Appendix E1

Materials and Methods

This study was approved by our institutional review board. It followed the ethical guidelines of the declaration of Helsinki, and the need to obtain patient's written informed consent was waived. Three authors (F.G., J.B., P.C.) had access to the study data. No author has any conflict of interest to declare in relation to this study.

Study type and inclusion criteria

The inclusion criteria were consecutive adult patients (>= 18 years old) with a RT-PCR diagnosis of SARS-CoV-2 or a strong clinical suspicion of COVID-19 (fever and/or respiratory symptoms of quick onset, non-protected exposure to a confirmed SARS-CoV-2 infection case) who underwent a chest CT scan between March 16th 2020 and April 4th 2020. In patients with suspected or confirmed SARS-CoV-2 infection, chest CT scan was performed when clinical signs of severity were present (oxygen saturation below 92%, polypnea over 25 cycles per minute, fever over 40°C, increasing oxygen needs, need for invasive mechanical ventilation (IMV) or when the patient suffered from comorbidity (active neoplasia, immunosuppression, history of organ or bone-marrow transplantation).

Patient with non-contrast chest CT scan were excluded.

Study population

Of 2003 patients diagnosed with COVID-19, 280 patients were hospitalized during the study period. Of these, 129 of 280 (46%) hospitalized patients underwent CT scan. Twenty-nine patients had non-contrast chest CT scan or non-severe clinical features and thus were excluded. Finally, 100 patients with COVID-19 infection were examined with contrast enhanced CT and severe clinical features were included (Figure 1) . Demographics and clinico-biological data were gathered from medical charts. Were reported 1) patients significant medical

history (cardiovascular disease, chronic lung disease, diabetes, history of neoplasia, surgery in the month preceding pulmonary CT angiography (CTA), 2) information concerning COVID-19 (onset of symptoms, delay between first symptoms and pulmonary CTA realization, RT-PCR results), 3) Care status of the patient at pulmonary CTA realization (conventional care unit, critical care unit), 4) Need for IMV at the time of the pulmonary CTA or in the following 12 hours after the pulmonary CTA .

Computed tomography protocol

Multidetector pulmonary CTA was performed on a Revolution CT (GE Healthcare, Milwaukee, WI, USA) after intravenous injection of 60 ml iodinated contrast agent (Iomeprol 400 Mg I/mL, Bracco Imaging, Milan, IT) at a flow rate of 4 mL/s, triggered in the pulmonary trunk. CT scan settings were 120 kVp, 80 x .625 mm, rotation time .28 s, average tube current 300 mA, pitch .992 and CTDIvol 4.28 mGy.

Imaging analysis

Imaging results were independently reviewed by two chest radiologists (J.B. and F.G. with respectively 11 and 6 years of experience) on a PACS workstation (Carestream Health, Rochester, NY, USA). Readers were blinded to the patient's status, clinical and biological features. Readers were asked to assess: 1) the CT pattern of COVID-19: Ground glass opacity, areas of consolidation, reticulations (Fig 2; Figs E1, E2), pattern of crazy paving (ground-glass opacities limited by thickened septal lines), subpleural curvilinear line, bronchiectasis (Fig 2), nodules, mediastinal or hilar lymphadenopathy ; 2) Location of the abnormalities: peripheral, central or mixed ; unilateral or bilateral ; superior, inferior or mixed ; 3) Extent of lesions graded from 0 to 4 as follows: 0=0%, 1=[1-24%], 2=[25%- 49%], 3=[50%-74%], 4=[75%-100%] of whole lung surface.

Presence or absence of pulmonary embolus was assessed, defined as a filling defect within pulmonary vessels (Fig 2; Figs E1, E2). When present readers were asked to report 1) Extent of emboli: unilateral or bilateral, number of lung lobes involved, 2) Topography of the emboli: proximal, lobar or segmental ; 3) Signs of acute pulmonary heart disease: enlargement of the pulmonary artery > 35mm,

abnormal position of the interventricular septum, right ventricle dilatation (ratio right ventricular diameter by left ventricular diameter >1 on reformatted four chamber images) ; 4) Presence of pulmonary infarction.

In case of discordance between readers, a simultaneous reading to reach consensus was achieved.

Statistical Analysis

Continuous data was expressed as mean ± standard deviation (SD) and categorical data as frequency and percentage. Comparisons between continuous variables were performed using Student t-test when distribution was normal. Comparison between categorical variables were performed using Pearson's chi-squared test or Fisher's exact test. To determine the risks factors of pulmonary embolus, a logistic regression model was made with the extent of lesions, need for invasive mechanical ventilation, age, sex, and the presence of comorbidities. All tests were two-sided, and an overall P value of less than .05 was considered to indicate a significant difference. All analyses were performed with R version 3.4.4 (R Core Team 2017).

