



CORSO PRE-CONGRESSUALE DI  
ECOGRAFIA TORACICA  
NELL'ANZIANO



70<sup>o</sup> CONGRESSO  
NAZIONALE

SIGG

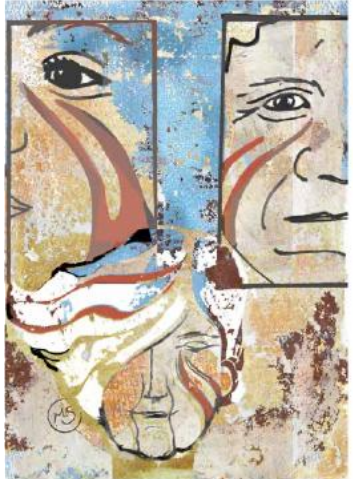
LIBERI E LONGEVI

17-20  
Dicembre  
2025  
Napoli

Università degli  
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di **SCAMPIA**



SOCIETÀ ITALIANA  
DI GERONTOLOGIA  
E GERIATRIA



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CORSO PRE-CONGRESSUALE IN ECOGRAFIA TORACICA NELL'ANZIANO

## **EVIDENZE SULL'APPLICAZIONE DELL'ECOGRAFIA TORACICA NELL'ANZIANO**

Chukwuma Okoye

Università degli Studi di Milano-Bicocca  
Fondazione IRCCS San Gerardo dei Tintori





**Situazione ideale**



**Situazione reale**



Research

Open Access

## 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 Boddart<sup>8</sup>

### Abstract

**Introduction** Our objectives were to determine the causes of acute respiratory failure (ARF) in elderly patients and to assess the accuracy of the initial diagnosis by the emergency physician, and that of the prognosis.

**Method** In this prospective observational study, patients were included if they were admitted to our emergency department, aged 65 years or more with dyspnea, and fulfilled at least one of the following criteria of ARF: respiratory rate at least 25 minute<sup>-1</sup>; arterial partial pressure of oxygen (PaO<sub>2</sub>) 70 mmHg or less, or peripheral oxygen saturation 92% or less in breathing room air; arterial partial pressure of CO<sub>2</sub> (PaCO<sub>2</sub>) ≥ 45 mmHg, with pH ≤ 7.35. The final diagnoses were determined by an expert panel from the completed medical chart.

**Results** A total of 514 patients (aged (mean ± standard deviation) 80 ± 9 years) were included. The main causes of ARF were cardiogenic pulmonary edema (43%), community-acquired pneumonia (35%), acute exacerbation of chronic respiratory disease (32%), pulmonary embolism (18%), and

acute asthma (3%); 47% had more than two diagnoses. In-hospital mortality was 16%. A missed diagnosis in the emergency department was noted in 101 (20%) patients. The accuracy of the diagnosis of the emergency physician ranged from 0.76 for cardiogenic pulmonary edema to 0.96 for asthma. An inappropriate treatment occurred in 162 (32%) patients, and lead to a higher mortality (25% versus 11%;  $p < 0.001$ ). In a multivariate analysis, inappropriate initial treatment (odds ratio 2.83,  $p < 0.002$ ), hypercapnia > 45 mmHg (odds ratio 2.79,  $p < 0.004$ ), clearance of creatinine < 50 ml minute<sup>-1</sup> (odds ratio 2.37,  $p < 0.013$ ), elevated NT-pro-B-type natriuretic peptide or B-type natriuretic peptide (odds ratio 2.06,  $p < 0.046$ ), and clinical signs of acute ventilatory failure (odds ratio 1.98,  $p < 0.047$ ) were predictive of death.

**Conclusion** Inappropriate initial treatment in the emergency room was associated with increased mortality in elderly patients with ARF.

## 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>

An inappropriate treatment occurred in 162 (32%) patients, and lead to a higher mortality (25% versus 11%;  $p < 0.001$ ).

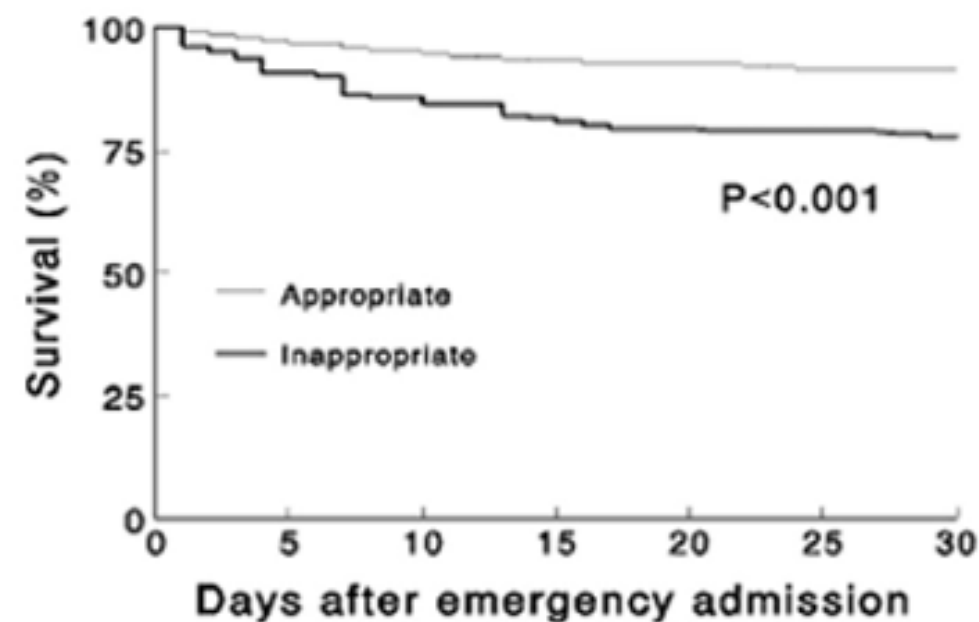
Criteria of clinical severity	Number of criteria of clinical severity	Number of patients (%)	
Heart rate $\geq 120$ minute <sup>-1</sup>	52 (10)	None	139 (27)
Heart rate (mm <sup>-1</sup> )	129 $\pm$ 14	1 criterion	114 (22)
Orthopnea	255 (50)	2 criteria	89 (17)
Abdominal respiration	77 (15)	3 or more	172 (34)
Use of accessory muscles	146 (28)		
Cyanosis	56 (11)		
Ventilatory rate $\geq 30$ minute <sup>-1</sup>	100 (19)		
Encephalopathy	13 (3)		
Mottling	37 (7)		
Clinical signs of right heart failure <sup>a</sup>	288 (56)		

All patients fulfilled the other inclusion criteria (namely admission to the emergency department, acute dyspnea, and age  $\geq 65$  years). Data are number (%) and means  $\pm$  SD for the numeric variables in patients who fulfilled the given criteria. <sup>a</sup>Abdominal jugular reflux and/or jugular venous pulse. PaO<sub>2</sub>, arterial partial pressure of oxygen; PaCO<sub>2</sub>, arterial partial pressure of CO<sub>2</sub>; SpO<sub>2</sub>, peripheral oxygen saturation.

Acute Exacer.

Causes

Figure 2

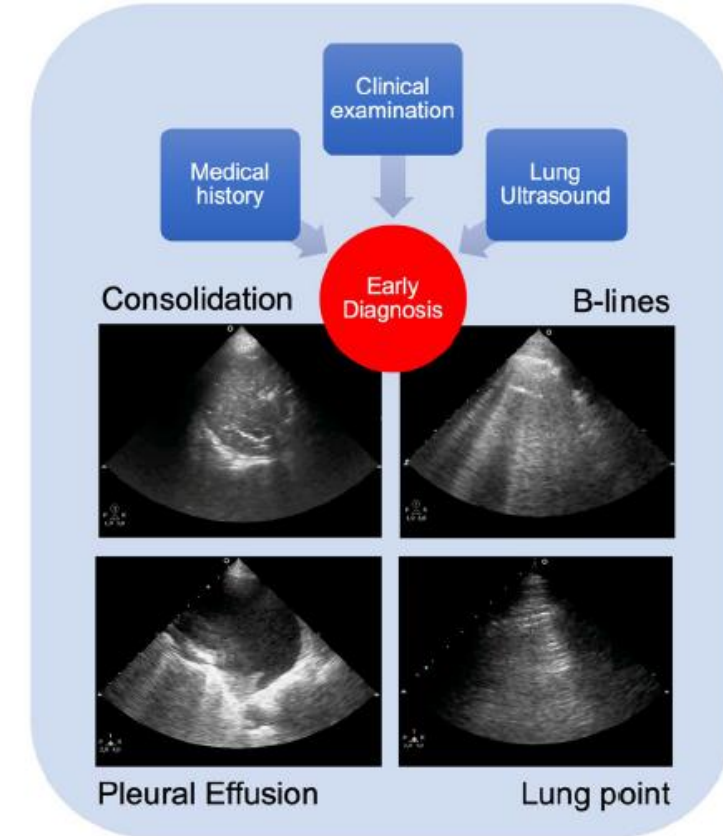
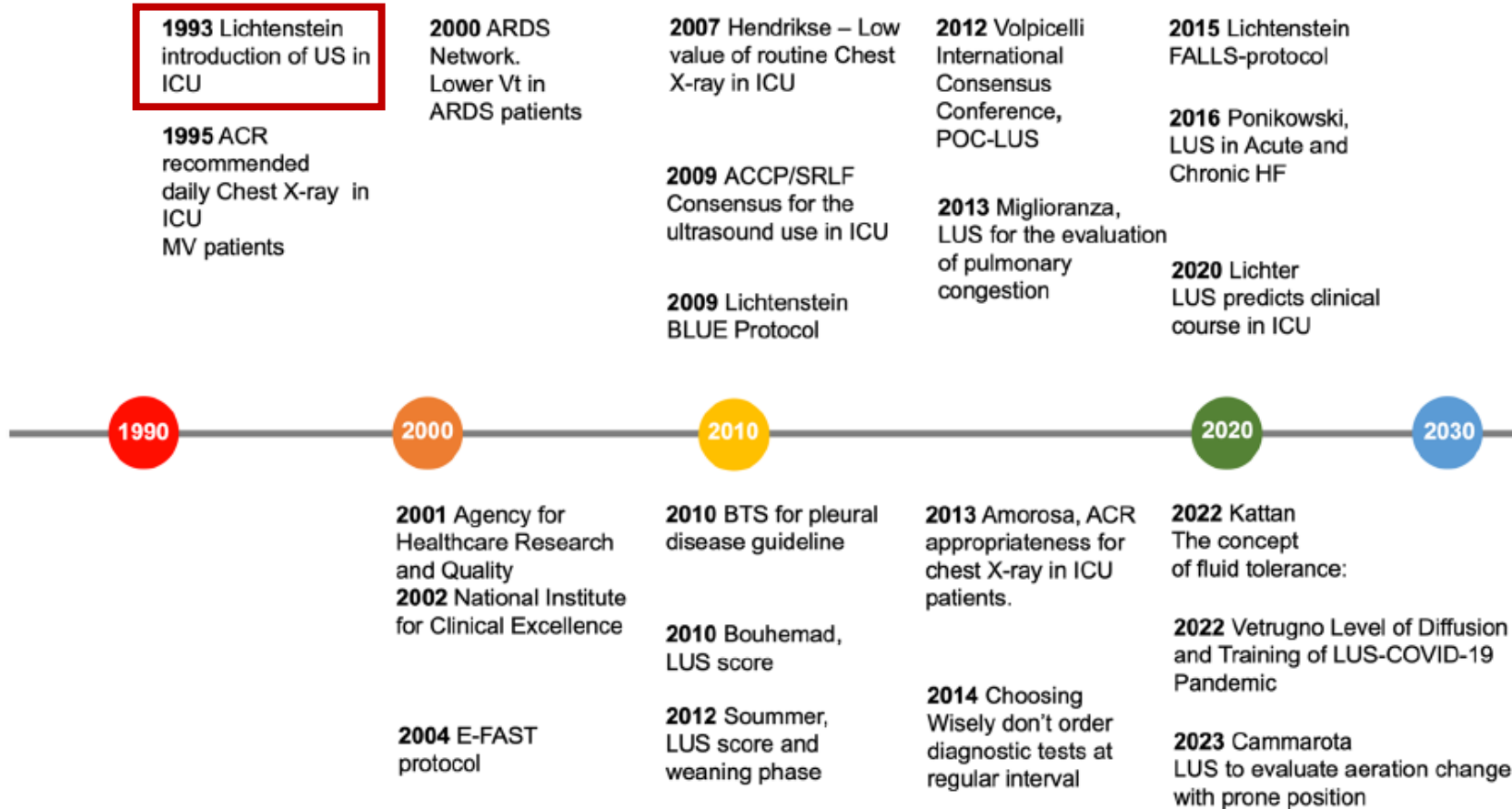




