JMUGE 2025

8èmes Journées de Médecine d'Urgence du Grand Est

Prise en charge de la Dyspnée aux (en) urgences

Pr Tahar Chouihed
SAMU-SMUR et Service d'Urgences – CHRU Nancy
Centre d'Investigation Clinique Plurithématique
UMR_S 1116: Défaillance Cardio-vasculaire Aigues et Chroniques

REIMS 13 & 14 MAI 2025

Wang CS, and al Does this dyspneic patient in the emergency department have congestive heart failure?
JAMA. 19 oct 2005;294(15):1944-56.

Validité intrinsèque des **différents symptômes, signes cliniques et éléments anamnestiques** orientant vers une ICA

	Sensibilité	Spécificité	RV+ (IC95%)	RV- (IC95%)
Jugement Clinique initial	0.61	0.86	4.4 (1.8-10.0)	0.45 (0.28-0.73)

Examen physique = Diagnostic de gravité

- En urgence, l'examen clinique recherche avant tout **des signes de gravités** :
  - FR : tachypnée ou polypnée >30, bradypnée < 15, pauses respiratoires
  - Signes de lutte : balancement thoraco-abdominal, tirages
  - Signe d'hypoxémie : cyanose, confusion, convulsions
  - Incapacité à parler
  - Signe d'hypercapnie : somnolence, sueurs, flappping

American Journal of Emergency Medicine xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

Original Contribution

Development of a clinical prediction score for congestive heart failure diagnosis in the emergency care setting: The Brest score

Adrien Basset, MD [a], Emmanuel Nowak, PhD [b], Philippe Castellant, MD [c], Christophe Gut-Gobert, MD [d], Grégoire Le Gal, MD, PhD [b,e], Erwan L'Her, MD, PhD [a,f,g,*]

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[e] Department of Medicine, Ottawa Hospital Research Institute, University of Ottawa, Ottawa, ON, Canada
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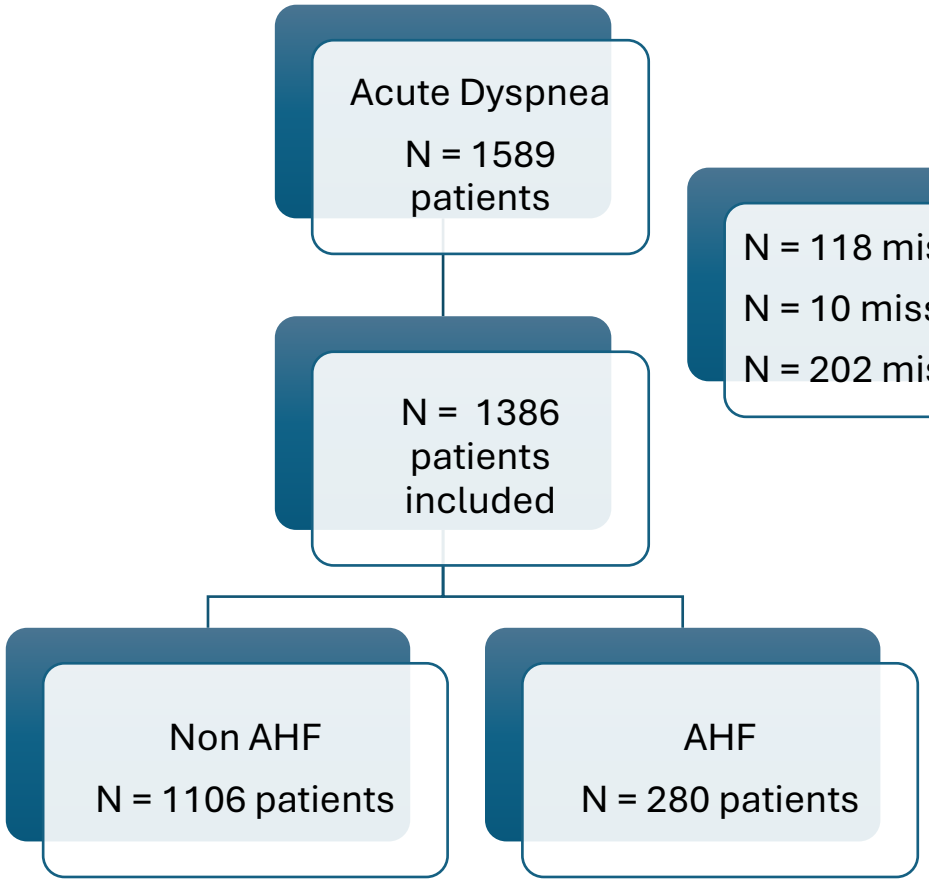
Am J Emerg Med, 2016

Variables	*Logistic regression coefficients*	*P value*	*Points score*
			+ 2

Classification	*Congestive Heart Failure*	*No Congestive Heart Failure*	*Total*
Low probability *(Score 0-3)*	2 (6.7 %)	28 (93.3 %)	30 (14.6 %)
Intermediate probability *(Score 4-8)*	55 (58.5 %)	39 (41.5 %)	94 (45.6 %)
High probability *(Score 9-15)*	75 (91. 5 %)	7 (8.5 %)	82 (39.8 %)

ST segment abnormalities	1,08	0,0083	1
Atrial fibrillation/flutter	0,99	0,0002	1
Maximal score			15

Comparaison score de Brest et du score PREDICA pour le diagnostic SICA



Score A	Score B	Score A vs. Score B	
		IAUC (CI 95%)	p-value
Brest score (points)	PREDICA score (points)	3.3 (0.8 to 5.8)	0.009