Supplemental Tables

Table E1. CT features of COVID-19 patients with and without Acute Pulmonary Embolism (APE)

	Total	COVID-19 APE +	COVID-19 APE -	
	n = 100	n = 23	n = 77	p value
CT features of COVID-19				
Ground glass opacity, n (%)	37 (37)	4 (17)	33 (43)	.028
Consolidation, n (%)	4 (4)	2 (9)	2 (3)	.226
mixed, n (%)	58 (58)	17 (74)	41 (53)	.095
Reticulations, n (%)	33 (33)	10 (42)	23 (30)	.312
bronchiectasis, n (%)	44 (44)	14 (60)	30 (39)	.093
crazy paving, n (%)	41 (41)	9 (39)	32 (42)	1
Subpleural curvilinear line, n (%)	51 (49)	7 (30)	42 (56)	.057
Nodules, n (%)	6 (6)	1 (4)	5 (6)	1
Mediastinum or hilar lymphadenopathy, n (%)	19 (19)	3 (13)	16 (21)	.459
Location				
peripheral, n (%)	46 (46)	12 (52)	34 (45)	.637
central, n (%)	4 (6)	1 (4)	3 (4)	1
mixed, n (%)	49 (49)	10 (44)	39 (50)	.751
unilateral, n (%)	0 (0)	0 (0)	0 (0)	-
bilateral, n (%)	99 (99)	23 (100)	76 (99)	1
Superior, n (%)	9 (9)	2 (8)	7 (9)	1
inferior, n (%)	35 (35)	6 (28)	29 (40)	.455
mixed, n (%)	55 (54)	15 (64)	40 (50)	.377
Extent of lesions				
Grade 0 (0%)	1 (1)	0(0)	1 (1)	
Grade 1 (< 25%)	37 (37)	6 (26)	31 (40)	
Grade 2 (>25 / < 50%)	31 (31)	3 (13)	28 (36)	.004
Grade 3 (> 50% / < 75%)	19 (19)	7 (30)	12 (16)	
Grade 4 (> 75%)	12 (12)	7 (30)	5 (6)	

Table E2. Characteristics of acute pulmonary embolism

Total	**n=23**
Unilateral	7 (30)
Bilateral	16 (70)
Proximal	0 (0)
Lobar	10 (43)
Segment	23 (100)
number of lobes involved	2.4 ± 1.2
RV / LG > 1	2 (9)
Septal abnormalities	2 (9)
Pulmonary infarction suspicion	2 (9)

Table E3. The association of clinical factors with acute pulmonary embolus in multivariable analysis.

	OR	95%CI	p value
Invasive mechanical ventilation	3.76	1.02 - 14.63	.049
Male gender	6.55	1.51 - 42.24	.026
Extent of lesions	1.50	0.83 - 2.78	.178
Comorbidities	0.65	0.19 - 2.14	.477
Age	1.02	0.97 - 1.06	.522