# Ma facciamo un passo indietro nel tempo



# ECOGRAFIA TORACICA: TIMELINE STORICA



## The Comet-tail Artifact An Ultrasound Sign of Alveolar-Interstitial Syndrome

DANIEL LICHTENSTEIN, GILBERT MÉZIÈRE, PHILIPPE BIDERMAN, AGNÈS GEPNER, and OLIVIER BARRÉ

Service de Réanimation Médicale and Service de Radiologie, Hôpital Ambroise-Paré, Boulogne (Paris), and Service de Réanimation Polyvalente, Centre Hospitalier Général, Saint-Cloud (Paris), France

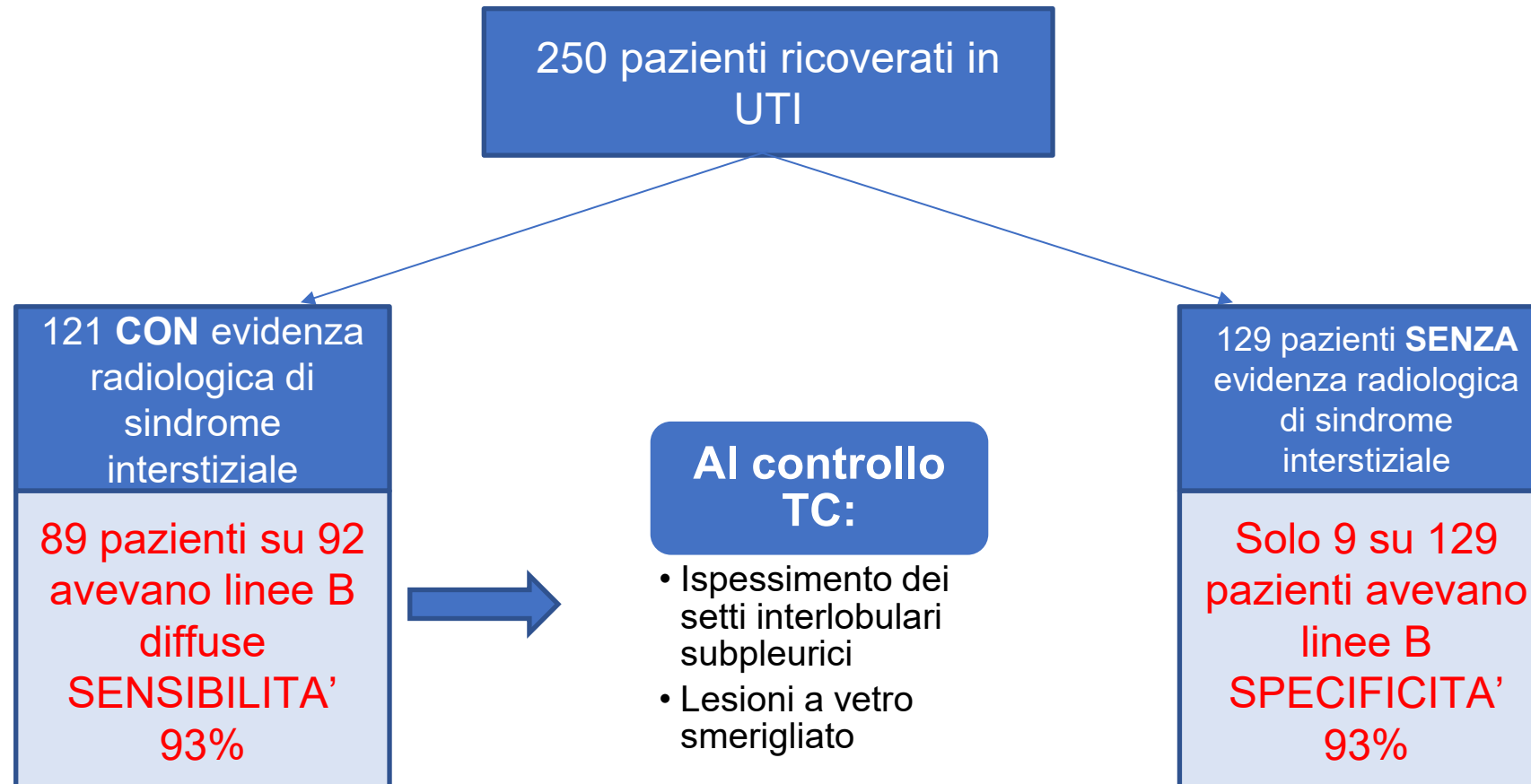
Can ultrasound be of any help in the diagnosis of alveolar-interstitial syndrome? In a prospective study, we examined 250 consecutive patients in a medical intensive care unit: 121 patients with radiologic alveolar-interstitial syndrome (disseminated to the whole lung,  $n = 92$ ; localized,  $n = 29$ ) and 129 patients without radiologic evidence of alveolar-interstitial syndrome. The antero-lateral chest wall was examined using ultrasound. The ultrasonic feature of multiple comet-tail artifacts fanning out from the lung surface was investigated. This pattern was present all over the lung surface in 86 of 92 patients with diffuse alveolar-interstitial syndrome (sensitivity of 93.4%). It was absent or confined to the last lateral intercostal space in 120 of 129 patients with normal chest X-ray (specificity of 93.0%). Tomodensitometric correlations showed that the thickened sub-pleural interlobular septa, as well as ground-glass areas, two lesions present in acute pulmonary edema, were associated with the presence of the comet-tail artifact. In conclusion, presence of the comet-tail artifact allowed diagnosis of alveolar-interstitial syndrome. **Lichtenstein D, Mézière G, Biderman P, Gepner A, Barré O. The comet-tail artifact: an ultrasound sign of alveolar-interstitial syndrome.**

AM J RESPIR CRIT CARE MED 1997;156:1640-1646.

