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Review Article

Pulmonary Embolism in Patients with COVID-19: Retrospective Study of Ten (10) Cases at the Renaissance University Hospital of N'Djamena/Chad

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Abstract

Introduction: Venous thromboembolic events are encountered during the course of COVID-19, the main one being pulmonary embolism, which shares clinical manifestations. The objective of this study is to recognize the arguments that can evoke a pulmonary embolism in a patient with COVID-19.

Patients and methods: This was a case-control study conducted over 6 months at the renaissance university hospital. We collected ten (10) records of covid 19 patients diagnosed with pulmonary embolism representing the cases, and twenty (20) records of covid 19 patients without pulmonary embolism (controls).

Results: Five (05) patients (50%) had a comorbidity. The thromboembolic risk factor found was prolonged bed rest. The symptoms were: cough and fever (0.3%), dyspnea and chest pain (0.2%), fever and dyspnea (0.3%) and other symptoms (0.2%) p=0.3. Arterial hypotension (70%) normal blood pressure (10%) and hypertension (20%) p=0.9. Electrical abnormalities were found in 60% of patients and dominated by rhythm disorders (40%), p=0.29. At admission, 10% of patients had a saturation of less than 90% and 90% had a saturation of more than 90%, p=0.48. The d-dimer level from 5 times abore normal represented 90% p=0.007. High CRP and below 20 mg/l (20%) from 20-100mg/l (60%) and above 100 mg/l

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(20%) p=0.27. All received effective anticoagulation with enoxaparin. Thirty percent (30%) died and 70% returned home on oral anticoagulation (57% vitamin K antagonist and 43% direct oral anticoagulants).

Conclusion: Pulmonary embolism in covid 19 is difficult to diagnose. An elevation of d-dimer may suggest the diagnosis.

Keywords: Pulmonary; Embolism; COVID-19; N Djamena; Chad.

Introduction

The coronavirus disease that emerged in China in December 2019 is responsible for a potentially fatal pneumonia. It is a pandemic during which humanity has paid a heavy price. The clinical manifestations are rich and varied, ranging from an influenza-like syndrome to a severe acute respiratory syndrome leading to hospitalization [1]. Thrombosis is a predominant clinical feature of covid-19.

Indeed, 5 to 30% of patients have a clinically proven thrombotic event [2,3]. Since the beginning of March 2020, the problem of thrombosis during the course of COVID-19 has become a major medical challenge since a significant rate of patients thrombosed, some of them despite of a well conducted preventive anticoagulation [4].

The cases of pulmonary embolism during COVID-19 occur in cases who most often require resuscitation. The pathophysiological phenomena can be explained by the thromboembolic risk factors present in this category of patients.

Virchow's triad can be evoked with notably venous stasis due to prolonged bed rest, parietal damage due to inflammation and hyper coagulability due to sepsis. Another mechanism is due to endothelial activation and thrombogenic inflammation (increase in von willebrand factor, factor VIII) due to the virus itself in situ on the infected pulmonary sites inducing micro and macro vascular pulmonary venous thrombosis from close to close [5].

In a French multicentric cohort of 150 intensive care patients, they found 18% of major thromboembolic events, mainly pulmonary embolism [6]. The incidence of thromboembolic events in COVID-19 patients is higher compared with non-COVID-19 patients (OR=6.2) [7].

The occurrence of pulmonary embolism during COVID-19 constitute a bad prognostic factor. As sub-Saharan Africa in general and Chad in particular are not as much affected by COVID-19 compared to other regions of the world. Cases associated with pulmonary embolism have been recorded.

Methodology

The study took place in the COVID-19 unit of the University Hospital of the Renaissance. This unit was created at the peak of the COVID-19 pandemic that our country experienced in order to solve the problem of the flow of patients whose care requires special monitoring. This was a case-control study with retrospective data collection conducted over a period of six (06) months

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(from October 2020 to March 2021). We collected 10 patients hospitalized for COVID-19 with pulmonary embolism diagnosed on thoracic angioscan (cases) and 20 patients hospitalized for COVID-19 without pulmonary embolism, respectively. Cases and controls were matched on age and sex. The diagnosis of COVID-19 was made by RT-PCR or chest CT. Angioscan was performed mainly on the basis of clinical evidence, including worsening of dyspnea, desaturation and worsening or appearance of chest pain.

