4S for YOUNG

SECONDO CONGRESSO NAZIONALE GIOVANI MEDICI

29-30 SETTEMBRE
1 OTTOBRE
2021

ROMA FIUMICINO
HILTON ROME AIRPORT

La trasformazione della Medicina Generale in era Covid tra riorganizzazione territoriale, telemedicina e nuove emergenze

SECONDO CONGRESSO NAZIONALE GIOVANI MEDICI

VENERDÌ | 1 OTTOBRE

8° SESSIONE | Moderazione: ***F. Leto, D. Postorino***

10.30 - 11.00 | Covid-19 e telemedicina (ecografia)

A. Bramanti, R. Trevisan

ASUGI
Azienda Sanitaria Universitaria Giuliano Isontina
REGIONE AUTONOMA FRIULI VENEZIA GIULIA

Ospedale Gorizia - Monfalcone
Dipartimento medico
S.S.D. Pneumologia

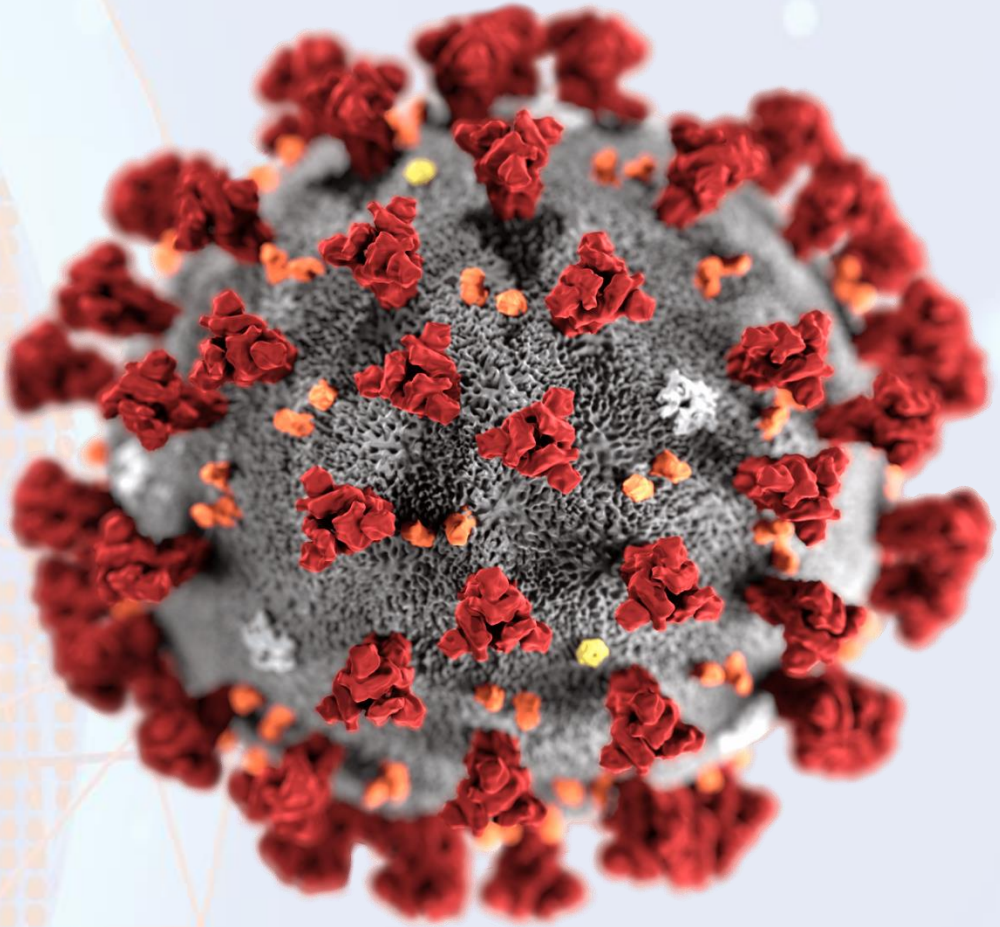
ITS ITALIAN THORACIC SOCIETY
AIPO ASSOCIAZIONE ITALIANA PNEUMOLOGI OSPEDALIERI
SEZIONE: FRIULI VENEZIA GIULIA

Disease

COVID-19

SARS-CoV-2
2019-nCov
HCoV-19

Virus Name



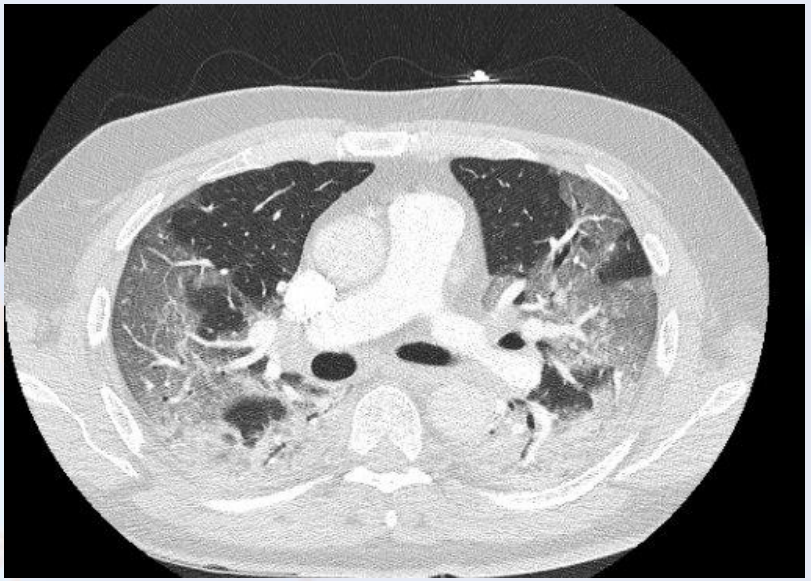
Histopathological findings and clinicopathologic correlation in COVID-19: a systematic review