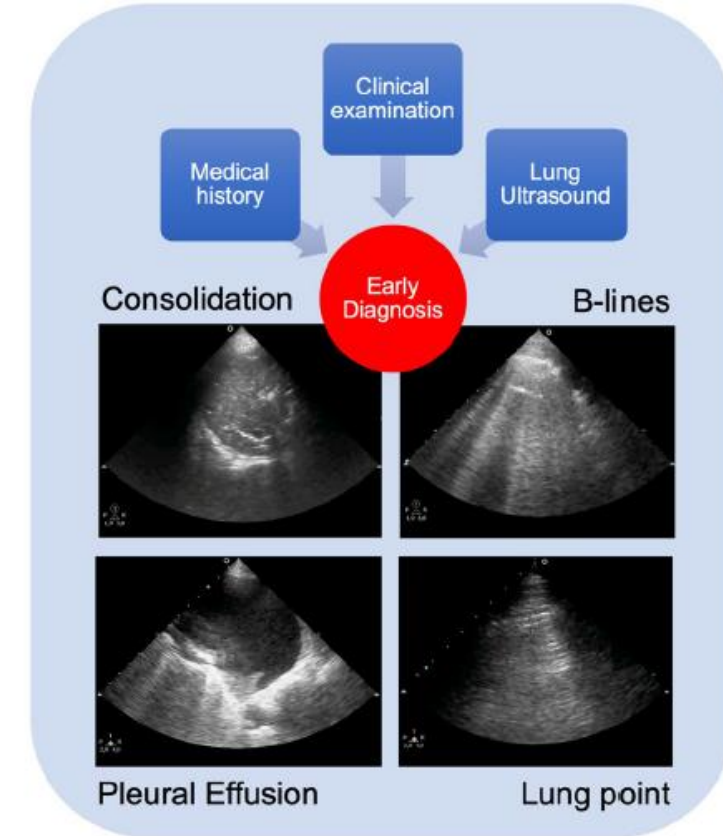
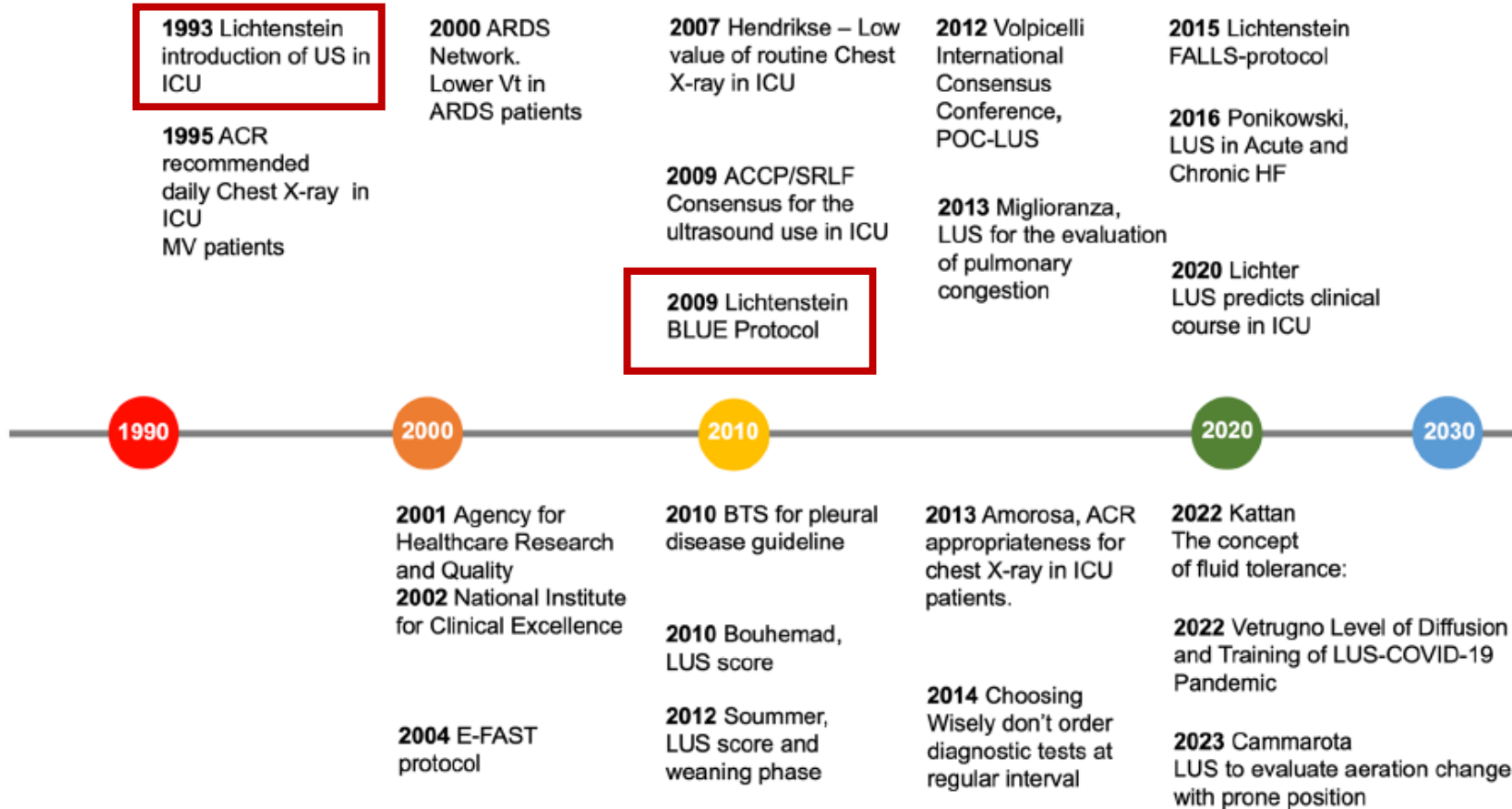


# La scoperta delle linee B

Lichstenstein D, The comet-tail artifact: an ultrasound sign of alveolar-interstitial syndrome. AM J Respir Crit Care Med 1997.



# ECOGRAFIA TORACICA: TIMELINE STORICA





# CHEST<sup>®</sup>

Official publication of the American College of Chest Physicians

**Relevance of Lung Ultrasound in the Diagnosis of Acute Respiratory Failure<sup>\*</sup>: The BLUE Protocol**

Daniel A. Lichtenstein and Gilbert A. Mezière

*Chest* 2008;134;117-125; Prepublished online April 10, 2008;  
DOI 10.1378/chest.07-2800



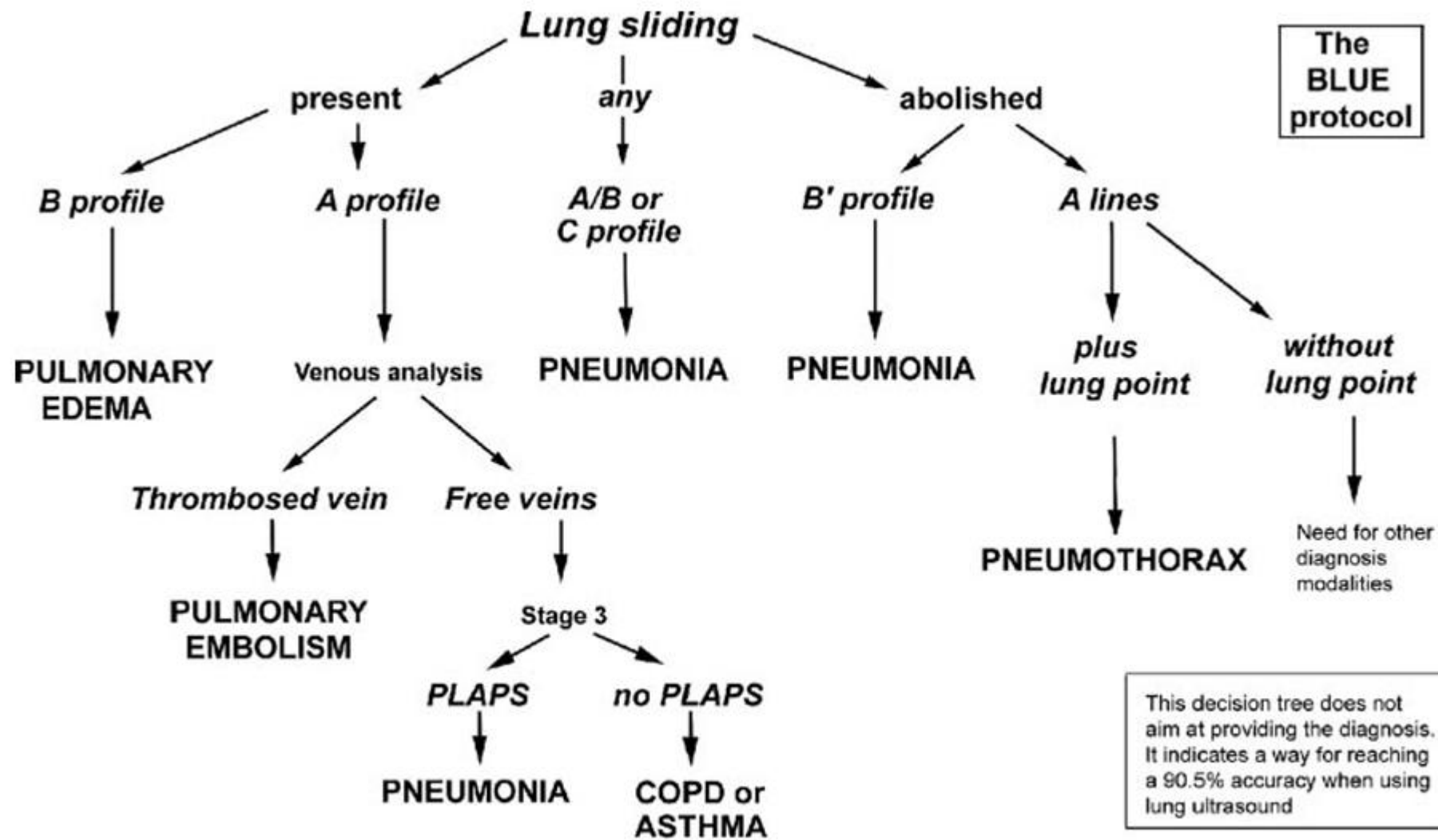


FIGURE 7. A decision tree utilizing lung ultrasonography to guide diagnosis of severe dyspnea.

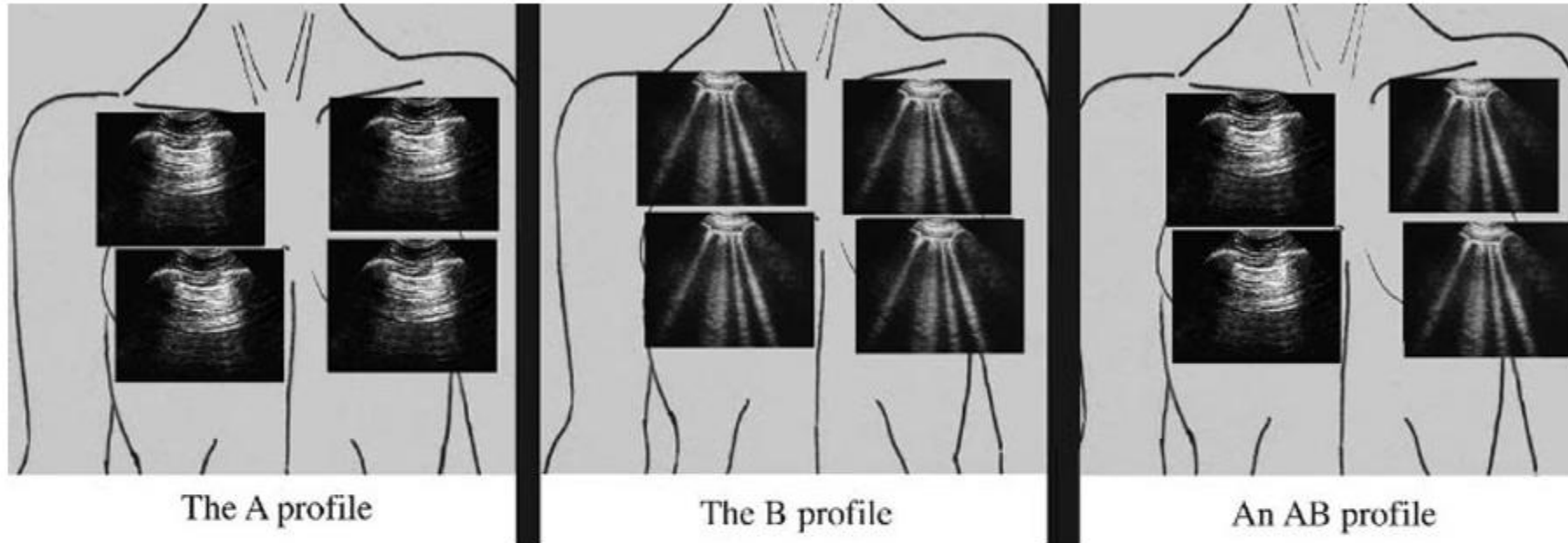


FIGURE 6. Ultrasound profiles. *Left panel:* The A profile is defined as predominant A lines plus lung sliding at the anterior surface in supine or half-sitting patients (stage 1/1'). This profile suggests COPD, embolism, and some posterior pneumonia. Pulmonary edema is nearly ruled out. *Middle:* The B profile is defined as predominant B + lines in stage 1. This profile suggests cardiogenic pulmonary edema, and nearly rules out COPD, pulmonary embolism, and pneumothorax. *Right panel:* an A/B + profile, massive B lines at the left lung, A lines at the right lung. This profile is usually associated with pneumonia.

