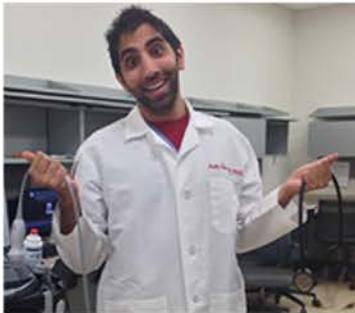
Quelques limites

CHEST / Thought Leader Blog / HOCUS POCUS: An informal case-series to express the magic of bedside ultrasound

## HOCUS POCUS: An informal case-series to express the magic of bedside ultrasound

An informal case-series to express the magic of bedside ultrasound

September 15, 2015



*We're checking back in with CHEST blogger, Dr. Rohit Devnani. Dr. Devnani is in his second year of fellowship in pulmonary and critical care medicine, and we've asked for a sneak peek into his journey.*

**By Rohit Devnani, MD, @RoRo\_Nani**

My name is Rohit, and I'm an ultrasound addict. It's been 4 days since I last used—the last day I was on service in the VA MICU. I first tasted bedside ultrasonography in August of 2012 at the Society of Critical Care Medicine's critical care ultrasound course in Chicago and was instantly under its spell. A noninvasive tool that gives me x-ray (well, without the radiation) vision through a patient's body to see the heart, lungs, veins, and more? Seeing is believing, after all, and I believe.

The point-of-care ultrasound (#POCUS) community is a bunch of enablers. Promoting addictions via free books for self-study (thanks, @ultrasoundpodcast), posting interesting images and cases to Twitter (free open access to medical education, or #FOAMed), and blogging stories about lives saved are just some of their contributions to the collective high. As the utility of point-of-care ultrasound expands, so does the population and vibrancy of the #POCUS community. However, skeptics still remain. While we are always cautious of the "n of 1" phenomenon, the following is an informal argument based on highlights from my first year of pulmonary and critical care fellowship to enable more #POCUS addictions.

Sémiologie échographique

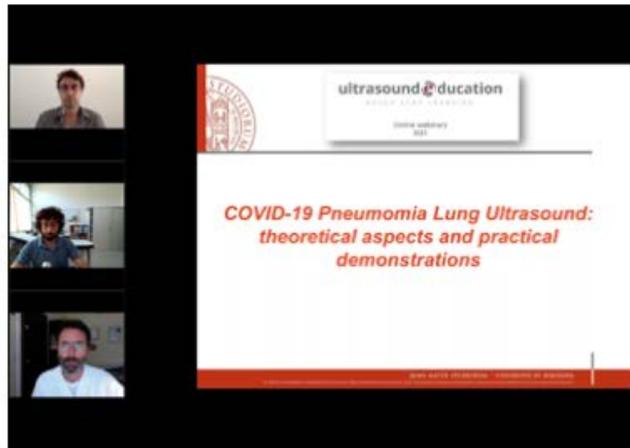
Démarche diagnostique

Quelques limites

## Is lung ultrasound the stethoscope of the new millennium? Definitely yes!

Acta Medica Academica 2016;45(1):80-81  
DOI: 10.5644/ama2006-124.162

Roberto Copetti\*



### Covid-19 Pneumonia Lung Ultrasound (LUS) - Theoretical aspects and practical demonstrations

START VIDEO

Registration is completely **FREE**: we kindly ask you to fill in the form with your basic personal info.

Diplômé en science du marabout - Licence en filtre d'amour  
Académicien des médiums

### POINT OF CARE ULTRASOUND

#### Médium-marabout très fort et compétent

Soigne les chagrins d'amour, redresse tous les sexes tordus, repart les pieds cassé et les scooter italiens, arrêt cigarette et alcool, réussite aux examens, détecte toutes les maladies, enlève les sondes anales, soigne l'éjaculation précoce, fais pousser la pelouse, favorise la chance (gain au loto garanti), soigne les diarrées passagères de vos animaux de compagnie, fais tout type d'interventions chirurgicales, réalise des coupes de cheveux à la mode tektonik.