Intern Emerg Med, 2022 Jun;17(4):1155-1163

Radiographie Pulmonaire (RP)

LIMITES

Qualité de la RP
Souvent faite en position assise
Retard radiologique
Interprétation variable

Wang CS, and al JAMA. 19 oct 2005;294(15):1944-56.C

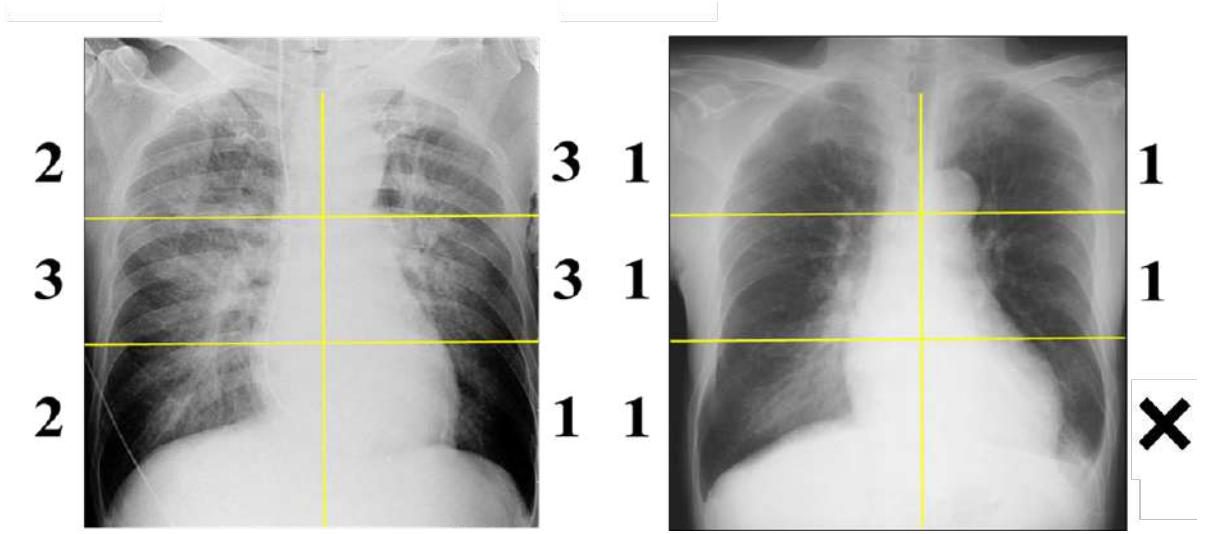
PLOS MEDICINE

RESEARCH ARTICLE

Diagnostic performance of congestion score index evaluated from chest radiography for acute heart failure in the emergency department: A retrospective analysis from the PARADISE cohort

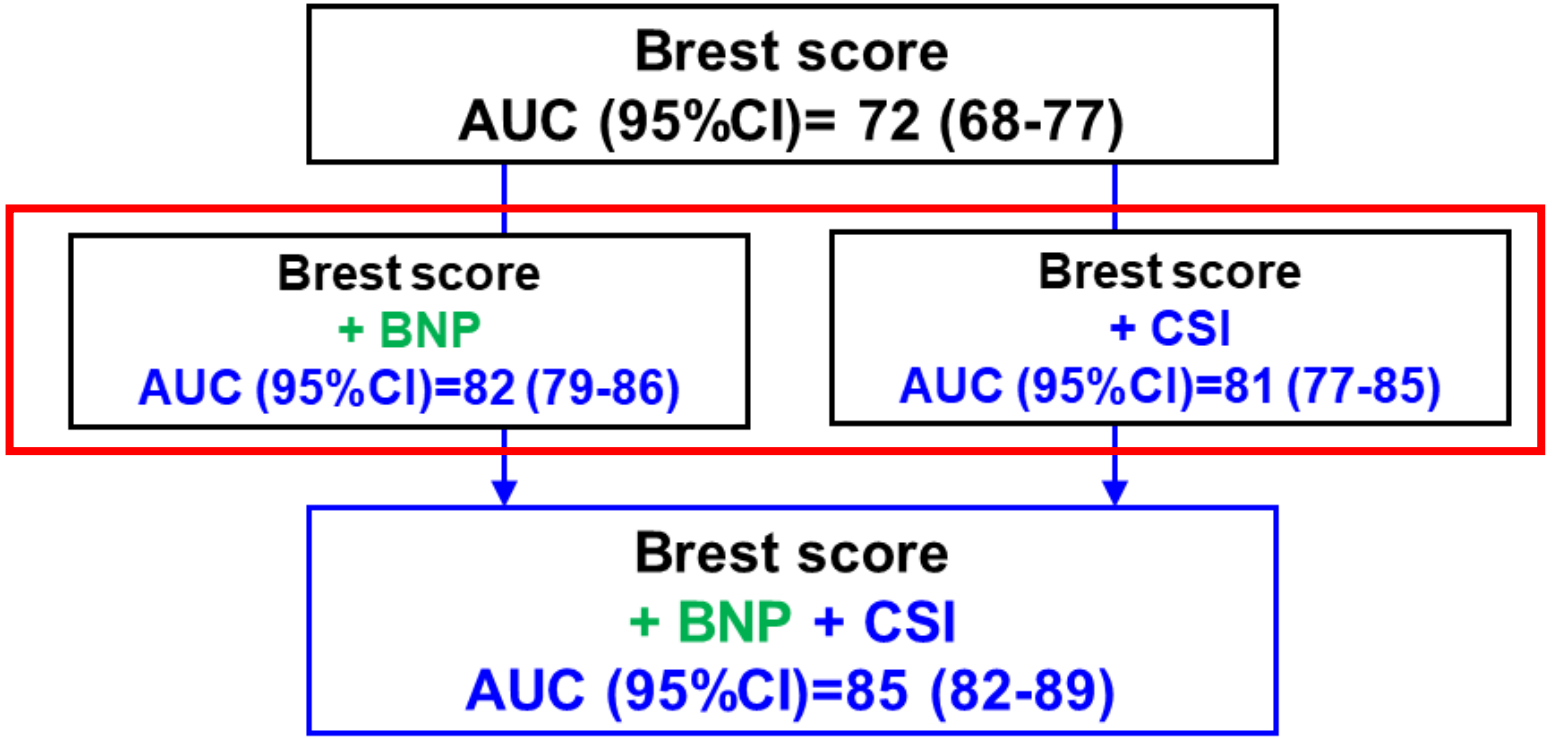
Masatake Kobayashi[1☯], Amine Douair[2☯], Kevin Duarte[1], Déborah Jaeger[1,2], Gaetan Giacomin[2], Adrien Bassand[2], Victor Jeangeorges[2], Laure Abensur Vuillaume[3], Gregoire Preud'homme[1], Olivier Huttin[1], Faiez Zannad[1], Patrick Rossignol[1], Tahar Chouihed[1,2], Nicolas Girerd[1]*