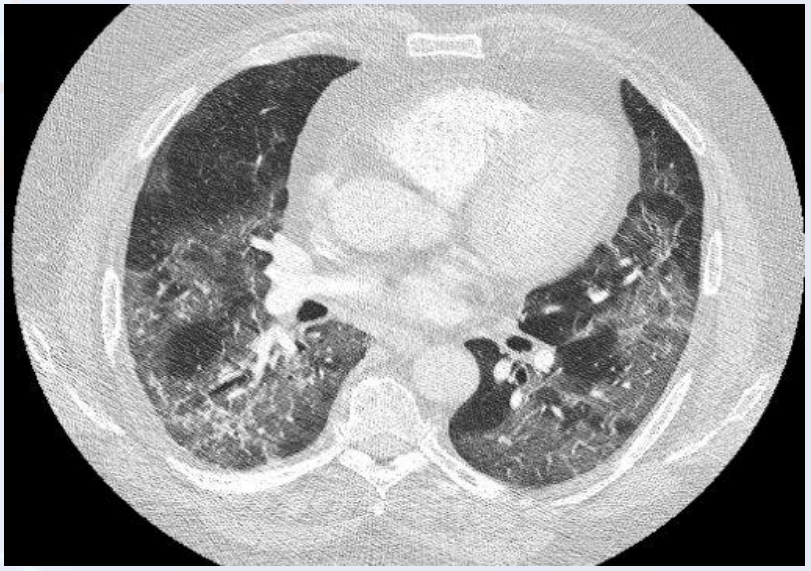
Modern Pathology (2021) 34:1614–1633

Stefania Caramaschi[1] · Meghan E. Kapp[2] · Sara E. Miller[3] · Rosana Eisenberg[2] · Joyce Johnson[2] · Garretson Epperly[4] · Antonino Maiorana[1] · Guido Silvestri[5,6] · Giovanna A. Giannico[2]

Table 2 Summary of main histopathologic findings in COVID-19.

Organ	Histopathologic findings	
Lung		
	DAD	Acute
		Acute-Proliferative
		Proliferative
		Proliferative-Fibrotic
		Fibrotic
	Interstitial/alveolar edema	
	Interstitial lymphocytic infiltrate	
	Pneumocyte reactive hyperplasia	
	Multinucleated giant cells	
	Alveolar/capillary megakaryocytes	
	Arteriolar vascular microthrombi	
	Alveolar/interstitial thickening	
	Pulmonary/alveolar hemorrhage	
	Vasculitis necrotizing/non-necrotizing	
	Bronchial/bronchiolar inflammation	
	Tracheobronchial inflammation	
	Acute bronchopneumonia (aspiration or secondary infection)	
	Acute pneumonia/bronchopneumonia NOS[a]	
	Organizing pneumonia	





Diagnostic imaging in COVID-19 pneumonia: a literature review

Sarah Campagnano[1] · Flavia Angelini[1] · Giovanni Battista Fonsi[2] · Simone Novelli[3] · Francesco Maria Drudi[1]

Imaging features

Lung ultrasound (LUS) is an economic and easy tool, with a bedside approach, that can be used to diagnose COVID-19-related pulmonary involvement [8]. Computed tomography (CT) is the most sensitive technique for detecting early disease, assessing the nature and extent of lesions, and discovering minor changes that are often not visible on chest radiography [9]; it allows evaluating the disease's evolution and the therapy outcome. Chest radiography of COVID-19 patients is not routinely recommended in clinical practice because it cannot detect COVID-19 in the early stage [7, 10]. Finally, 18F-fluorodeoxyglucose (FDG) positron emission tomography (PET)/CT cannot be routinely used in an emergency setting, and it is generally not recommended for infectious diseases, but it can be useful for differential diagnosis [11].

Lung ultrasound

Ultrasound (US) can be used in the triage of symptomatic patients, in the assessment of the severity of lung damage, and in the assessment of the evolution of the disease [8]. It is a radiation-free method and can be safely used in children and pregnant women [8, 12, 13].

One year of SARS-CoV-2 and lung ultrasound: what has been learned and future perspectives

Andrea Boccatonda[1,6] · Giulio Cocco[2] · Eugenia Ianniello[3] · Marco Montanari[4] · Damiano D'Ardes[2] · Claudio Borghi[3] · Fabrizio Giostra[1] · Roberto Copetti[5] · Cosima Schiavone[2]

Abstract

A first screening by ultrasound can be relevant to set a specific diagnostic and therapeutic route for a patient with a COVID-19 infection. The finding of bilateral B-lines and white lung areas with patchy peripheral distribution and sparing areas is the most suggestive ultrasound picture of COVID-19 pneumonia. Failure to detect bilateral interstitial syndrome (A pattern) on ultrasound excludes COVID-19 pneumonia with good diagnostic accuracy, but does not exclude current infection. The use of shared semiotic and reporting schemes allows the comparison and monitoring of the COVID-19 pulmonary involvement over time. This review aims to summarise the main data on pulmonary ultrasound and COVID-19 to provide accurate and relevant information for clinical practice.