# Attention aux angles morts!



Sémiologie échographique

Démarche diagnostique

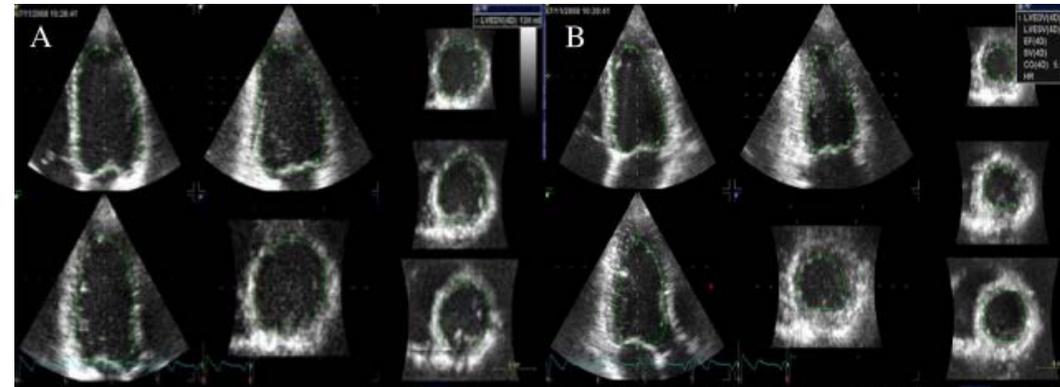
Quelques limites

## Visually estimated ejection fraction by two dimensional and triplane echocardiography is closely correlated with quantitative ejection fraction by real-time three dimensional echocardiography

Kambiz Shahgaldi\*<sup>1</sup>, Petri Gudmundsson<sup>2</sup>, Aristomenis Manouras<sup>1,3</sup>, Lars-Åke Brodin<sup>4</sup> and Reidar Winter<sup>1,3</sup>

## Reliability of reporting left ventricular systolic function by echocardiography: A systematic review of 3 methods

James H. McGowan, MRCP,<sup>a</sup> and John G. F. Cleland, MD, FRCP, FACC, FESC<sup>b</sup> Glasgow and Kingston-upon-Hull, United Kingdom



Author	No.	Study group	Reference method	'r' (Simpson's)	'r' (Subjective)	'r' (WMI)
Stamm (43)	64	Mixed	CVG	0.89	0.89	ND
Mueller (50)	40	Mixed	CVG	0.49	0.80	ND
Gopal (57)	44	Mixed	RNVG	0.87	0.89	ND
Jensen-Urstad (62)	96 (Simpson's, n = 70)	Post-MI	RNVG	0.45	0.71	-0.72
van't Hof (64)	90 (Simpson's, n = 41)	Post-MI	RNVG	0.59	0.71	-0.68

Sémiologie échographique

Démarche diagnostique

Quelques limites

## Evaluation de la FEVG visuelle



## Evaluation de la FEVG visuelle

- Réponse A      FEVG est  $\leq 25\%$
- Réponse B      la FEVG est comprise **entre 25 et 50%**
- Réponse C      la FEVG est  $\geq 50\%$