**Table 2—Comprehensive Results\***

Anterior Pattern	Bilateral-Predominant A Lines				Bilateral-Predominant B + Lines				Alveolar Consolidation				Predominant A Lines on One Side, and Predominant B + Lines on Other Side				A Lines — plus lung point Any
	+	–	+	–	+	+	–	–	+	+	–	–	+	+	–	–	
Lung sliding PLAPS	Yes	Yes	No	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
Pulmonary edema	2	0	0	0	54 <sup>1</sup>	8	0	0	0	0	0	0	0	0	0	0	0
COPD	2	1	38	4	2	1	0	0	1	0	0	0	0	0	0	0	0
Asthma	1	0	33 <sup>1</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pulmonary embolism	10 <sup>8</sup>	0	10 <sup>9</sup>	0	0	0	0	0	0	0	1 <sup>0</sup>	0	0	0	0	0	0
Pneumothorax	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	8
Pneumonia	34	1	3	0	4	2	9	0	7	2	9	0	7	1	4	0	0
	A and A' profile plus PLAPS		Normal profile, and A' profile without PLAPS		B profile		B' profile		C profile			A/B profile			Pneumothorax profile		

\*Exponent indicates No. of cases with venous thrombosis (datum without exponent means negative venous exploration).



Sì, ma i nostri pazienti?



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Special Article

## The Geriatric Patient: The Ideal One for Chest Ultrasonography? A Review From the Chest Ultrasound in the Elderly Study Group (GRETA) of the Italian Society of Gerontology and Geriatrics (SIGG)



Andrea Ticinesi MD, PhD<sup>a,b,\*</sup>, Simone Scarlata MD<sup>c</sup>, Antonio Nouvenne MD, PhD<sup>a,b</sup>,  
Fulvio Lauretani MD, PhD<sup>a,b</sup>, Raffaele Antonelli Incalzi MD<sup>c</sup>, Andrea Ungar MD, PhD<sup>d</sup>,  
on behalf of the GRETA (Gruppo di Ricerca sull'Ecografia Toracica nell'Anziano) Group  
of the Italian Society of Gerontology and Geriatrics (SIGG)

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# DIAGNOSTICA ECOGRAFICA DELLA POLMONITE BATTERICA NELL'ANZIANO

2016

Medicine®

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Diagnostic Accuracy Study

## Lung ultrasound and chest x-ray for detecting pneumonia in an acute geriatric ward

Andrea Ticinesi (MD)<sup>a,b,\*</sup>, Fulvio Lauretani (MD)<sup>a,b</sup>, Antonio Nouvenne (MD, PhD)<sup>a,b</sup>, Giulia Mori (MD)<sup>a,b</sup>, Giulia Chiussi (MD)<sup>a</sup>, Marcello Maggio (MD, PhD)<sup>b</sup>, Tiziana Meschi (MD)<sup>a,b</sup>

**169** pazienti anziani con multimorbidità, ricoverati da PS (età **83 ± 9**; 80 M – 89 F)

- ✓ Sintomi respiratori acuti con sospetto clinico per polmonite (dispnea, tosse, emottisi, dolore pleuritico)
- ✓ RX torace standard eseguito nelle 6 ore precedenti al ricovero



**1 Very Fit** - People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.



**7 Severely Frail** - Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).



**2 Well** - People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g. seasonally.



**8 Very Severely Frail** - Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.



**3 Managing Well** - People whose medical problems are well controlled, but are not regularly active beyond routine walking.



**9 Terminally Ill** - Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.



**4 Vulnerable** - While not dependent on others for daily help, often symptoms limit activities. A common complaint is being "slowed up", and/or being tired during the day.



**5 Mildly Frail** - These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.



**6 Moderately Frail** - People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.

### Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common symptoms in mild dementia include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In moderate dementia, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

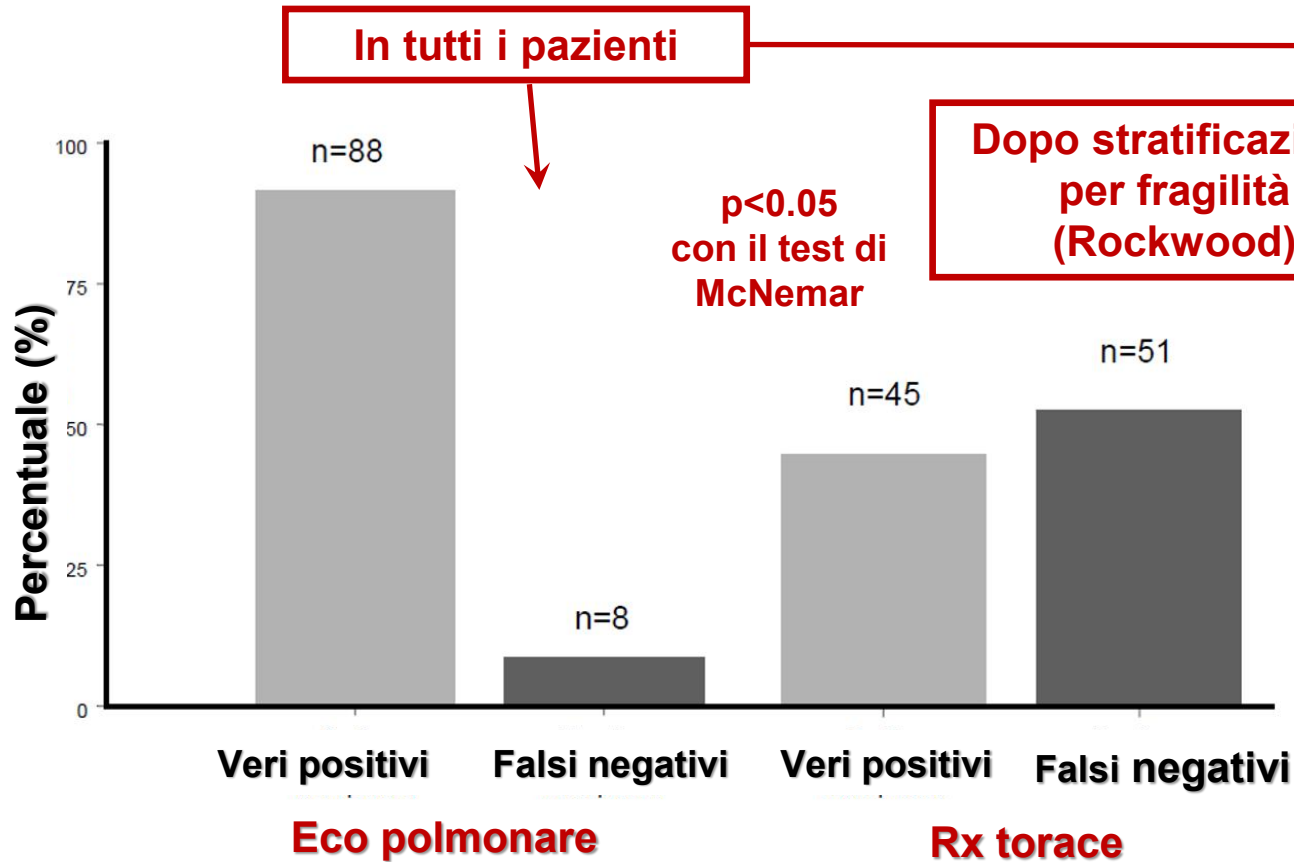
In severe dementia, they cannot do personal care without help.



**STRATIFICAZIONE  
PER ROCKWOOD  
CLINICAL FRAILTY  
SCALE**

# DIAGNOSTICA ECOGRAFICA DELLA POLMONITE BATTERICA NELL'ANZIANO

Confronto Rx torace vs eco torace nella diagnosi di polmonite



	Ecografia polmonare	RX torace
Accuratezza	<b>0.90 [0.83-0.96]</b>	<b>0.67 [0.60-0.74]</b>
Sensibilità	0.92 [0.86-0.97]	0.47 [0.37-0.57]
Specificità	0.94 [0.89-0.99]	0.93 [0.87-0.99]
VPP	0.95 [0.91-0.99]	0.90 [0.82-0.98]
VPN	0.95 [0.83-0.96]	0.57 [0.48-0.66]

<b>ACCURATEZZA DIAGNOSTICA</b>	Ecografia polmonare	RX torace
Soggetti non fragili (Rockwood 1-3)	0.98 [0.93-1.00]	0.81 [0.70-0.93]
Soggetti pre-fragili (Rockwood 4)	<b>0.89 [0.79-0.99]*</b>	<b>0.65 [0.50-0.81]*</b>
Soggetti fragili/disabili (Rockwood 5-9)	<b>0.91 [0.86-0.98]*</b>	<b>0.59 [0.49-0.70]*</b>

**\*p<0.05**

# DIAGNOSTICA ECOGRAFICA DELLA POLMONITE BATTERICA NELL'ANZIANO

## CLINICAL INVESTIGATION

### Pneumonia Lung Ultrasound Score (PLUS): A New Tool for Detecting Pneumonia in the Oldest Patients

Giuseppe Linsalata,\* Chukwuma Okoye,\* Rachele Antognoli,\* Daniela Guarino,\*  
 Virginia Ravenna,† Eugenio Orsitto,† Valeria Calsolaro,\* and Fabio Monzani\*