Radiographic congestion score index



	1		2	3
Superior	Cephalization	Interstitial pulmonary edema	Alveolar pulmonary edema	
Middle	Peribronchial cuffing		Localized edema	Confluent edema
	Perivascular cuffing			Mild / Intense
	Kerley A line			
Inferior	Kerley B line			
	Kerley C line			
No congestive sign; Vanishing tumor / Costophrenic angle				

- ✓1,333 patients admitted for acute dyspnea to the ED
- ✓Mean age 72years, Men 52%, HTN 55%, Hx HF 19%
- ✓Radiographic CSI at the ED
- ✓17% had AHF diagnosis at discharge



Brest score calculated from
age, comorbidity burden, dyspnea and clinical congestion

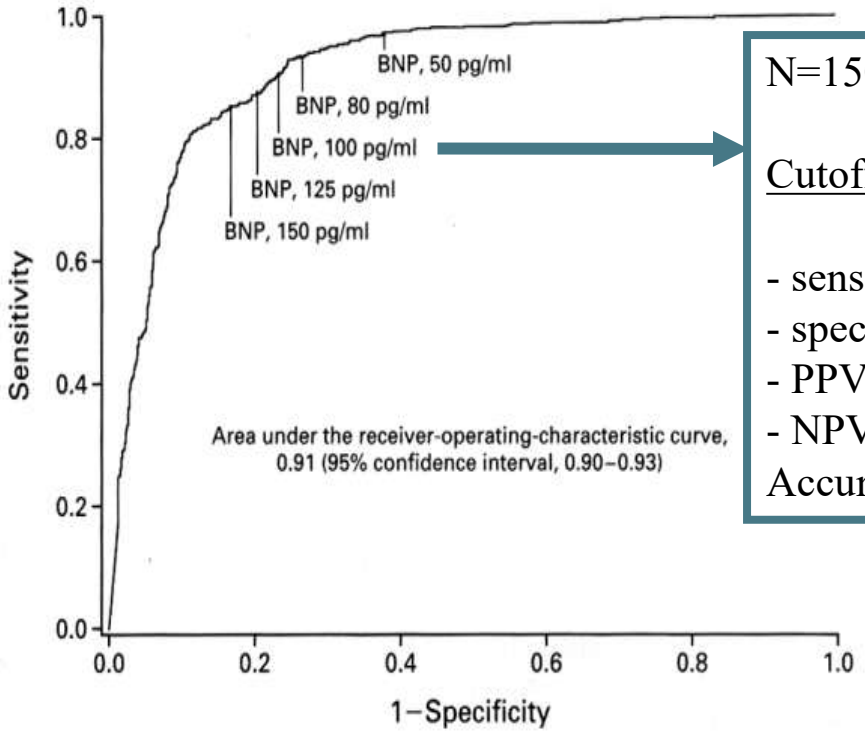
	CSI		BNP	
Baseline model	delta AUC (95%CI)	NRI (95%CI)	delta AUC (95%CI)	NRI (95%CI)
on top of Brest score	9 (5-12)	75 (59-91)	10 (7-13)	74 (58-90)
on top of Brest score + BNP	3 (1-5)	55 (38-72)	—	—
on top of Brest score + CSI	—	—	4 (2-6)	63 (47-79)

CSI improved clinical-based diagnostic value, to a similar extent as BNP

Echographie Cardiaque: quoi faire ?

LIMITES

Compliqué
Nécessite une formation importante
Validation nécessaire pratique +++++
Limité par l'échogénicité des patients
Durée de l'examen +++



N=1500

Cutoff 100 pg /ml

- sensitivity	90 %
- specificity	76 %
- PPV	79 %
- NPV	89 %
Accuracy	83 %

BNP pg/ml	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value	Accuracy
	(95 percent confidence interval)				
50	97 (96–98)	62 (59–66)	71 (68–74)	96 (94–97)	79
80	93 (91–95)	74 (70–77)	77 (75–80)	92 (89–94)	83
100	90 (88–92)	76 (73–79)	79 (76–81)	89 (87–91)	83
125	87 (85–90)	79 (76–82)	80 (78–83)	87 (84–89)	83
150	85 (82–88)	83 (80–85)	83 (80–85)	85 (83–88)	84

Maisel, NEJM 2002

BREATHING NOT PROPERLY
B N P
MULTINATIONAL STUDY

BNP et NT-proBNP : Exclusion !!!