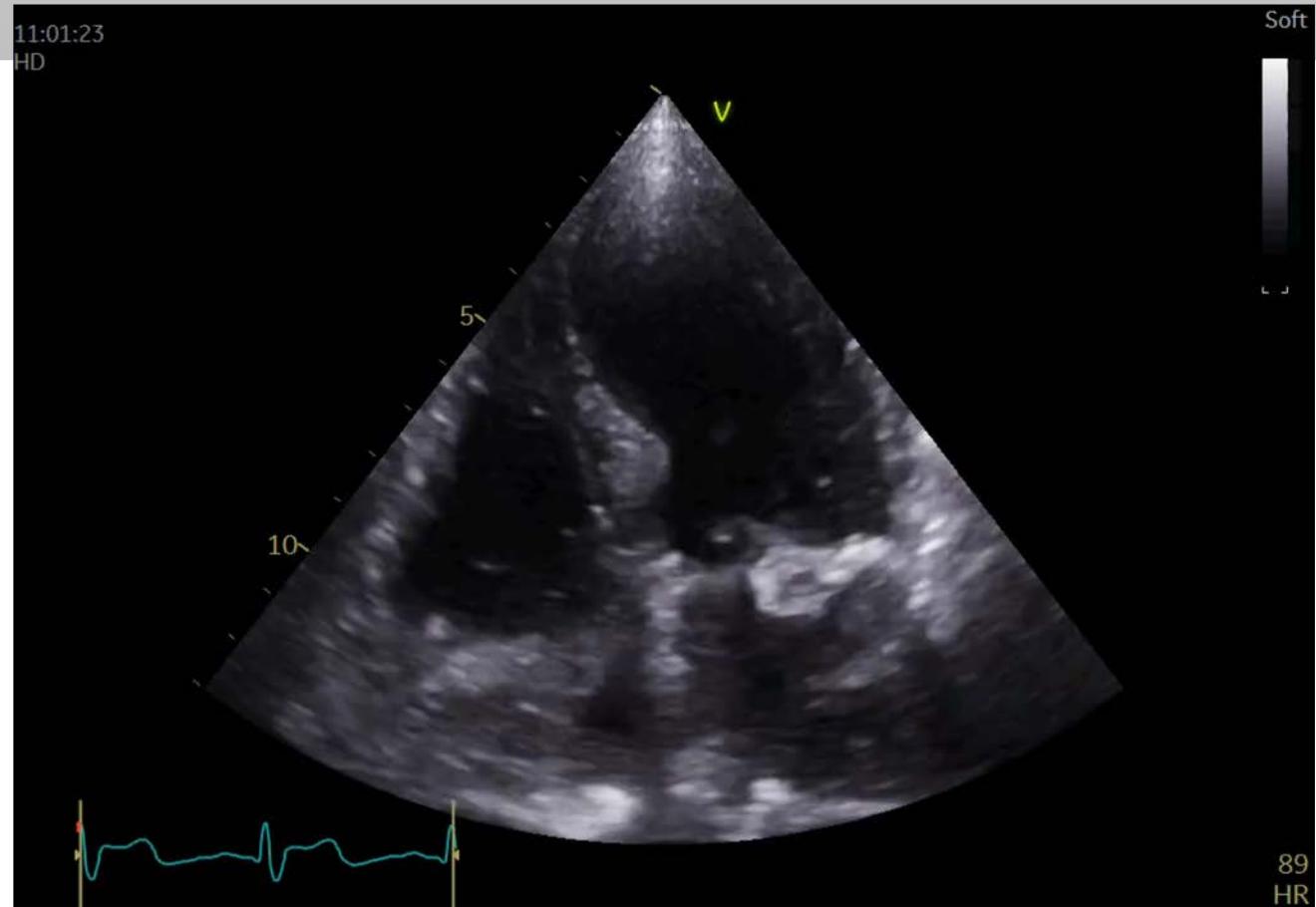
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Sémiologie échographique