Supplemental figures

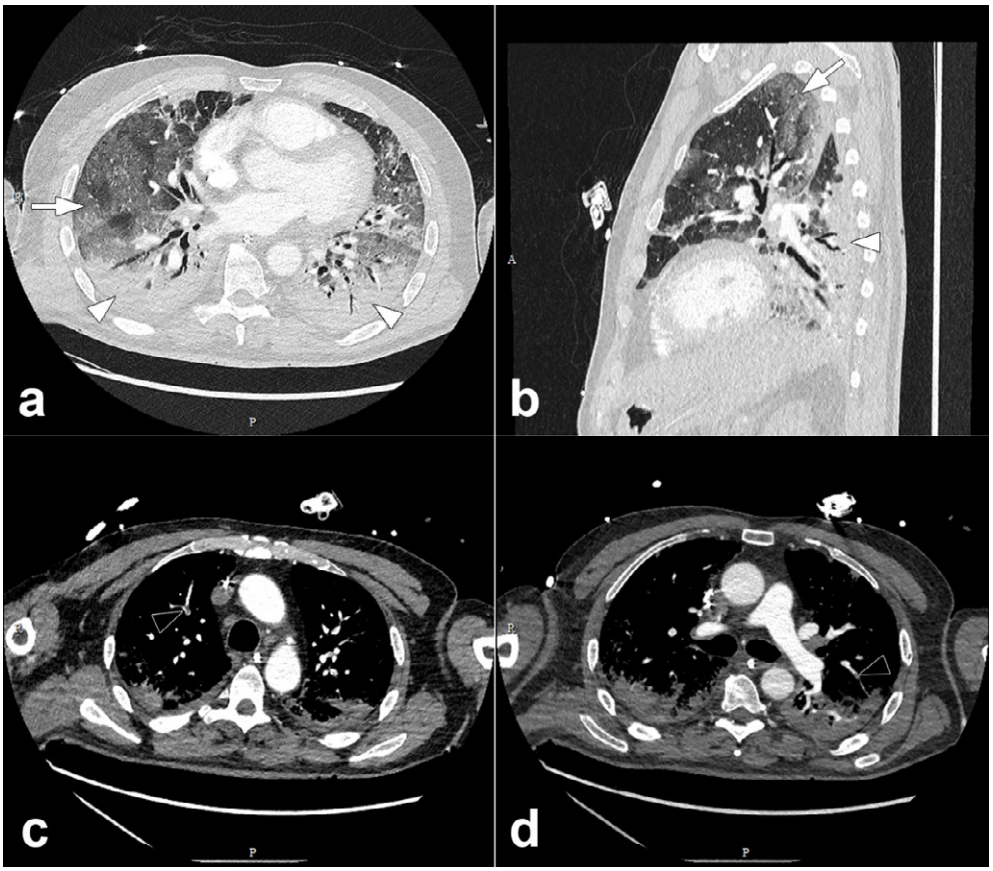

Figure E1: Pulmonary Computed Tomography Angiography (CTA) of a 62 years old male seven days after COVID-19 symptoms' onset and 2 days after his transfer to critical-care unit and tracheal intubation for an acute respiratory distress. Axial (a) and sagittal reformatted (b) lung window images showed a COVID-19 CT pattern associating peripheral ground-glass opacities (arrows) and areas of consolidations associated with bronchiectasis (arrowheads) in decline lung areas. As it involves >75% of lung surface, the extent of lesions is critical. Axial mediastinum window pulmonary CTA images (c, d) revealed bilateral segmental acute pulmonary embolism of segmental location: filling defects within the right superior lobe pulmonary arteria and the left superior lobe pulmonary arteria both at a segmental - subsegmental division (black arrowheads).

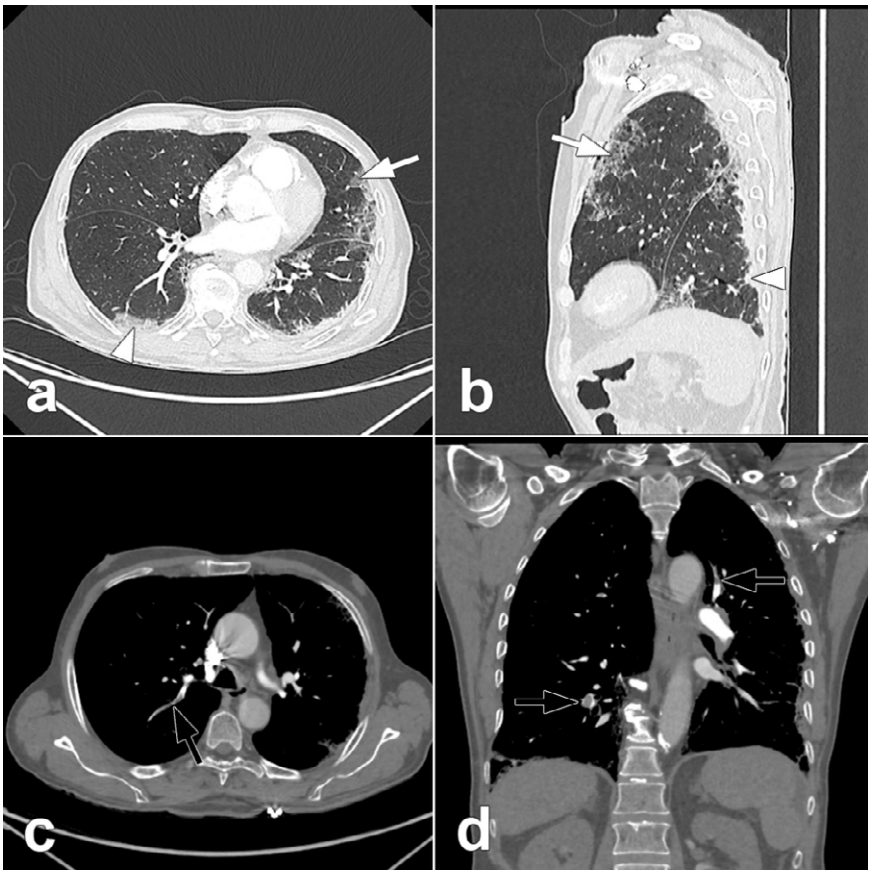

Figure E2: Pulmonary Computed Tomography Angiography (CTA) of a 57 years old male in infectious disease unit, five days after COVID-19 symptoms' onset. Pulmonary CTA was performed because of an increasing need of oxygen therapy. Axial (a) and sagittal reformatted (b) lung window images showed a COVID-19 CT pattern with peripheral ground-glass opacities (arrows) associated with areas of consolidation in decline lung areas (arrowheads). Its extension is moderate and interests < 25% of lung surface. Bilateral segmental acute pulmonary embolism was visible on axial (c) and coronal reformatted (d) mediastinum window images, as filing defects (black arrows) within the right superior lobe pulmonary arteria (segmental - subsegmental division of the posterior sector), the right inferior lobe pulmonary arteria (segmental division), and the left superior lobe pulmonary arteria (segmental - subsegmental division of the apical sector).