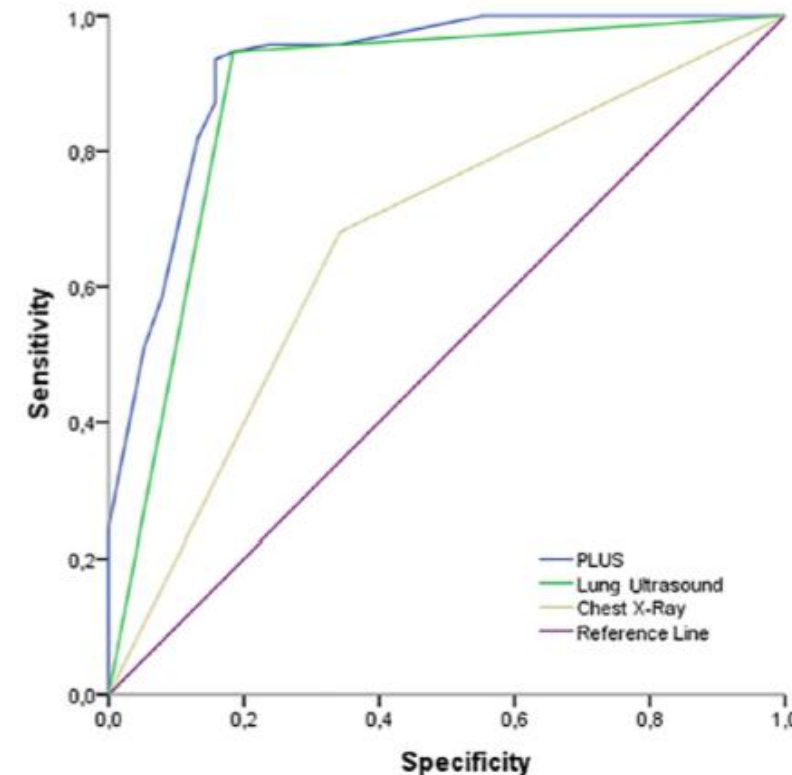


Table 2. Multivariate Backward Stepwise Analysis

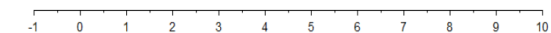
Variable	Univariate		Multivariate 1-Step 7		Multivariate 2-Step 6		Weight
	OR (95% CI)	$\beta$	OR (95% CI)	$\beta$	OR (95% CI)	$\beta$	
Age	0.82 (0.59–1.14)	-0.51					
Sex	0.76 (0.24–2.35)	-0.27					
ADL	1.43 (0.90–2.28)	-0.21					
IADL	0.94 (0.66–1.32)	-0.61					
SPMSQ	1.27 (0.97–1.66)	0.24	1.30 (1.04–1.65)	0.27			
CIRS-C	0.73 (0.19–2.68)	-0.31					
Amount of medications	0.76 (0.36–1.61)	-0.27					
ESS	3.47 (0.88–13.6)	1.25					
MNA	1.40 (0.48–4.10)	0.34					
WBC count	1 (1.01–1.01)	0					
BNP	0.99 (0.99–1)	-0.01			0.99 (0.98–1.01)	-0.001	-1
hs-CRP	1.09 (1.01–1.19)	0.10			1.11 (1.02–1.20)	0.10	1
PaO <sub>2</sub> /FIO <sub>2</sub> ratio	0.98 (0.98–0.99)	-0.11			0.98 (0.98–0.99)	-0.10	1
Pulmonary consolidation	0.27 (0.06–0.11)	3.63			0.27 (0.06–0.11)	3.63	4

Note. Multivariate 1 model included: age, sex, ADL, IADL, SPMSQ, CIRS-C, amount of medications, ESS, MNA, and history of chronic obstructive pulmonary disease. Multivariate 2 model included: age, sex, white blood cell count, BNP, hs-CRP, PaO<sub>2</sub>/FIO<sub>2</sub> ratio, and pulmonary consolidation.

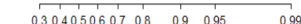
Abbreviations: ADL, Activity of Daily Living; BNP, brain natriuretic peptide; CI, confidence interval; CIRS-C, Cumulative Illness Rating Scale-Comorbidity; ESS, Exton-Smith Scale; hs-CRP, high-sensitivity C-reactive protein; IADL, Instrumental ADL; MNA, Mini Nutritional Assessment; OR, odds ratio; PaO<sub>2</sub>/FIO<sub>2</sub> ratio, partial pressure arterial oxygen/fraction of inspired oxygen ratio; SPMSQ, Short Portable Mental Status Questionnaire.



PLUS score



Likelihood of Acute Pneumonia



**Supplemental Figure 1:** Chest X-Ray, Lung ultrasound and Chest CT of right-sided posterior basal consolidation of 88 years old woman admitted to our acute geriatric ward in November 2018.

A: Chest X-Ray shows no signs of pneumonia. B: Lung ultrasound demonstrates right basal consolidation with bronchograms and pleural effusion. C: CT scan confirmed the presence of right basal consolidation and pleural effusion. Pulmonary consolidation is showed by arrows



# Valutazione integrata nel paziente scompensato

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of Cardiology

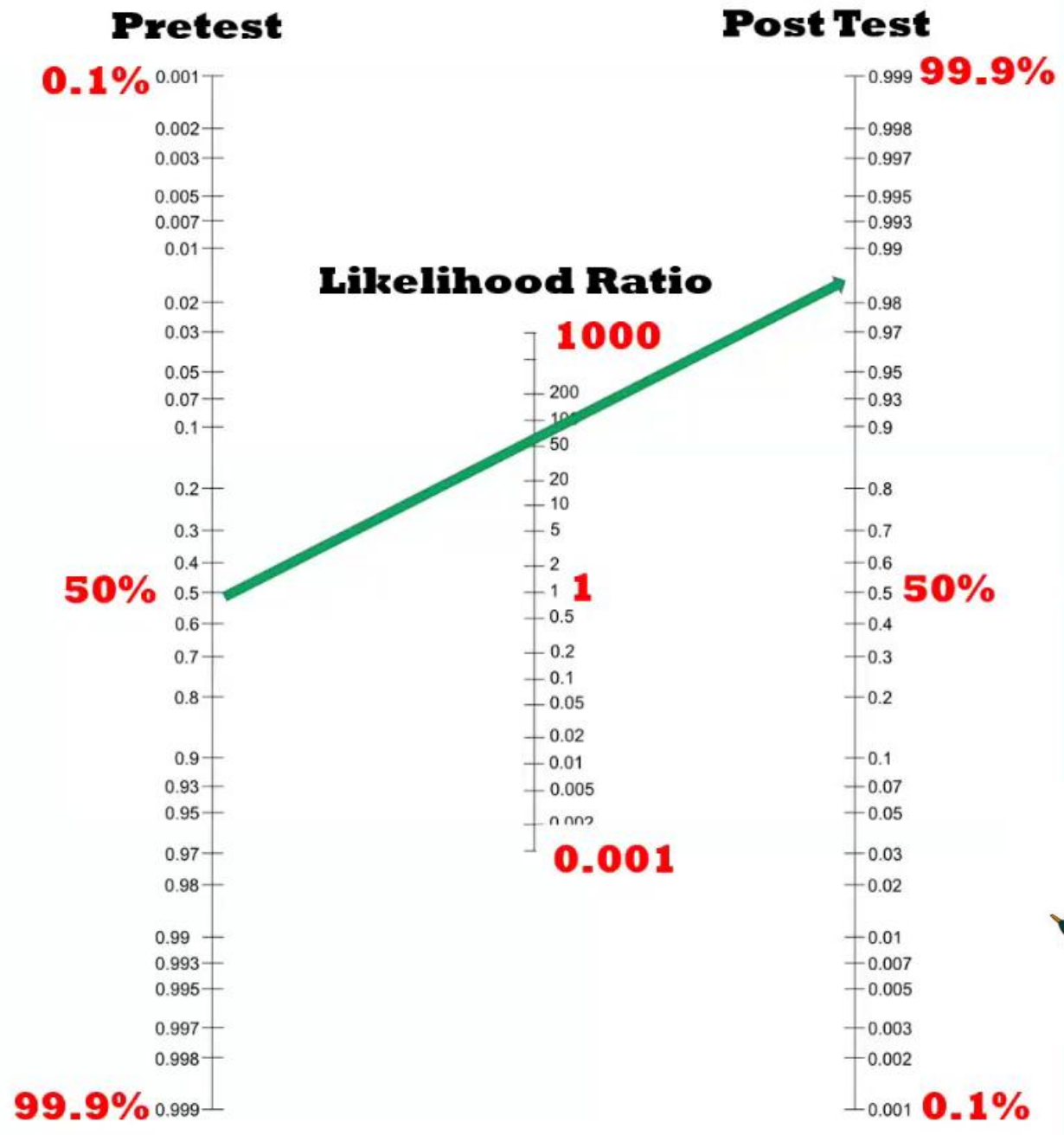
European Journal of Heart Failure (2019)  
doi:10.1002/ejhf.1379

**RESEARCH ARTICLE**

## Lung ultrasound integrated with clinical assessment for the diagnosis of acute decompensated heart failure in the emergency department: a randomized controlled trial

Emanuele Pivetta<sup>1,2\*</sup>, Alberto Goffi<sup>3,4,5</sup>, Peiman Nazerian<sup>6</sup>, Davide Castagno<sup>7</sup>, Camilla Tozzetti<sup>8</sup>, Pietro Tizzani<sup>2,9</sup>, Maria Tizzani<sup>2</sup>, Giulio Porrino<sup>2</sup>, Enrico Ferreri<sup>2</sup>, Valeria Busso<sup>2</sup>, Fulvio Morello<sup>2</sup>, Cristina Paglieri<sup>2</sup>, Monica Masoero<sup>10</sup>, Elisa Cassine<sup>11</sup>, Federica Bovaro<sup>10</sup>, Stefano Grifoni<sup>6</sup>, Milena M. Maule<sup>1</sup>, and Enrico Lupia<sup>2,12</sup>, on behalf of the Study Group on Lung Ultrasound from the Molinette and Careggi Hospitals<sup>†</sup>