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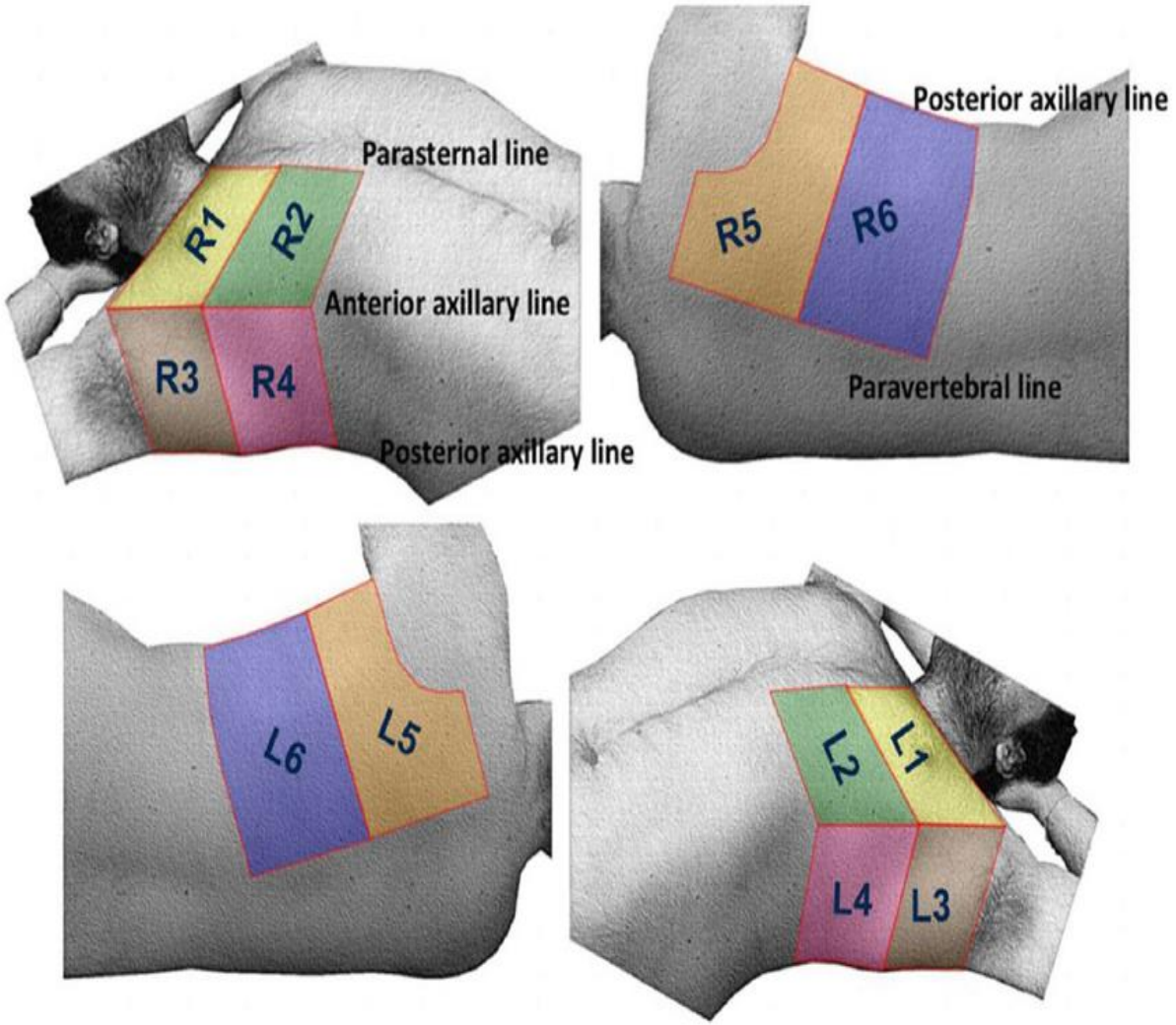

Six regions for each hemitorax: right and left

Fig. 1 The 12-zone protocol in the evaluation of pulmonary parenchyma with US. Six zones on each hemithorax: anterior–superior (yellow), lateral-superior (beige), posterior-superior (orange), anterior-inferior (green), lateral-inferior (pink), and posterior-inferior (blue)

Technique

One year of SARS-CoV-2 and lung ultrasound: what has been learned and future perspectives

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Sonographic artifact evaluation

Therefore, changes of the subpleural interstitium are represented on ultrasound by the vertical artifacts arising from the pleural line, defined as B-lines [5]. Several suggestions and data in literature have described the peculiarities of the B lines in COVID-19 pneumonia. These often arise from an irregular pleural line, with minute subpleural consolidations, becoming wider while spreading in depth; moreover, there is often a lack of homogeneity between different lines, even in the same lung field [6, 7, 9, 18]. This is probably due to a relevant damage of the subpleural lung interstitium.

Therefore, COVID-19 pneumonia features on ultrasound have been described as 'a storm of clusters of B-lines' [7, 22].

An increasing number of B lines is related to a more relevant pathological change of the lung. When B lines completely occupy the lung field and become coalescent, it is called 'white lung'; that feature has been often related to alveolar pulmonary edema in patients with heart failure [14, 18, 23]. In COVID-19 patients, preliminary data have shown that there is a correspondence between white lung on ultrasound and ground glass on HRTC [4, 6, 9].

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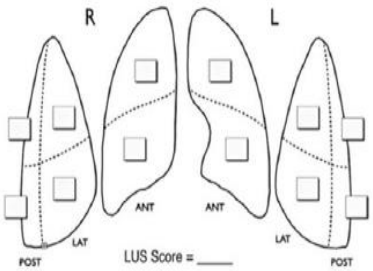
Lung ultrasound execution scheme

It is essential to consider the patient's position during the examination. In suspected cases of pneumonia, the posterolateral alveolar and/or pleural syndrome (PLAPS) point(s) is/are usually referred to as the elective area(s) in which to search [12–16]. The localisation of the specific infection undoubtedly depends on its pathogenetic mechanism (lobar bacterial pneumonia vs interstitial viral) [12–16]. In the specific case of SARS-CoV-2, the infection displays a typical non-homogeneous peripheral distribution [9, 17, 18].

Ultrasound Pattern	Score
Presence of lung sliding with A lines or fewer than two isolated B lines	0
Multiple, well-defined B lines	1
Multiple coalescent B lines "white lung"	2
Lung consolidation, presence of a tissue-like pattern	3