Januzzi et al. *Eur Heart J* 2006

Table 2 Optimal NT-proBNP cut-points for the diagnosis or exclusion of acute HF among dyspnoeic patients

Category	Optimal cut-point	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Accuracy (%)
Confirmatory ('rule in') cut-points						
<50 years ($n = 184$)	450 pg/mL	97	93	76	99	94
50–75 years ($n = 537$)	900 pg/mL	90	82	83	88	85
>75 years ($n = 535$)	1800 pg/mL	85	73	92	55	83
Rule in, overall		90	84	88	66	85
Exclusionary ('rule out') cut-point						
All patients ($n = 1256$)	300 pg/mL	99	60	77	98	83

International evidence-based recommendations for point-of-care lung ultrasound

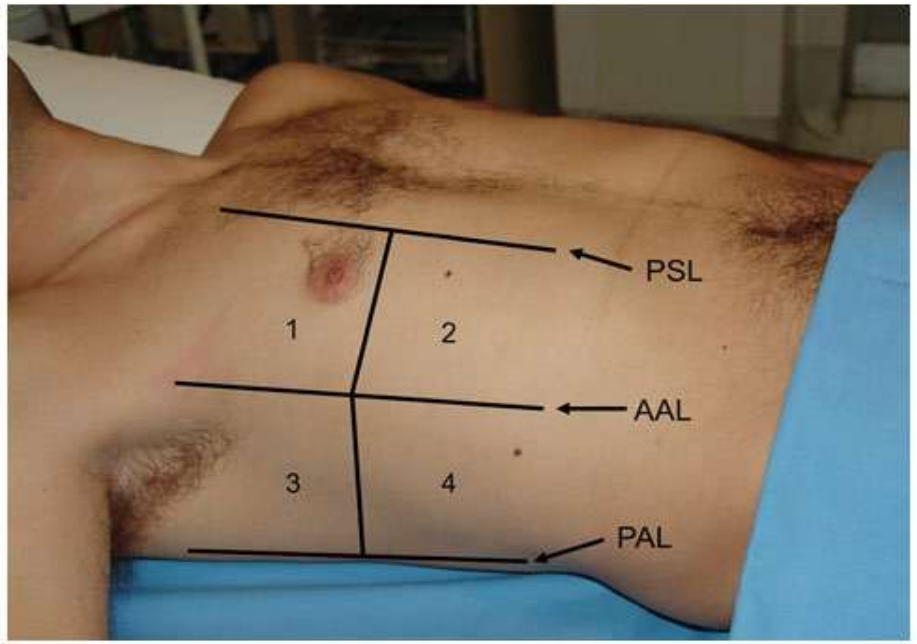


Fig. 2 The four chest areas per side considered for complete eight-zone lung ultrasound examination. These areas are used to evaluate for the presence of interstitial syndrome. Areas *1* and *2* denote the upper anterior and lower anterior chest areas, respectively. Areas *3* and *4* denote the upper lateral and basal lateral chest areas, respectively. *PSL* parasternal line, *AAL* anterior axillary line, *PAL* posterior axillary line (modified from Volpicelli et al. [19])