Démarche diagnostique

Quelques limites



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Sémiologie échographique

Démarche diagnostique

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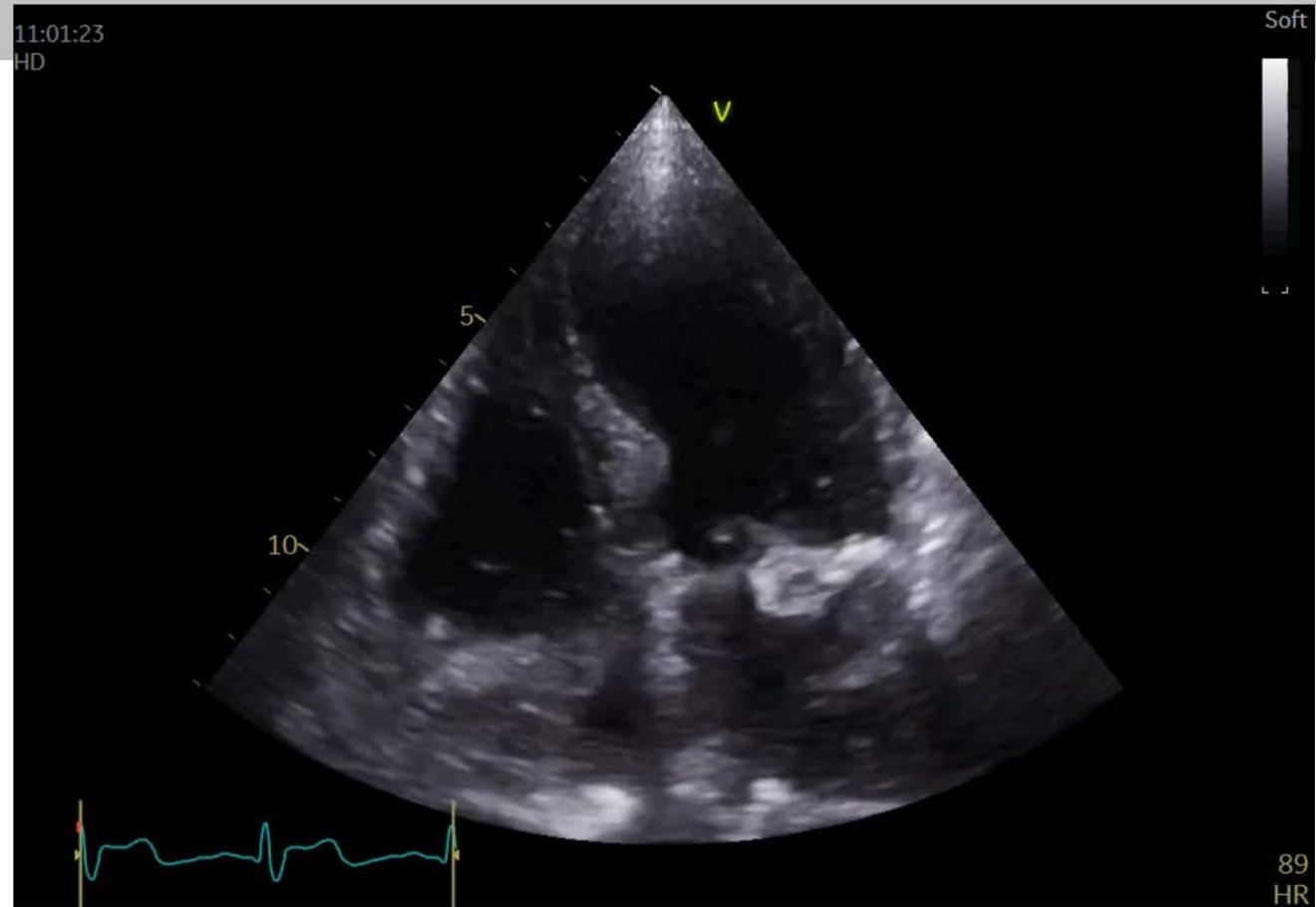
## Evaluation de la FEVG visuelle

Et ou est le thrombus?

Sémiologie échographique

Démarche diagnostique

Quelques limites



## Quelques biais cognitifs en situation d'urgence (pensée heuristique ++)

### **Biais d'ancrage**

L'hypothèse diagnostique initiale n'est pas modifiée même si de nouvelles informations sont à disposition

### **Biais de confirmation**

On retient uniquement les éléments qui confirment notre hypothèse sans rechercher d'éléments contradictoires

### **Biais de disponibilité**

On se souvient plus facilement d'un élément marquant ou récent

## En conclusion



Un outil très pertinent pour aider au diagnostic en urgence  
mais attention aux **faux négatifs!** (embolie pulmonaire++)

L'échographie pulmonaire reste une **analyse de surface**

Quelle place dans la COVID 19? -> selon l'**environnement hospitalier?**

Quelle place pour **le score LUS?** Attention à la **reproductibilité...**

## En conclusion



Un outil accessible, multi-organe, rapide (...), de plus en plus ergonomique

Mais un écran (de plus!) entre le praticien et le patient, source de biais et de diversion

Une sémiologie à comprendre, acquérir et intégrer à la pratique clinique

« L'erreur est facile à tous, plus facile peut-être à celui qui croit savoir beaucoup. »  
*Alain - Propos sur l'éducation - 1932*