	<b>CXR/NT Pro BNP Arm</b>	<b>Lung Ultrasound</b>
<b>Clinical Evaluation</b>	<b>7.2</b>	<b>9.46</b>
	<b>0.21</b>	<b>0.17</b>
<b>Integrated Evaluation</b>	<b>8.0</b>	<b>20.9</b>
	<b>0.17</b>	<b>0.07</b>

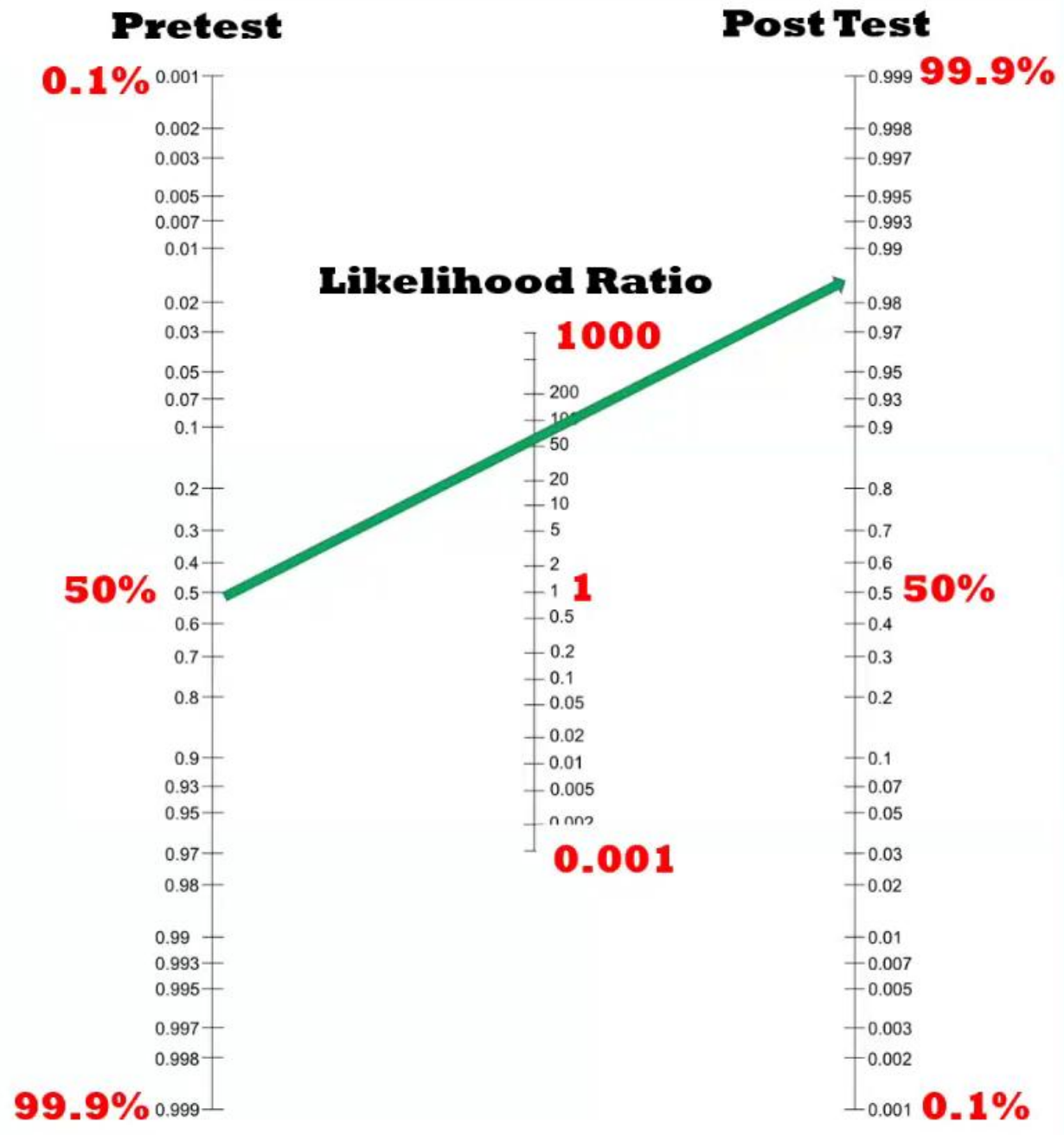


	<b>CXR/NT Pro BNP Arm</b>	<b>Lung Ultrasound</b>
<b>Clinical Evaluation</b>	<b>7.2</b>	<b>9.46</b>
	<b>0.21</b>	<b>0.17</b>
<b>Integrated Evaluation</b>	<b>8.0</b>	<b>20.9</b>
	<b>0.17</b>	<b>0.07</b>



↓  
104 minuti

↓  
5 minuti



## DISCUSSION

...[The addition of LUS **was able to correctly reclassify 8.9%** of patients with ADHF, and 4.5% of patients with non-ADHF causes of dyspnoea.]

[Addition of CXR and NT-proBNP measurement only reduced the diagnostic error in approximately 2.5 cases out of 100 patients evaluated]

# Lung ultrasound for the early diagnosis of COVID-19 pneumonia: an international multicenter study



Giovanni Volpicelli<sup>1\*</sup>, Luna Gargani<sup>2\*</sup>, Stefano Perlini<sup>3</sup>, Stefano Spinelli<sup>4</sup>, Greta Barbieri<sup>4</sup>, Antonella Lanotte<sup>5</sup>, Gonzalo García Casasola<sup>6</sup>, Ramon Nogué-Bou<sup>7</sup>, Alessandro Lamorte<sup>8</sup>, Eustachio Agricola<sup>9,10</sup>, Tomas Villén<sup>11</sup>, Paramjeet Singh Deol<sup>12</sup>, Peiman Nazerian<sup>13</sup>, Francesco Corradi<sup>14,15</sup>, Valerio Stefanone<sup>16</sup>, Denise Nicole Fraga<sup>17</sup>, Paolo Navalesi<sup>18</sup>, Robinson Ferre<sup>19</sup>, Enrico Boero<sup>20</sup>, Giampaolo Martinelli<sup>21</sup>, Lorenzo Cristoni<sup>22</sup>, Cristiano Perani<sup>23</sup>, Luigi Vetrugno<sup>24</sup>, Cian McDermott<sup>25</sup>, Francisco Miralles-Aguilar<sup>26</sup>, Gianmarco Secco<sup>3</sup>, Caterina Zattera<sup>3</sup>, Francesco Salinaro<sup>3</sup>, Alice Grignaschi<sup>5</sup>, Andrea Boccatonda<sup>5</sup>, Fabrizio Giostra<sup>5</sup>, Marta Nogué Infante<sup>7</sup>, Michele Covella<sup>8</sup>, Giacomo Ingallina<sup>10</sup>, Julia Burkert<sup>12</sup>, Paolo Frumento<sup>27</sup>, Francesco Forfori<sup>14</sup> and Lorenzo Ghiadoni<sup>4</sup> on behalf of the International Multicenter Study Group on LUS in COVID-19

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## Abstract

**Purpose:** To analyze the application of a lung ultrasound (LUS)-based diagnostic approach to patients suspected of COVID-19, combining the LUS likelihood of COVID-19 pneumonia with patient's symptoms and clinical history.

**Methods:** This is an international multicenter observational study in 20 US and European hospitals. Patients suspected of COVID-19 were tested with reverse transcription-polymerase chain reaction (RT-PCR) swab test and had an LUS examination. We identified three clinical phenotypes based on pre-existing chronic diseases (mixed phenotype), and on the presence (severe phenotype) or absence (mild phenotype) of signs and/or symptoms of respiratory failure at presentation. We defined the LUS likelihood of COVID-19 pneumonia according to four different patterns: high (HighLUS), intermediate (IntLUS), alternative (AltLUS), and low (LowLUS) probability. The combination of patterns and phenotypes with RT-PCR results was described and analyzed.

**Results:** We studied 1462 patients, classified in mild ( $n = 400$ ), severe ( $n = 727$ ), and mixed ( $n = 335$ ) phenotypes. HighLUS and IntLUS showed an overall sensitivity of 90.2% (95% CI 88.23–91.97%) in identifying patients with positive RT-PCR, with higher values in the mixed (94.7%) and severe phenotype (97.1%), and even higher in those patients