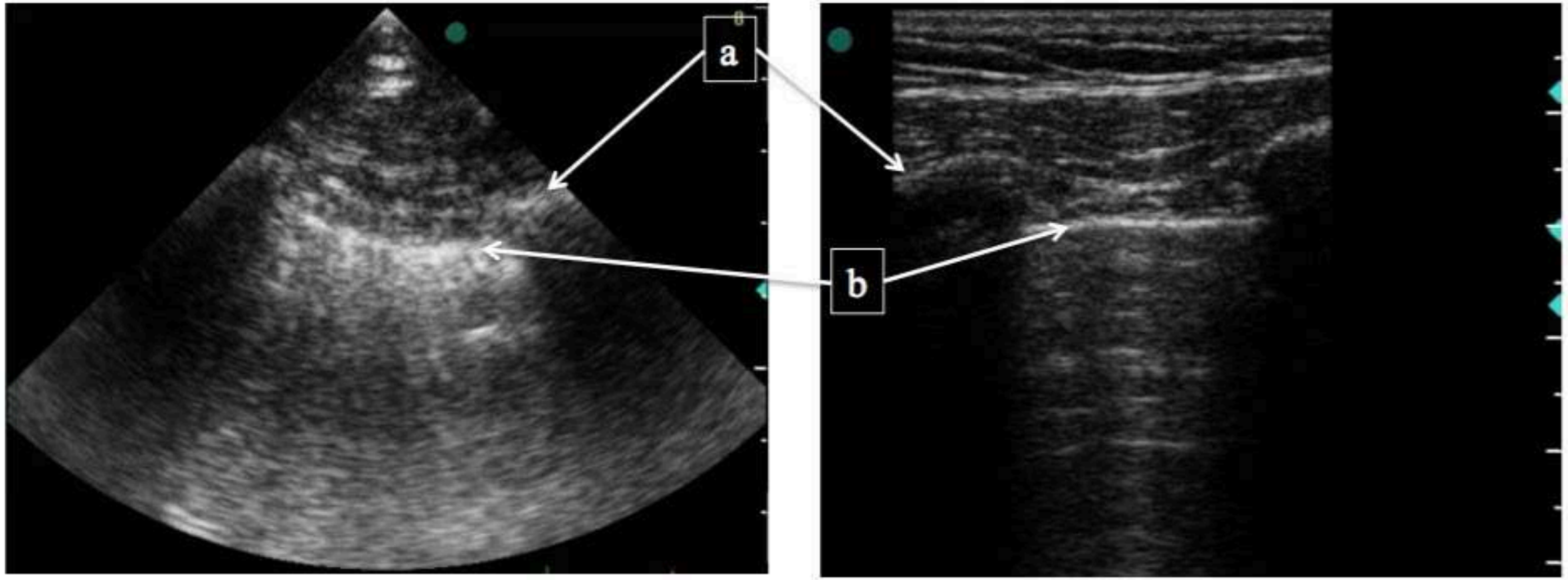
28 points

Quantification pour les contextes néphrologiques et cardiologiques

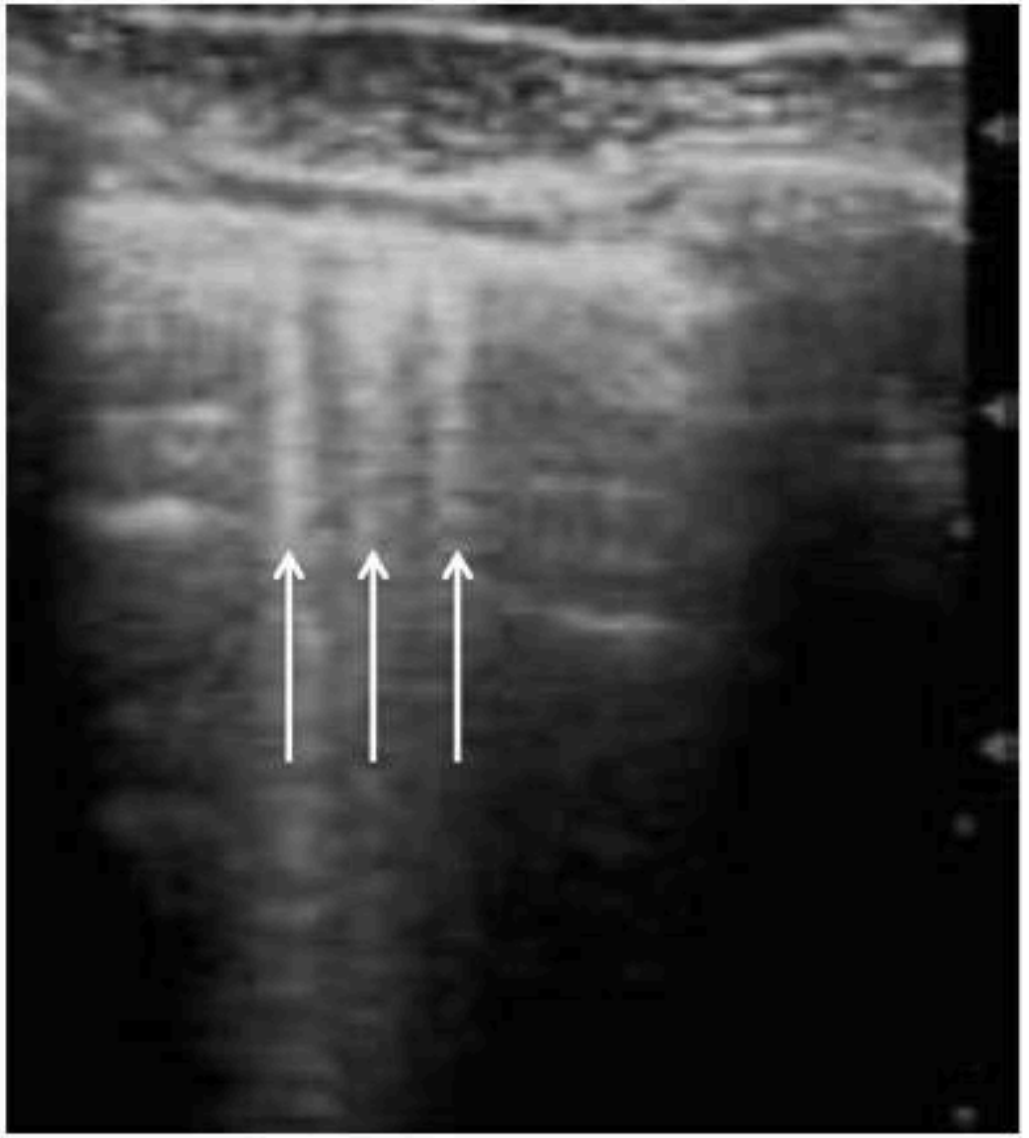
Mais en URGENCE ???

Volpicelli, Intensive Care Med 2012

Echographie pulmonaire normale



Ligne B => SICA



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[Education and Clinical Practice Original Research]

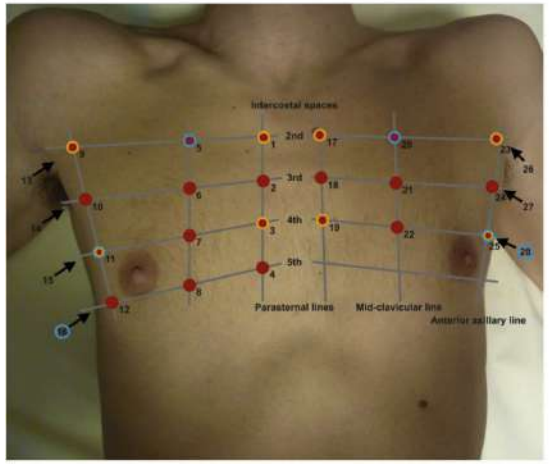
CHEST

Accuracy of Several Lung Ultrasound Methods for the Diagnosis of Acute Heart Failure in the ED