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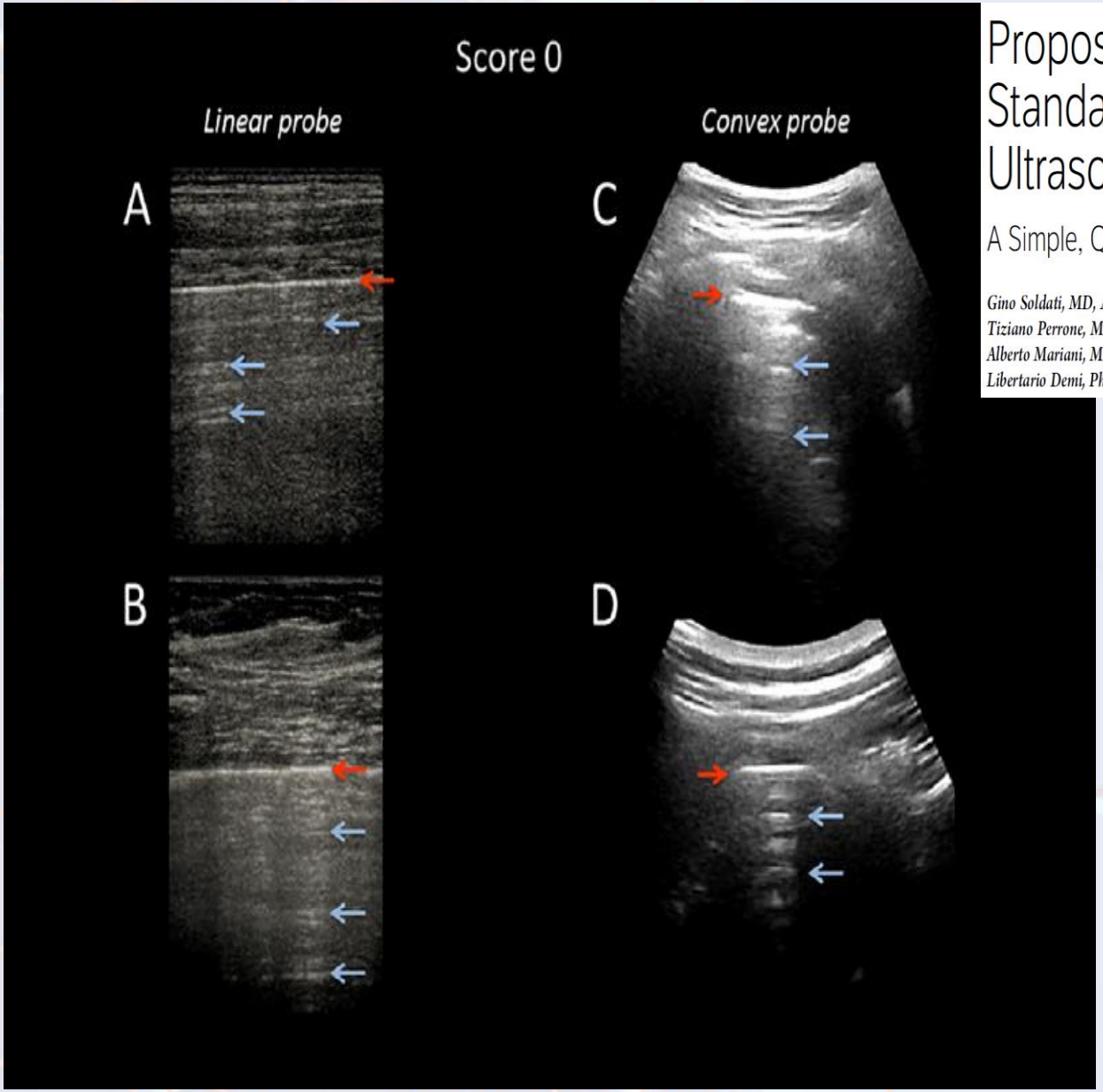
Proposal for International Standardization of the Use of Lung Ultrasound for Patients With COVID-19

A Simple, Quantitative, Reproducible Method

Gino Soldati, MD, Andrea Smargiassi, MD, PhD, Riccardo Inchingolo, MD, Danilo Buonsenso, MD, Tiziano Perrone, MD, PhD, Domenica Federica Briganti, MD, Stefano Perlini, MD, PhD, Elena Torri, MD, Alberto Mariani, MD, Elisa Eleonora Mossolani, MD, Francesco Tursi, MD, Federico Mento, MSc, Libertario Demi, PhD



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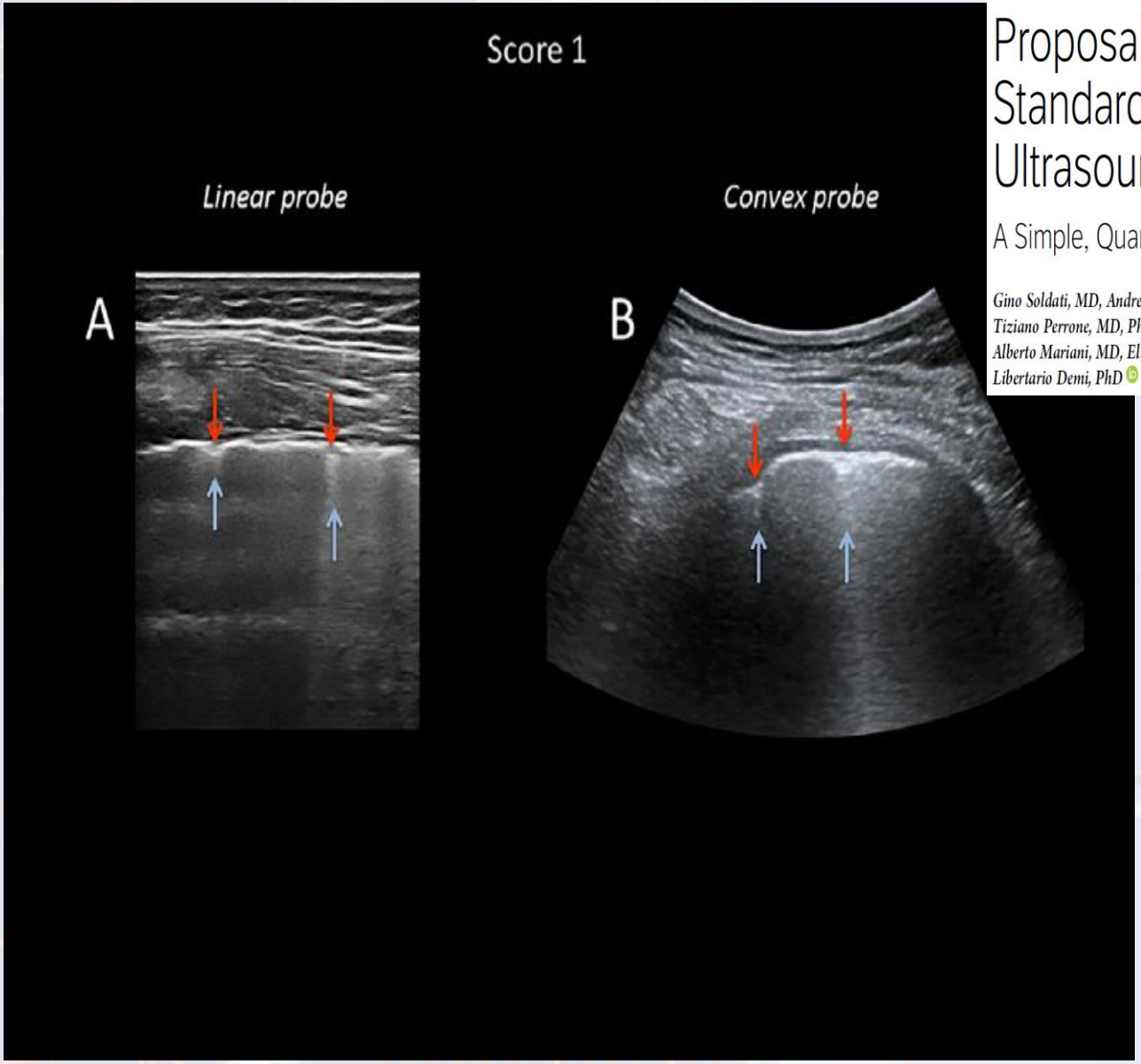
J Ultrasound Med 2020; 9999:1–7