## High probability



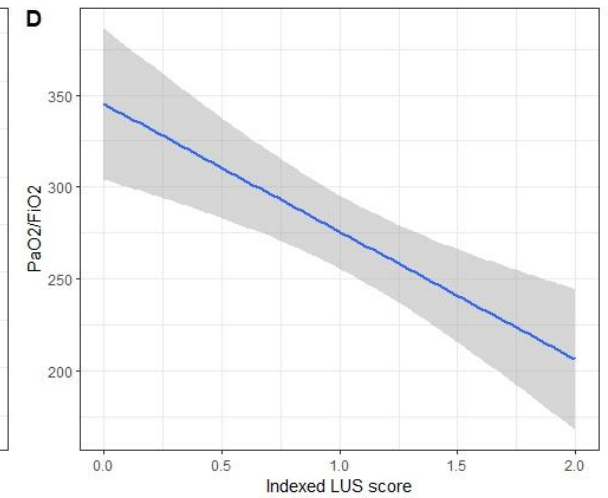
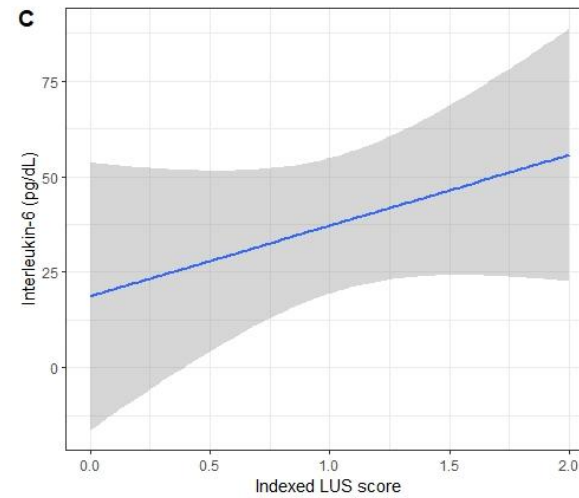
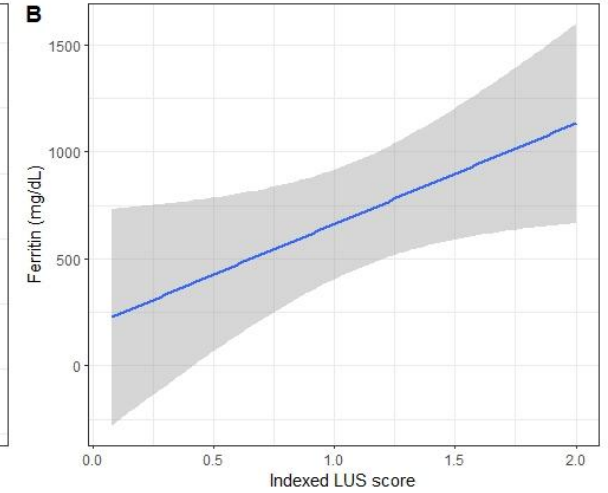
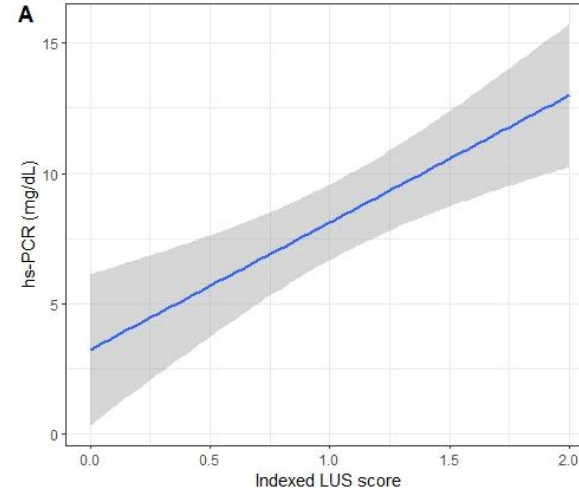
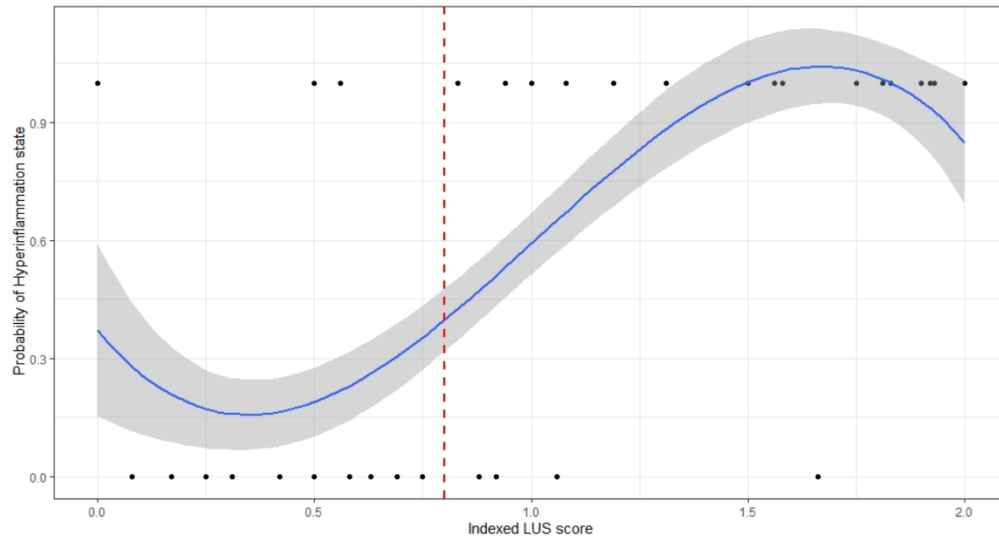
## Intermediate probability



# Utility of lung ultrasound in selecting older patients with hyperinflammatory phase in COVID-19 pneumonia. A monocentric, cross-sectional pilot study

Riccardo Franchi, Chukwuma Okoye, Virginia Morelli, Daniela Guarino, Tessa Mazzarone, Giulia Coppini, Umberto Peta, Sara Rogani, Alessandra Fabbri, Antonio Polini, Fabio Monzani

Geriatrics Unit, Department of Clinical & Experimental Medicine, University Hospital of Pisa, Pisa, Italy



Original Article

## Accuracy of preoperative lung ultrasound score for the prediction of major adverse cardiac events in elderly patients undergoing HIP surgery under spinal anesthesia: The LUSHIP multicenter observational prospective study

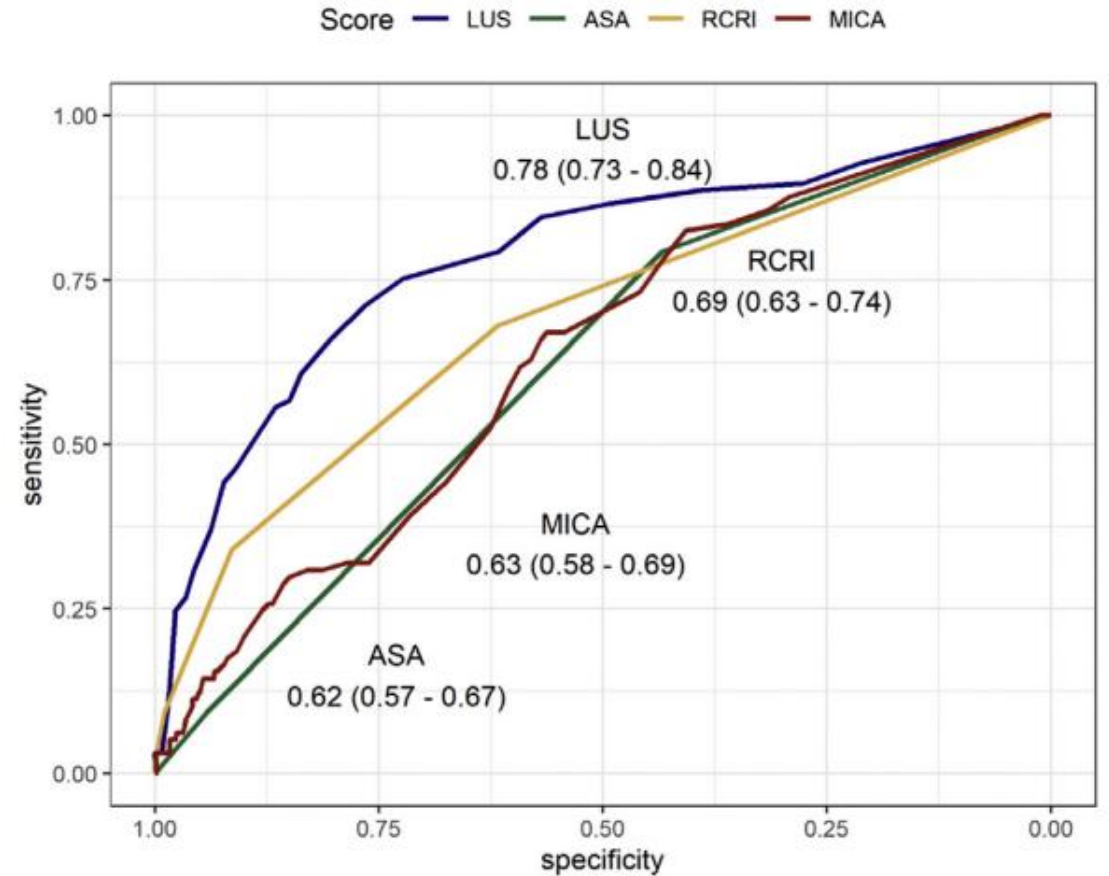
Luigi Vetrugno<sup>a,b,\*</sup>, Enrico Boero<sup>c</sup>, Paola Berchiolla<sup>d</sup>, Francesco Forfori<sup>e</sup>, Mattia Bernardinetti<sup>f</sup>, Savino Spadaro<sup>g</sup>, Gianmaria Cammarota<sup>h</sup>, Andrea Bruni<sup>i</sup>, Eugenio Garofalo<sup>j</sup>, Marco Tescione<sup>j</sup>, Cristian Deana<sup>k</sup>, Nicola Federici<sup>k</sup>, Lisa Mattuzzi<sup>l</sup>, Francesco Meroi<sup>k</sup>, Luca Flaibani<sup>l</sup>, Andrea Cortegiani<sup>m,n</sup>, Federico Longhini<sup>i</sup>, Alessandro Cavarape<sup>l,o</sup>, Daniele Guerino Biasucci<sup>p</sup>, Stefano D'Incà<sup>q</sup>, Anna Pesamosca<sup>q</sup>, Agnese Cattarossi<sup>q</sup>, Saskia Granzotti<sup>q</sup>, Loris D'Orlando<sup>r</sup>, Felice Urso<sup>s</sup>, Camilla Colombotto<sup>c</sup>, Pieter Roel Tuinman<sup>s</sup>, Edoardo De Robertis<sup>t</sup>, Sergio Livigni<sup>u</sup>, Salvatore Maurizio Maggiore<sup>v,w</sup>, Vito Marco Ranieri<sup>x,y</sup>, Elena Giovanna Bignami<sup>z</sup>  
LUSHIP Study Group

**Table 4**

Multivariate analysis of the risk associated with main predictors of major adverse cardiovascular events (MACE).

Predictors	Adjusted OR	95% CI	p-value
CHF	3.29	1.85–5.79	<0.001
Stroke	1.55	0.79–2.92	0.182
ASA	1.07	0.70–1.63	0.760
sCr >1.5 mg/dL	2.08	1.19–3.58	0.009
LUS (dichotomous)	5.81	3.55–9.69	<0.001
Observations	877		
R <sup>2</sup> Tjur	0.175		

CHF, chronic heart failure; ASA, American Society of Anesthesiologists score; sCr, serum creatinine; LUS, lung ultrasound score; R<sup>2</sup> Tjur, Coefficient of Discrimination.