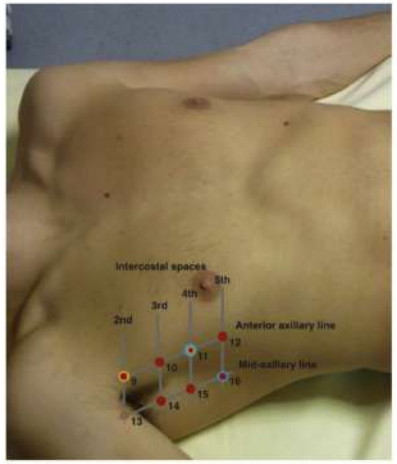
A Multicenter Prospective Study

Aurélien Buessler, MD; Tahar Chouihed, MD, PhD; Kévin Duarte, PhD; Adrien Bassand, MD; Matthieu Huot-Marchand, MD; Yannick Gottwalles, MD; Alice Pénine, MD; Elies André, MD; Lionel Nace, MD; Déborah Jaeger, MD; Masatake Kobayashi, MD; Stefano Coiro, MD, PhD; Patrick Rossignol, MD, PhD; and Nicolas Girerd, MD, PhD

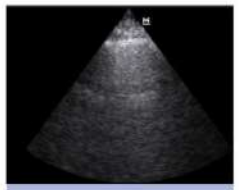
A



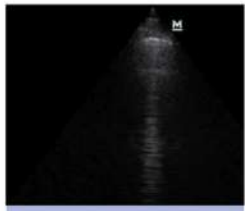
B



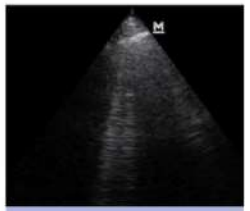
C



No B-line



1 B-line



3 B-lines

28-point method

8-point method

6-point method

and 4-point method

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TABLE 3] Diagnostic Performance of the Various LUS Techniques in Conjunction With the Brest Score for Pulmonary Congestion Assessment

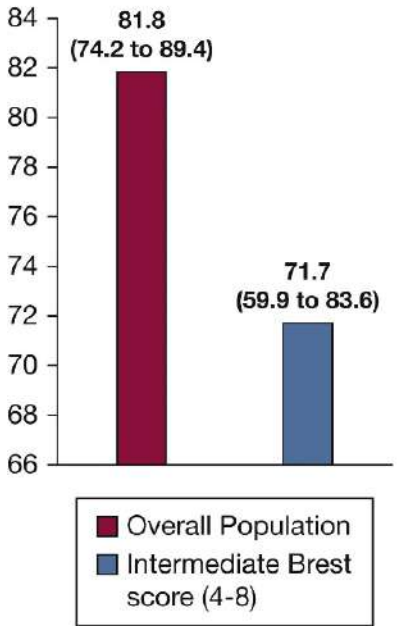
Variable	Performance			Diagnostic Value of LUS Techniques in Addition to the Brest Score			
	C-Index Value of the Considered Parameter (95% CI)	Specificity (95% CI)	Sensitivity (95% CI)	C-Index Value of Brest Score and Considered Parameter (95% CI)	*P* Value	C-Index Increase in Addition to the Brest Score (95% CI)	*P* Value
Overall population							
Brest score							
Continuous	81.8 (74.2 to 89.4)	...	...	...		...	
Categories (0-3, 4-8, 9-15)	72.8 (65.3 to 80.3)	...	...	...		...	
4-point method							
B-line count	76.7 (68.2 to 85.1)	...	...	88.1 (82.0 to 94.1)	< .0001	6.3 (1.0 to 11.6)	.020
≥ 1 bilateral positive point	68.3 (60.8 to 75.8)	88.6 (75.4 to 96.2)	47.9 (36.1 to 60.0)	86.6 (80.1 to 93.1)	< .0001	4.8 (−0.1 to 9.6)	.053
≥ 2 bilateral positive points	63.7 (58.5 to 68.8)	100.0 (92.0 to 100.0)	27.4 (17.6 to 39.1)	85.3 (78.6 to 91.9)	< .0001	3.5 (0.4 to 6.5)	.026
6-point method							
B-line count	78.2 (70.1 to 86.4)	...	...	89.1 (83.3 to 94.8)	< .0001	7.3 (1.7 to 12.8)	.010
≥ 1 bilateral positive point	72.4 (65.0 to 79.8)	88.6 (75.4 to 96.2)	56.2 (44.1 to 67.8)	88.5 (82.5 to 94.5)	< .0001	6.7 (0.9 to 12.5)	.024
≥ 2 bilateral positive points	69.9 (64.2 to 75.5)	100.0 (92.0 to 100.0)	39.7 (28.5 to 51.9)	88.4 (82.6 to 94.2)	< .0001	6.6 (2.3 to 10.8)	.002
8-point method							
B-line count	81.8 (74.3 to 89.3)	...	....	90.6 (85.2 to 96.0)	< .0001	8.8 (2.8 to 14.7)	.004
≥1 bilateral positive point	74.0 (67.1 to 80.9)	93.2 (81.3 to 98.6)	54.8 (42.7 to 66.5)	88.7 (82.9 to 94.6)	< .0001	6.9 (1.6 to 12.2)	.010
≥ 2 bilateral positive points	69.4 (63.3 to 75.5)	97.7 (88.0 to 99.9)	41.1 (29.7 to 53.2)	88.7 (82.8 to 94.7)	< .0001	6.9 (1.7 to 12.1)	.009
Patients with intermediate Brest score							
Brest score							
Continuous	71.7 (59.9 to 83.6)	...	...	NA	...	...	...
4-point method							
B-line count	75.9 (65.0 to 86.8)	...	...	81.6 (71.7 to 91.5)	< .0001	9.9 (0.1 to 19.6)	.047
≥ 1 bilateral positive point	68.7 (59.3 to 78.2)	88.5 (69.8 to 97.6)	49.0 (34.4 to 63.7)	78.5 (67.8 to 89.2)	< .0001	6.8 (−2.1 to 15.7)	.13
≥ 2 bilateral positive points	61.2 (55.3 to 67.1)	100.0 (86.8 to 100.0)	22.4 (11.8 to 36.6)	76.5 (65.9 to 87.1)	< .0001	4.8 (0.3 to 9.3)	.037
6-point method							
B-line count	78.4 (68.0 to 88.7)	...	...	83.4 (74.0 to 92.7)	< .0001	11.6 (1.9 to 21.4)	.020
≥1 bilateral positive point	71.8 (62.4 to 81.2)	88.5 (69.8 to 97.6)	49.0 (34.4 to 63.7)	80.6 (70.4 to 90.8)	< .0001	8.9 (−0.2 to 17.9)	.054
≥2 bilateral positive points	69.4 (62.5 to 76.3)	100.0 (86.8 to 100.0)	22.4 (11.8 to 36.6)	81.4 (71.9 to 90.8)	< .0001	9.6 (3.1 to 16.1)	.004
8-point method							
B-line count	81.0 (71.2 to 90.8)	...	...	85.4 (76.4 to 94.3)	< .0001	13.6 (3.4 to 23.8)	.009
≥ 1 bilateral positive point	72.7 (63.9 to 81.5)	92.3 (74.9 to 99.1)	53.1 (38.3 to 67.5)	82.4 (72.6 to 92.2)	< .0001	10.7 (1.7 to 19.7)	0.020
≥ 2 bilateral positive points	67.5 (59.6 to 75.3)	96.2 (80.4 to 99.9)	38.8 (25.2 to 53.8)	80.4 (70.3 to 90.4)	< .0001	8.6 (0.9 to 16.4)	0.029