Figure 2. Lung US images obtained with linear (**A** and **B**) and convex (**C** and **D**) transducers. The pleura lines (indicated by red arrows) is continuous. Below, horizontal artifacts (indicated by blue arrows) may be visible. This pattern is classified as score 0.



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J Ultrasound Med 2020; 9999:1–7

Figure 3. Lung US images obtained with linear (**A**) and convex (**B**) transducers. The pleural line is not continuous. Below the point of discontinuity (indicated by red arrows), vertical areas of white are visible (indicated by blue arrows). This pattern is classified as score 1.

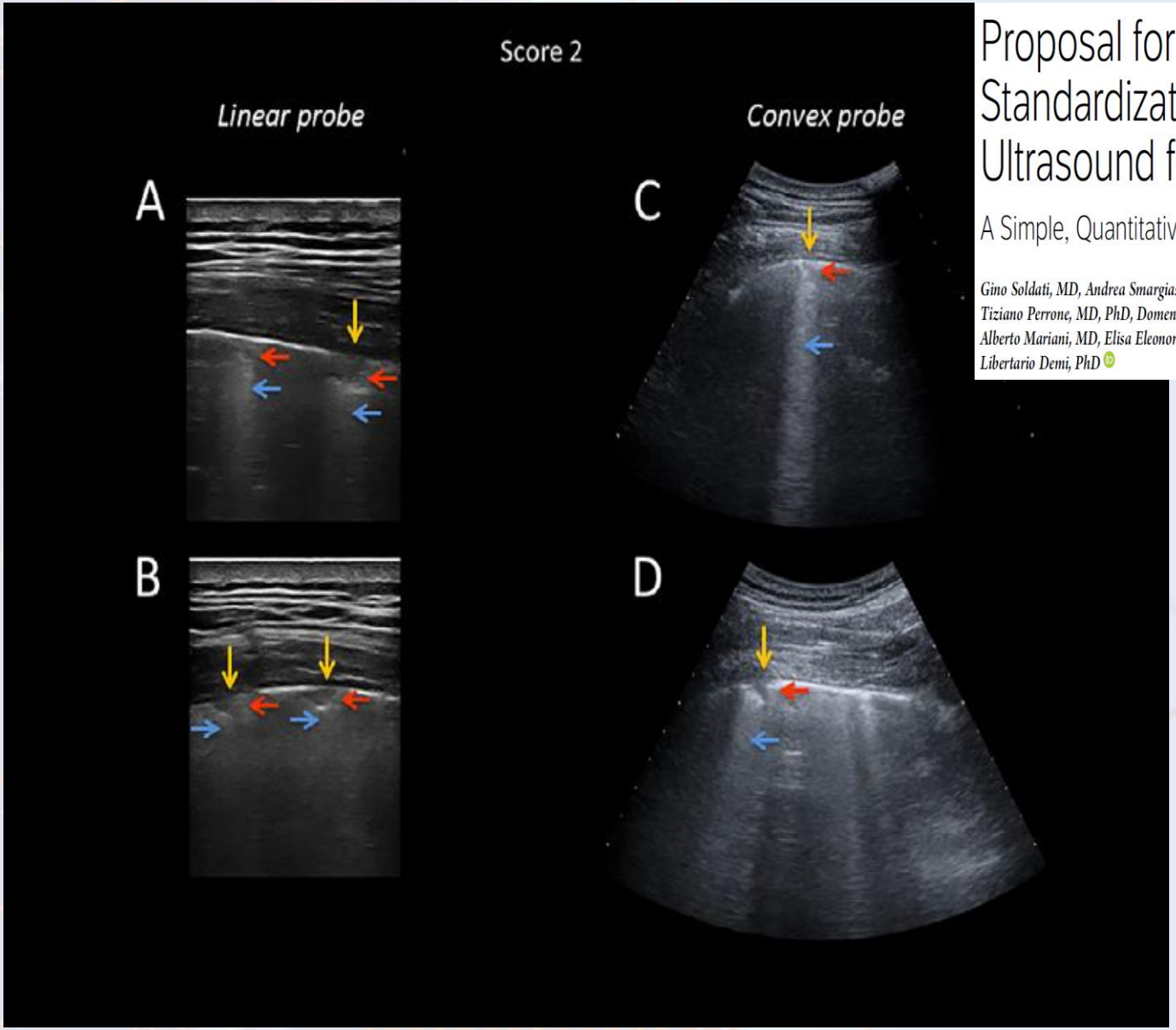

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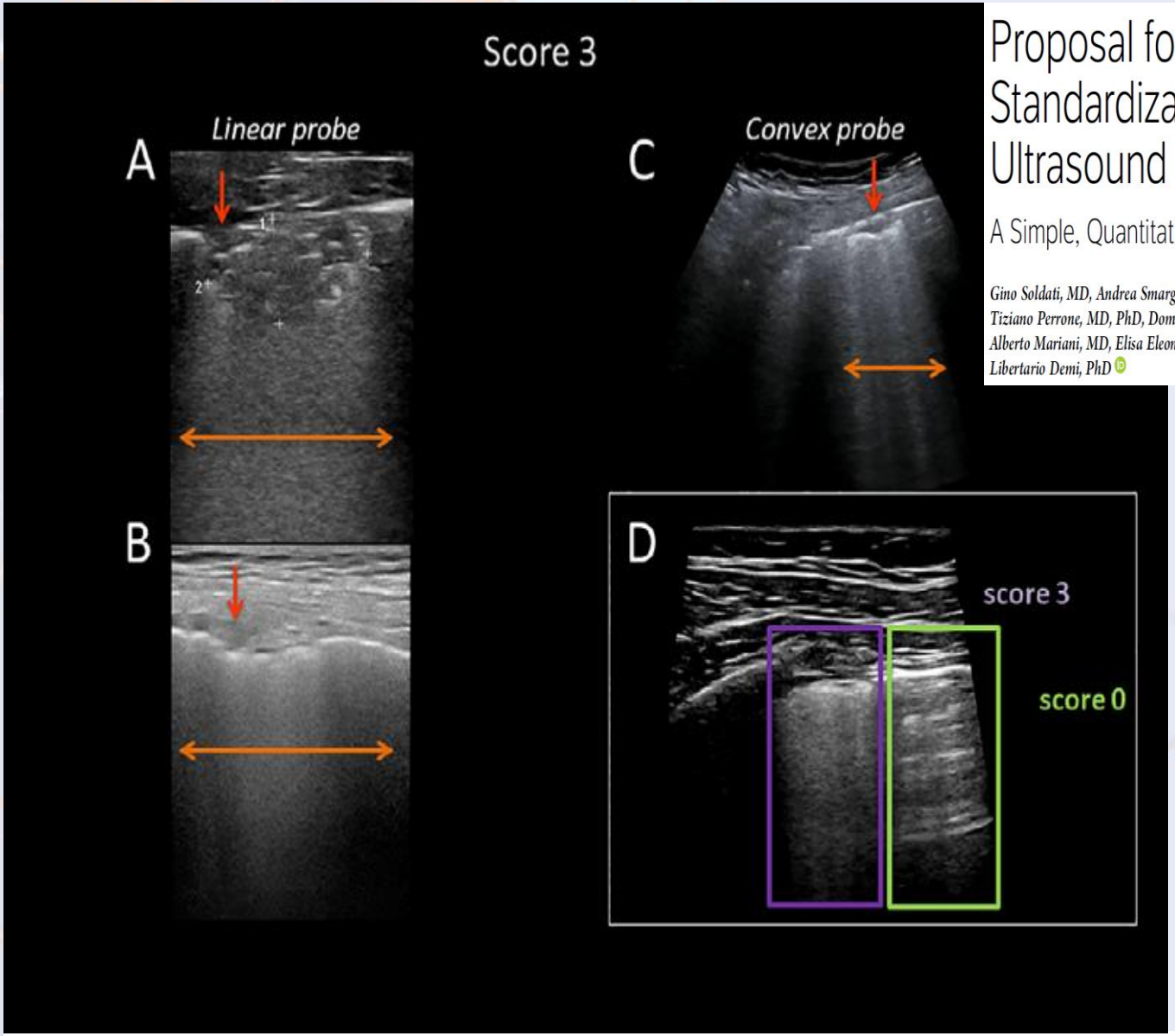
Figure 4. Lung US images obtained with linear (**A** and **B**) and convex (**C** and **D**) transducers. The pleural line is severely broken. Below the point of discontinuity (indicated by orange arrows), small consolidated areas (darker areas indicated by red arrows) appear with associated areas of white (indicated by blue arrows) in correspondence with the consolidations. This pattern is classified as score 2.



Proposal for International Standardization of the Use of Lung Ultrasound for Patients With COVID-19

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Figure 5. Lung US images obtained with linear (**A** and **B**) and convex (**C**) transducers. The pleural line is severely broken. Below the point of discontinuity, large consolidated areas (darker areas indicated by red arrows) appear with a generalized white lung pattern (indicated by orange arrows). This pattern is classified as score 2. In the box at the right bottom (**D**), a LUS image is shown where the edge between a score of 0 (green box) and a score of 3 (purple box) pattern is clearly visible.