Results

Five (05) patients or 50% had at least one comorbidity. The platelet count was normal in the cases (70%) and in the controls (80%). Severe lung injury (Corad III and IV) was observed in 70% of the cases and 65% of the controls. D-dimer levels of 5 above times normal were 90% p=0.007 in cases than in controls (40%). The in-hospital mortality rate was 30% in cases versus 10% in controls.

Variables	Modalities	Cases	Controls	Chi-2	p-value	Total
Sex	Male	7	13	0.07	0.78	20
	Female	3	7			10
Comorbidities	Without	5	12	0.27	0.60	18
	With	5	8			12
Platelets	Thrombocytopenia	0	2			2
	Normal	7	16	2.68	0.26	23
	Thrombocytosis	3	2			5
	Normal	3	3			6
Thoracic CT (Covid)	Corad I	0	2			2
	Corad II	0	2	2.77	0.42	2
	Corad III to V	7	13			20
	Normal	1	12			13
D- dimers	**less than or=to 5N**	**7**	**3**	9.96	**0.007**	10
	Above 5N	**2**	**5**			7
Outcome	Deaths	3	2			5
	Return at home	7	18	1.92	0.16	25

Table 1: Descriptive epidemiology.

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Variables	Modality	Odd ratio	p-value	Confidence	Interval
Comorbidities	Presence	1.5	0.6	0.3252299	6.918184
D-dimers	High	28	0.008	2.421976	323.7026
SPO2	Below 90%	2.28	0.49	0.2170551	23.32358
Chest CT	Corad III to V	0.53	0.51	0.0850623	3.408569

Table 2: Unadjusted logistic regression.

Variables	Modality	Adjusted OR	p-value	Confidence	Interval
White blood cells	Above 20.000	1.62	0.7	0.054819	48.02133
CRP	More than 100	0.43	0.62	0.014094	13.12068
D-dimers	High	3.2	0.43	0.170572	60.07263

Table 3: Adjusted logistic regression.

Discussion

The objective of our study was to recognize the arguments that could suggest pulmonary embolism in patients with COVID-19. The limitations of our study were first of all the retrospective character. This did not allow us to collect some parameters such as: body mass index, personal or family history of venous thromboembolic disease. Then the small size of our sample, whose results cannot be extrapolated to patients with covid 19. Despite our limitations, we achieved results that we could be compare with other studies.

Half of our patients had a comorbidity. Other studies have shown that the presence of comorbidities increases the risk of patients with covid19 [8]. However, the presence of comorbidity was not associated with the occurrence of pulmonary embolism in patients with COVID-19. D-dimer levels at 5 above times normal and accounted for 90% of our patients with pulmonary embolism. Many studies have reported that coagulopathy is frequently associated with COVID-19 disease. D-dimer was therefore often elevated. This increase in D-dimer is an independent biomarker of poor prognosis in COVID-19 disease [9]. Cohort studies have shown that thromboembolic complications in patients with covid 19 ranged from 11 to 35% [10,11].

Patients with COVID-19 were therefore at high risk of thromboembolic complications and these complications were associated with a poor prognosis [12]. Indeed, in unadjusted logistic regression, the increase in D-dimer levels was strongly associated with the occurrence of pulmonary embolism. But after adjustment for other factors, increased D-dimer levels were not associated with the

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occurrence of pulmonary embolism. Mortality was significant in our study (about 30%). In a French multicentric cohort, the mortality rate was lower (12.2%) than in our study [13]. The severity of lung parenchymal involvement was not correlated with the occurrence of pulmonary embolism in patients with COVID-19.

In our study, the increase in white blood cells was not correlated with the occurrence of pulmonary embolism. However, in a Chinese meta-analysis, the increase of D-dimer and white blood cells was at risk of pulmonary embolism and in patients with COVID-19 [14]. Elevation of CRP was not associated with the occurrence of pulmonary embolism. however, the increase in CRP was associated with the occurrence of pulmonary embolism in a multicenter study in France [15].

Conclusion

Pulmonary embolism during of COVID-19 is not rare. Its diagnosis is difficult because the symptoms are confused with those of COVID-19. The increase of D-dimer can evoke the diagnosis evoke but it remains questionable.

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