NA = not appropriate. See Table 1 legend for expansion of other abbreviations.

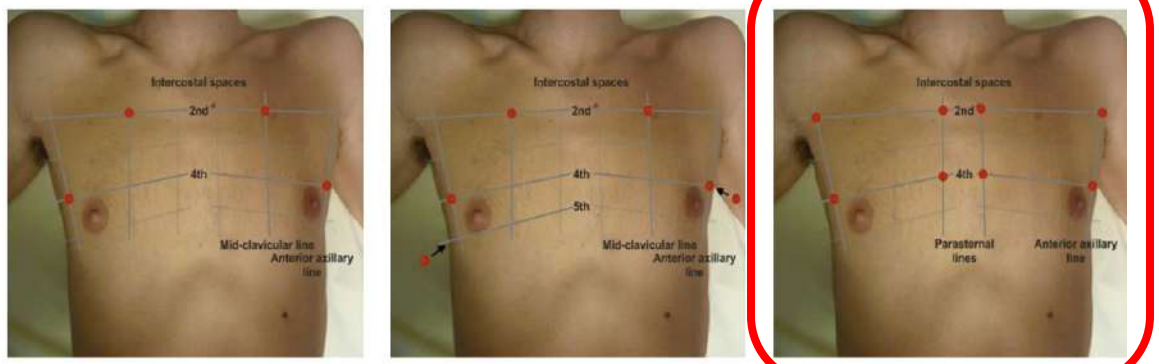
Brest Score

Variables	*Points score*
	+2
Age >65 y	1
Sudden dyspnea	2
Night outbreak	1
Orthopnea	1
Prior CHF episode	2
COPD	–2
Myocardial infarction	1
Pulmonary crackles	2
Pitting leg edema	1
ST abnormalities	1
Atrial fibrillation/flutter	1
Maximal score	**15**