Diagnostic imaging in COVID-19 pneumonia: a literature review

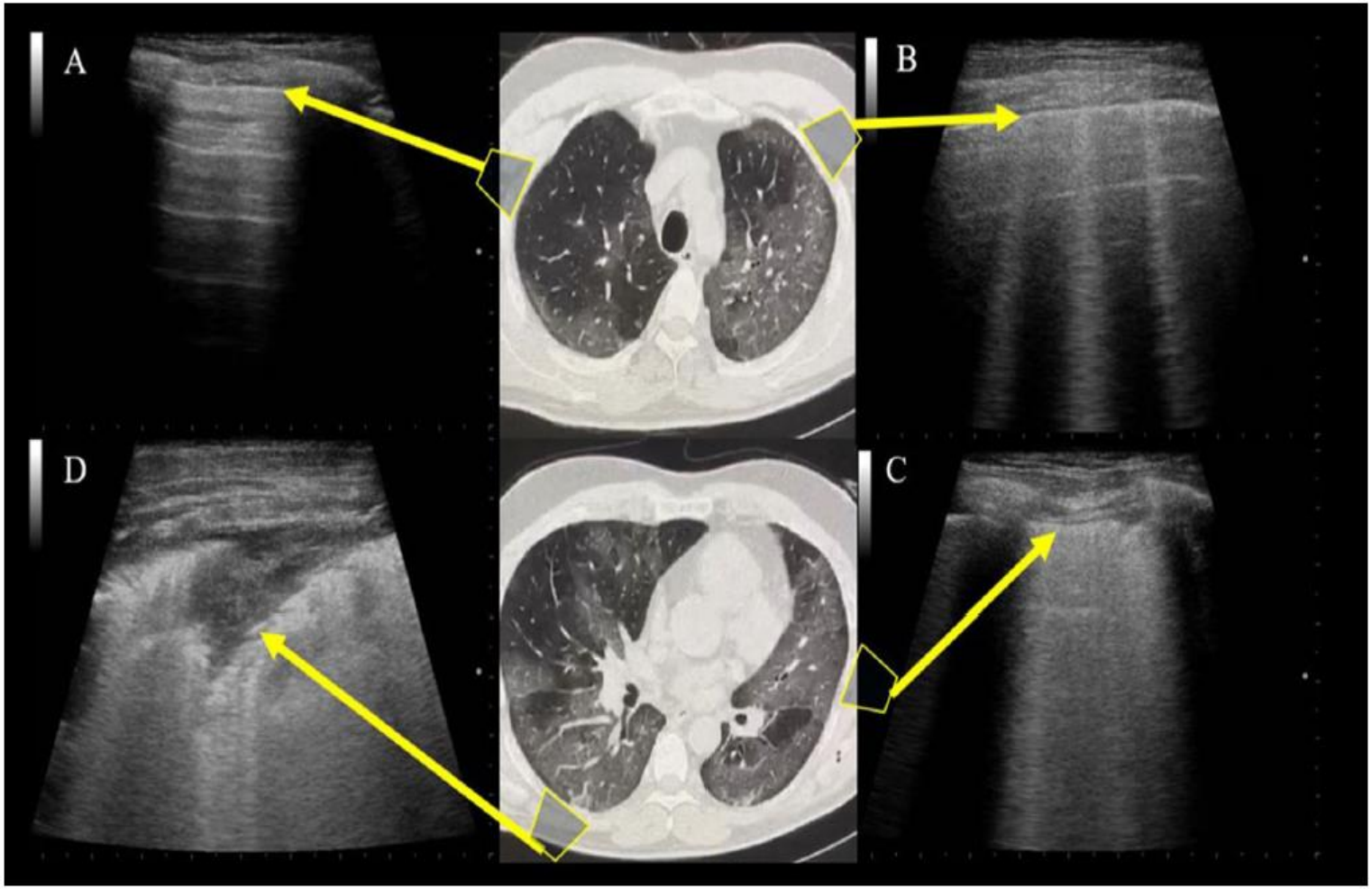

Fig. 3 Imaging correlation between LUS and chest CT scans of the same patients. **a** A-lines in normally aerated parenchyma. **b** Well-separated B-lines, corresponding to subpleural GGOs. **c** Coalescent B-lines, corresponding to more severe GGOs resulting from partial filling of alveolar spaces. **d** Lung consolidation

L'imaging integrato nel percorso del paziente con COVID-19: dalla diagnosi, al monitoraggio clinico, alla prognosi

Tabella 1. Confronto tra le tre metodiche di imaging nel paziente con COVID-19.

	Eco polmonare	Rx torace	TC polmonare (HCRT)
	Ispessimento polmonare	ND	Ispessimento polmonare
	Linee B confluenti	Aspetto di infiltrato polmonare bianco cotonoso	Immagini di infiltrati polmonari
	Piccole consolidazioni periferiche	Incremento delle aree iperecogene	Consolidazioni subpleuriche
	Consolidazioni translobari e non translobari	Addensamenti biancastri confluenti di grandi dimensioni translobari	Consolidazioni translobari
	Distribuzione multilobare Scansioni settori multipli anteriori e posteriori (se possibile)	Aspetto cotonoso di patologia interstiziale multilobare e bilaterale	Anomalie con distribuzione su più di due lobi e bilaterale
	Versamento pleurico raro	Versamento pleurico raro	Versamento pleurico raro
Aspetto clinico del paziente e le tre tecniche a confronto			
Fase precoce	Linee B focali	Potrebbe essere negativa o con poche alterazioni lobulari interstiziali	Poche aree multilobari a vetro smerigliato
Fase infezione lieve	Linee B focali con ispessimento pleurico	Alterazioni multilobulari di tipo interstiziale con aspetto cotonoso	Opacità confluenti a vetro smerigliato
Fase infezione grave	Consolidazioni parenchimali (epatizzazione del parenchima)	Aumento dell'interessamento interstiziale con fenomeni di addensamento multilobare	Sindrome alveolare interstiziale Consolidamenti broncogramma aereo

HRCT, tomografia computerizzata ad alta risoluzione; ND, non definibile; TC, tomografia computerizzata.
Eco polmonare: sensibilità e specificità alta soprattutto nelle fasi iniziali pre-sintomatiche ma operatore-dipendente; Rx torace: specifico ma con sensibilità ridotta nelle fasi iniziali; TC polmonare: sensibilità e specificità elevata, "gold standard".

Antonello D'Andrea[1], Giovanna Di Giannuario[2], Gemma Marrazzo[1], Lucia Riegler[1], Donato Mele[3], Massimiliano Rizzo[4], Marco Campana[5], Alessia Gimelli[6], Georgette Khoury[7], Antonella Moreo[8], a nome dell'Area Cardioimaging dell'Associazione Nazionale Medici Cardiologi Ospedalieri (ANMCO)

Acute respiratory failure

↓

LUS

BILATERAL B LINES

Artifact distribution

	CARDIOGENIC APE B lines confluent up to "White Lung" with base-apex gradient	ARDS B lines confluent up to "white lung", no base-apex gradient, spared areas	C-ILD Irregular pleural line / B lines with irregular morphology / small subpleural consolidation	COVID-19 PNEUMONIA B lines separate or confluent "white lung" with peripheral patchy distribution, pleural irregularity, consolidations
Epidemiological criterion	-	-	-	+
Main symptoms	Dyspnea and tachypnea, cough with pink sputum	Dyspnea, tachypnea, cough, fever	Exertion dyspnea and cough	Fever, cough, dyspnoea, dysgeusia, headache, myalgia, diarrhea
Blood tests	BNP +, troponins, PCR and PCT-	PCR +, PCT +/-, neutrophilic leukocytosis, renal and electrolyte disturbances, BNP and troponins -	PCR and VES +, BNP and troponins -, PCT -	Absolute lymphocipenia and eosinopenia, LDH +, ferritin +, PCR + PCT -, BNP and troponins -
Echocardiogram	Areas of dyskinesias or hypo / akinesias, heart chamber dilation, valvular defects, E / A alteration	Right ventricular overload, pericardial effusion	Right ventricle overload, tricuspid rigurgitation, dilated and hypocollassable cava vein	Negative / signs of myo-pericarditis or right-sided overload due to PE
ECG	Ischemic changes / overload; arrhythmias	Right axis deviation, pulmonary p, signs of subendocardial ischemia	Right axis deviation, pulmonary p	Normal / signs of right overload / ST changes from ischemia or pericarditis
Swab	-	-	-	+