# I VANTAGGI DELL'ECOGRAFIA TORACICA BEDSIDE NELL'ANZIANO

- In molti casi permette di arrivare a una **diagnosi** in situazioni di acuzie **senza spostare il paziente**



INIZIO PIU' RAPIDO DELLE  
TERAPIE

- Anche quando non consente di arrivare a una diagnosi certa, permette di **escludere** alcune patologie dalla diagnosi differenziale



MIGLIORAMENTO  
DELL'APPROPRIATEZZA DI  
ULTERIORI INDAGINI (TC)

- Consente di comprendere meglio la **fisiopatologia** della dispnea e dell'insufficienza respiratoria



MIGLIORAMENTO  
DELL'INQUADRAMENTO DEL  
PAZIENTE COMPLESSO

- Possibilità di **integrazione** con i dati clinici e con la conoscenza della performance e della traiettoria prognostica del paziente



RIDUZIONE DELLA  
PRESCRIZIONE DI RX E TC DI  
MONITORAGGIO CLINICO

- Consente il **monitoraggio evolutivo** del paziente

# L'ECOGRAFIA NELLA MEDICINA MODERNA

The NEW ENGLAND JOURNAL of MEDICINE

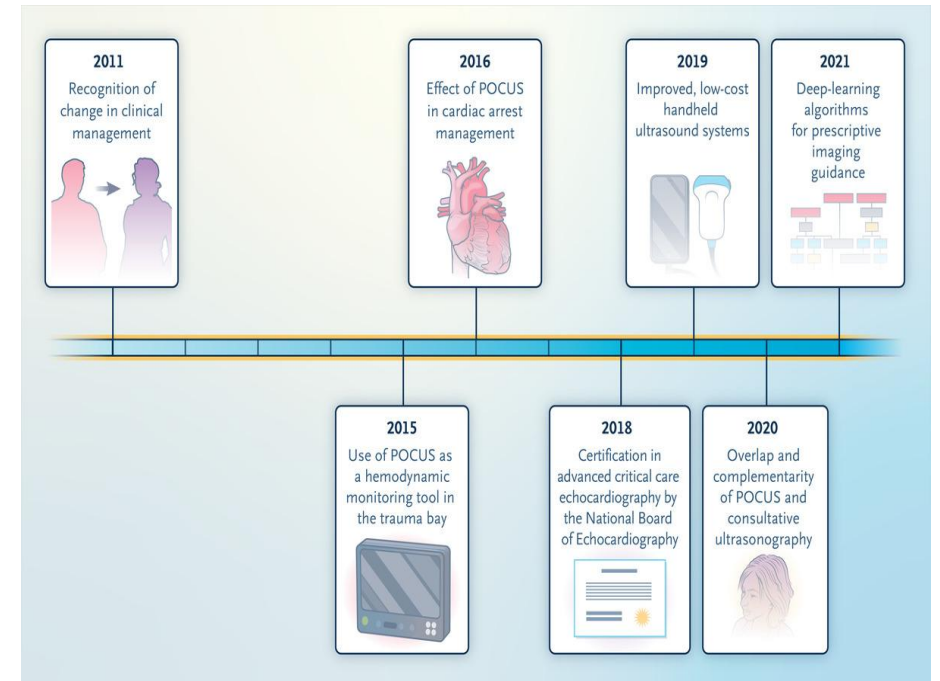
REVIEW ARTICLE

Julie R. Ingelfinger, M.D., Editor

## Point-of-Care Ultrasonography

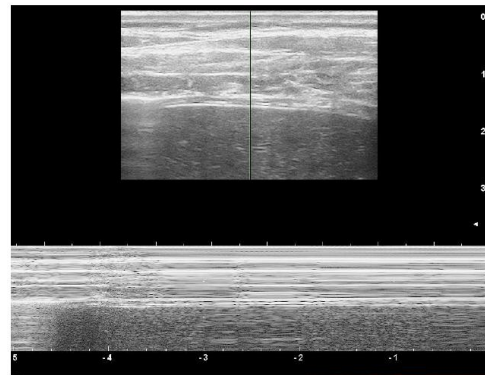
José L. Díaz-Gómez, M.D., Paul H. Mayo, M.D., and Seth J. Koenig, M.D.

**P**OINT-OF-CARE ULTRASONOGRAPHY (POCUS) IS DEFINED AS THE ACQUISITION, interpretation, and immediate clinical integration of ultrasonographic imaging performed by a treating clinician at the patient's bedside rather than by a radiologist or cardiologist. POCUS is an inclusive term; it is not limited to any specialty, protocol, or organ system.<sup>1</sup> With the advent of smaller and more affordable ultrasound machines, combined with evidence that nonradiologists and noncardiologists can become competent in the performance of POCUS, it is now used in many practice settings and in all phases of care — from screening and diagnosis to procedural guidance and monitoring — and has become associated with changes in clinical decision making in medical practice.<sup>2,3</sup> A recent study showed that POCUS facilitated confirmation of the suspected clinical diagnosis in up to 50% of cases and supported a change in the initial diagnosis in 23% of cases.<sup>4</sup> In this review, we discuss key trends in POCUS technology, advances in its

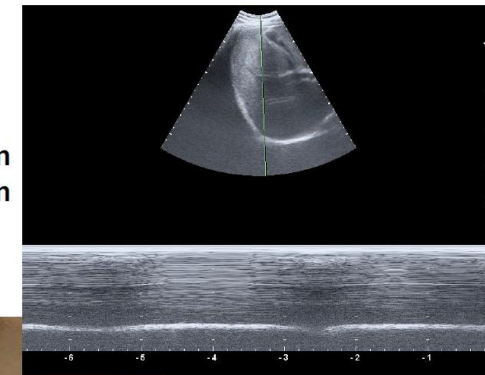


L'ecografia «point of care» al letto del malato ha portato a un cambio del paradigma clinico negli ultimi 10 anni

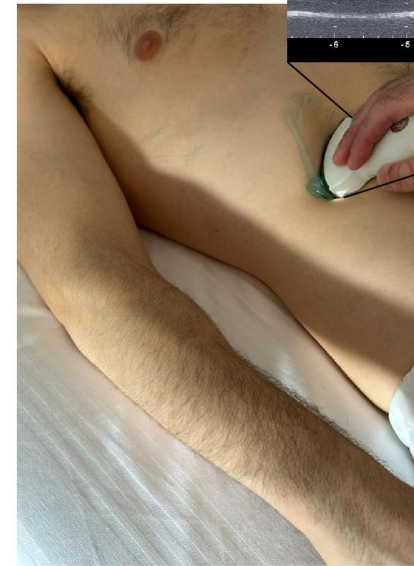
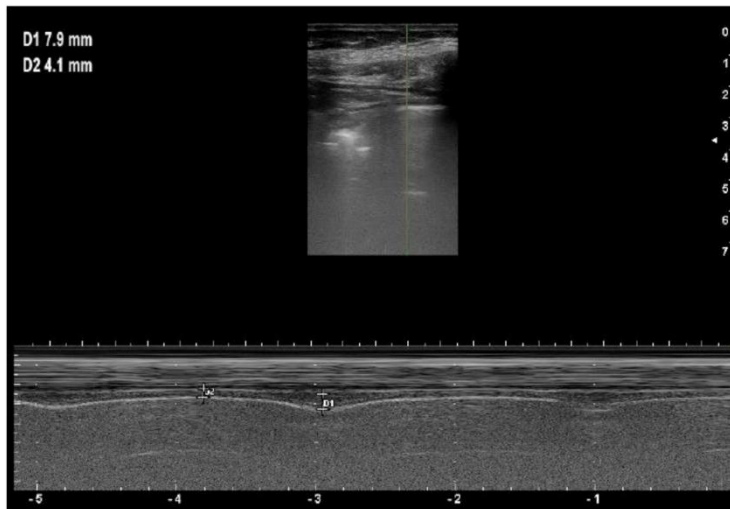
# PROSPETTIVE FUTURE: ECOGRAFIA DIAFRAMMATICA



a) Diaphragm thickness



b) Diaphragm excursion



**Spessore diaframma → sarcopenia (?)**  
**Escursione del diaframma → indice prognostico nelle malattie acute (?)**

# LE AREE DI RICERCA FUTURE

Aging Clinical and Experimental Research (2023) 35:2887–2901  
<https://doi.org/10.1007/s40520-023-02590-w>

REVIEW



## Advancing healthcare through thoracic ultrasound research in older patients

Simone Scarlata<sup>1,2</sup> · Chukwuma Okoye<sup>3,4</sup> · Sonia Zotti<sup>2</sup> · Fulvio Lauretani<sup>5,6</sup> · Antonio Nouvenne<sup>5,6</sup> · Nicoletta Cerundolo<sup>5,6</sup> · Adriana Antonella Bruni<sup>7</sup> · Monica Torrini<sup>8</sup> · Alberto Finazzi<sup>3</sup> · Tessa Mazzarone<sup>9</sup> · Marco Lunian<sup>5</sup> · Irene Zucchini<sup>6</sup> · Lorenzo Maccioni<sup>9</sup> · Daniela Guarino<sup>9</sup> · Silvia Fabbri della Faggiola<sup>5</sup> · Marco Capacci<sup>10</sup> · Maria Giovanna Bianco<sup>9</sup> · Guglielmo Guarona<sup>5</sup> · Giuseppe Bellelli<sup>3,7</sup> · Fabio Monzani<sup>11</sup> · Agostino Virdis<sup>9</sup> · Raffaele Antonelli Incalzi<sup>1,2</sup> · Andrea Ungar<sup>8,10</sup> · Andrea Ticinesi<sup>5,6</sup> · On behalf of the GRETA research group on thoracic ultrasound in the older patient, Italian Society of Geriatrics and Gerontology (SIGG)

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- ✓ **Definizione dei migliori setting tecnici per l'esame ecografico del torace nel soggetto anziano**
- ✓ **Sviluppo di modalità standard di refertazione degli esami nei soggetti anziani**
- ✓ **Definizione dei valori normativi nel soggetto anziano multimorbido e fragile**
- ✓ **Diagnostica differenziale ecografica delle polmoniti batteriche dalle polmoniti ab ingestis**
- ✓ **Definizione del miglior metodo di quantificazione ecografica dei versamenti pleurici**
- ✓ **Diagnostica differenziale ecografica fra versamenti trasudatizi ed essudatizi**
- ✓ **Utilizzo dell'intelligenza artificiale per quantificare la severità della sindrome interstiziale**
- ✓ **Diagnostica delle sequele di COVID-19**



**The association of bedside lung ultrasound with delirium and clinical outcomes  
in geriatric patients with acute respiratory failure:  
| a multicenter, prospective, observational study  
from the GRETA Group (Gruppo di Ricerca in Ecografia Toracica nell'Anziano) of  
the Italian Society of Gerontology and Geriatrics (SIGG)**

**Associazione dei risultati dell'ecografia polmonare bedside con il delirium e  
altri outcome clinici in pazienti anziani acuti: uno studio multicentrico, prospettico,  
osservazionale del gruppo GRETA (Gruppo di Ricerca in Ecografia Toracica  
nell'Anziano) della Società Italiana di Gerontologia e Geriatria (SIGG)**

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