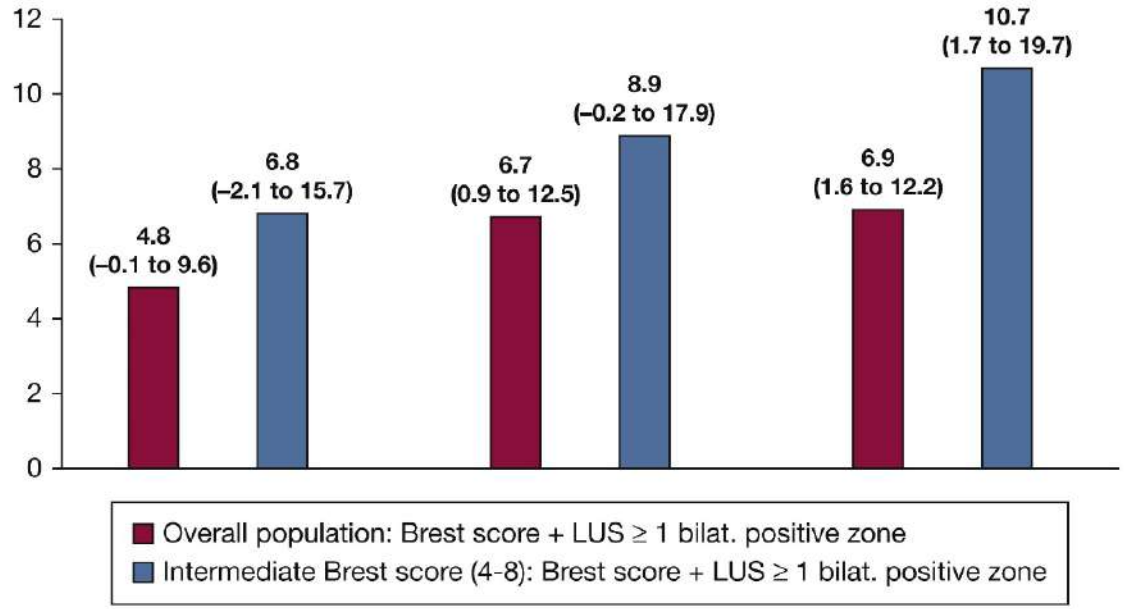
AUC for Brest score



4-point LUS method **6-point LUS method** **8-point LUS method**



Increase in AUC by LUS methods in addition to the Brest score



- L'écho.Pulm. est un outil précis pour le diagnostic de l'insuffisance cardiaque
- La méthode à 6 ou 8 points font aussi bien que celle à 28 points
- L'écho. Pulm. a une plus value encore plus importante pour les patients avec un score de Brest intermédiaire

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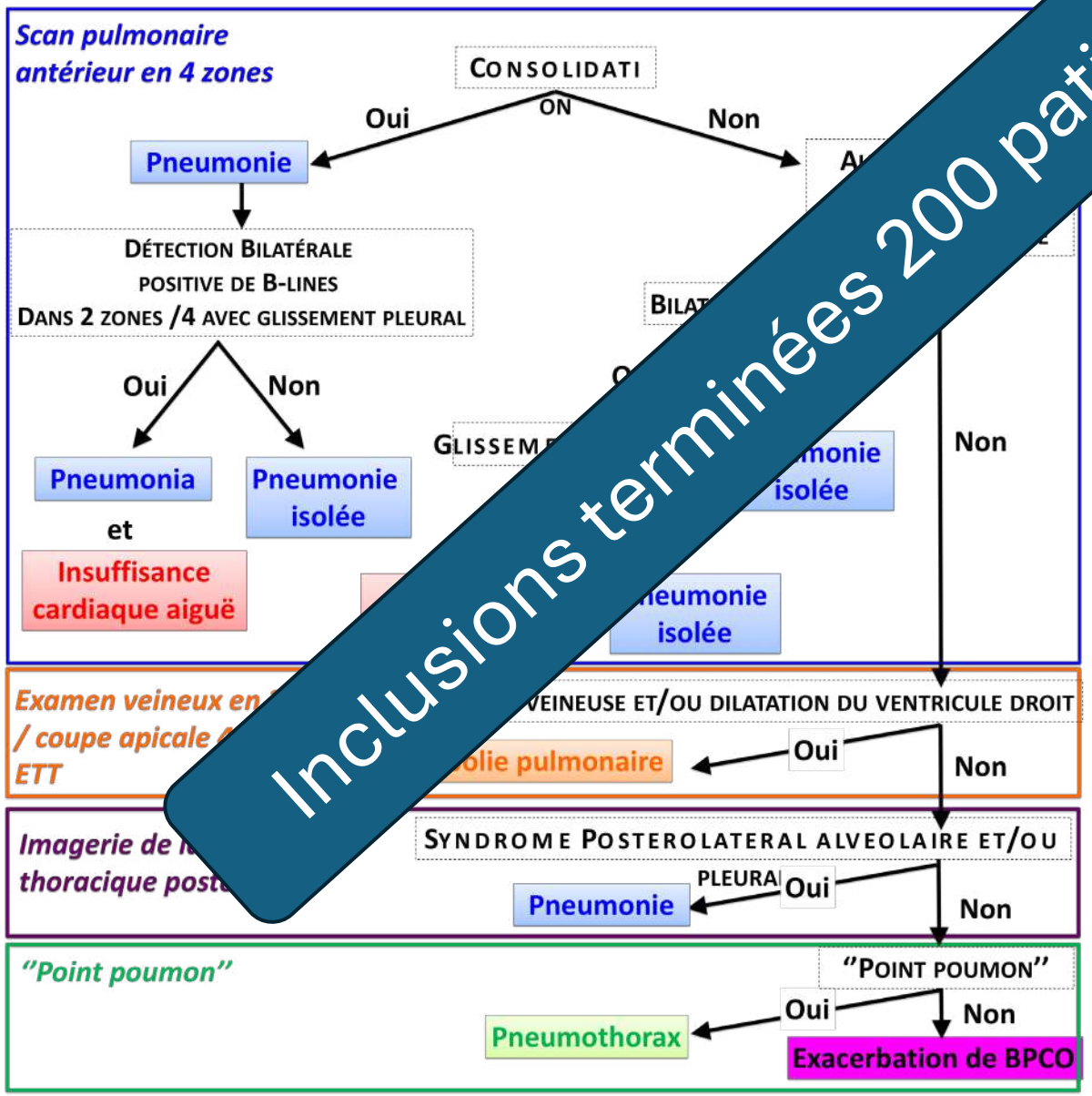

Inclusions terminées 200 patients

EMERALD-US

Evaluation de la faisabilite de la **M**ise en oeuvre
et de la p**ER**formance d'un **AL**gorithme d'échographie
aux urgences
pour le diagnostic de **D**yspnee aigue

PHRC

Originalité

- 8 pts d'évaluations thoracique
- Autorise le diagnostic "mixte"
  - Ex pneumopathie et décompensation cardiaque

Implementation of Mobile Intensive Care Unit Ultrasound based management for acute DYSPNEA : A stepped wedge cluster randomized controlled trial. IMICU2-Dyspnea

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PREPS

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