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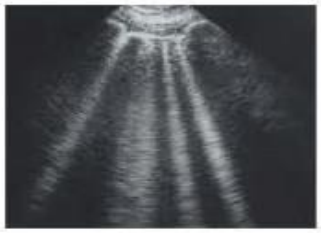
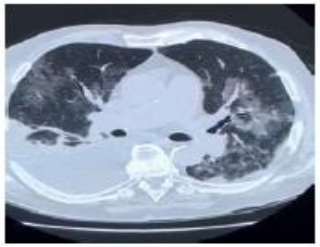




Valutazione iniziale con imaging del COVID-19 sospetto/diagnosticato

- Radiografia del torace
- Ecografia polmonare (a 12 segmenti per la ricerca di linee B)

↓ Rx torace negativo.

Ecografia polmonare negativa.

↓ Rx torace normale o con reperti non univoci.

Ecografia polmonare con linee B "patchy".

↓ Rx torace con infiltrati "patchy" o diffusi reperti patologici inequivocabili. Ecografia polmonare negativa.

↓ Rx torace con infiltrati "patchy".

Ecografia polmonare con linee B "patchy".

Nessuna indagine ulteriore. Possibile invio al domicilio.

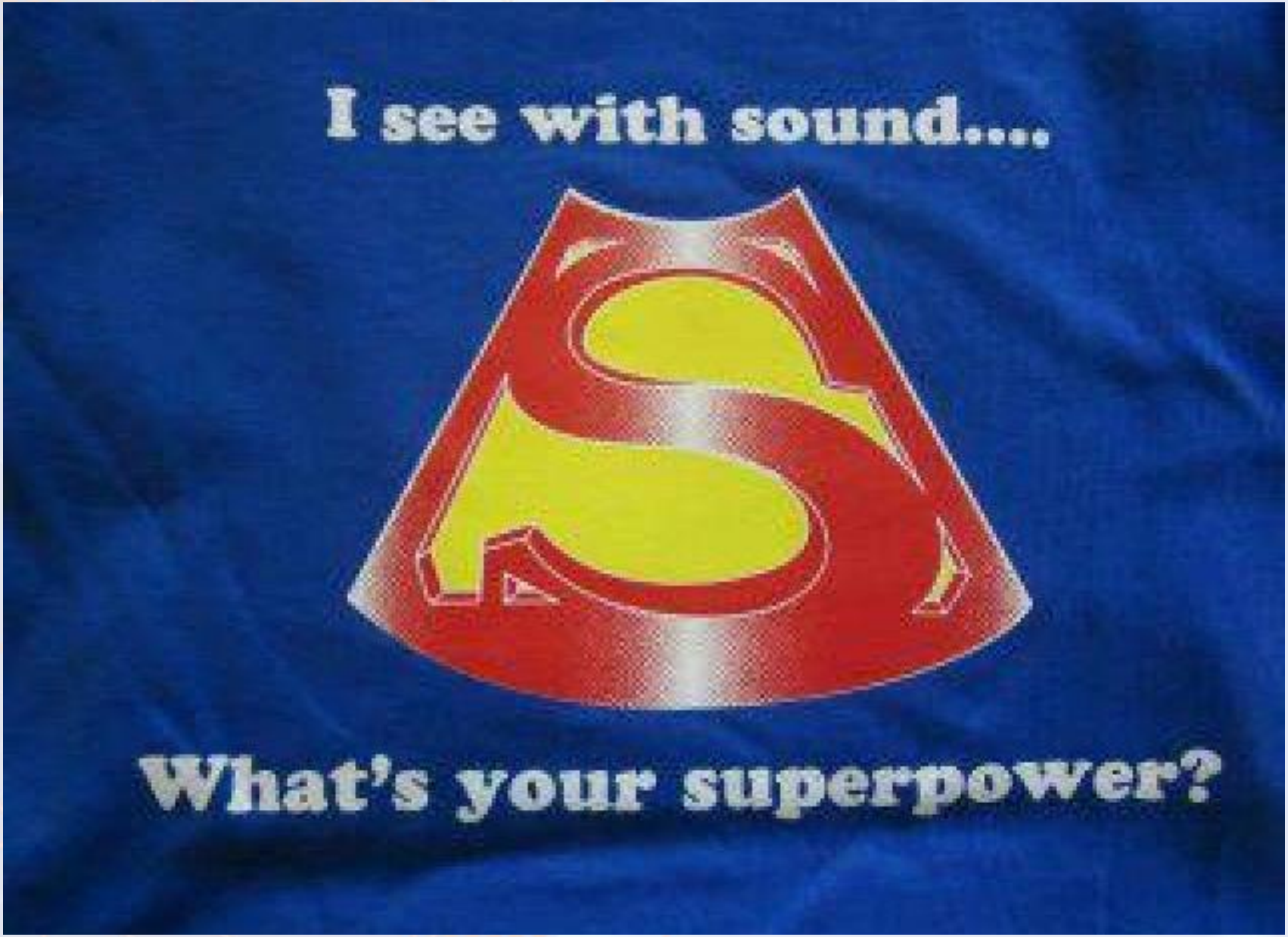
Eventualmente ripetere Rx ed ecografia torace se i sintomi persistono o peggiorano

Considerare TC torace solo se questa indagine può modificare atteggiamento terapeutico

Ulteriori indagini di imaging probabilmente non necessarie

Scarsa probabilità di modificare atteggiamento terapeutico. Da considerare TC in pazienti immunodepressi se sospetto di altri agenti patogeni (polmoniti micotiche o da pneumocisti)

Ecocardiogramma solo nei pazienti con instabilità emodinamica (sepsi)


I see with sound....
What's your superpower?