

Prevalence of Thrombosis in the Splanchnic Territory Before and After the Appearance of Covid19

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Abstract

Splanchnic venous thrombosis (SVT) refers to thrombosis of the hepatic venous system and thrombosis of the extrahepatic portal system.

With the spread of the pandemic, it has become apparent that Covid19 may be associated with an increased risk of thrombosis.

In this work we will describe and compare the prevalence of thrombosis in the splanchnic territory before and after the appearance of Covid19 in a Moroccan Hepato Gastro Enterology department.

This is a retrospective, cross-sectional study, during which we compared two populations of patients hospitalized in the Hepato Gastro Enterology Department of the University Hospital Centre Ibn Rochd of Casablanca:

- Group 1 (G1): Patients hospitalised in the department before the appearance of Covid19 between July 2018 and December 2019 (n = 1500).
- Group 2 (G2): Patients hospitalised after the appearance of Covid19 between January 2021 and June 2022 (n = 1210).

In G1, 10 patients had thrombosis in the splanchnic territory, a prevalence of 0.67%. Their average age was 47.5 years (+/-18.9) with a female predominance (70%).

3 patients were being followed for chronic liver disease (30%), 4 were on oral contraception (40%).

90% of the patients had consulted for abdominal pain.

An inflammatory syndrome was present in the majority of these patients.

On computed tomography angiography, 50% of patients had complete portal thrombosis (CPT). 50% had extension to the superior mesenteric vein.

All of them were treated with LMWH and subsequently with anti-vitamin k.

A long-term repermeabilisation was observed in 40% of patients, and clinical improvement in 30% of patients.

In G2, 21 patients had thrombosis in the splanchnic territory, a prevalence of 1.7%. Their average age was 60.8 years (+/-13.2) with a female predominance (66.7%). 10 patients were being followed for chronic liver disease (47.6%).

95% of the patients had consulted for abdominal pain.

An inflammatory syndrome was present in the majority of these patients.

On computed tomography angiography, 61.9% of patients had CPT and 38.1% had PPT, 61.9% had extension to the superior mesenteric vein.

71.4% of these patients were treated with LMWH followed by Anti-vitamin k, 14.3% were treated with Direct Oral Anticoagulants, and 14.3% with LMWH alone.

The evolution was marked by long-term repermeabilisation in 1 patient, clinical improvement in 19% of patients. One patient underwent surgery, two patients died.

Statistical analysis showed that Covid19 was a significant risk factor for the development of thrombosis in the splanchnic territory ($p = 0.009$).

Keywords: Covid19; Thrombosis; Splanchnic Territory; Portal Thrombosis; Prevalence; Risk Factor

Abbreviations

SVT: Splanchnic Venous Thrombosis; CPT: Complete Portal Thrombosis; PPT: Partial Portal Thrombosis; CVC: Collateral Venous Circulation; LMWH: Low Molecular Weight Heparin

Introduction

Splanchnic venous thrombosis (SVT) refers to thrombosis of the hepatic venous system and thrombosis of the extrahepatic portal system. They can occur in the context of cirrhosis or in the absence of underlying liver disease.

With the spread of the pandemic, it has become apparent that Covid19 may be associated with an increased risk of thrombosis.

In this work we will describe and compare the prevalence of thrombosis in the splanchnic territory before and after the appearance of Covid19 in a Moroccan Hepato Gastro Enterology department.

Materials and Methods

This is a retrospective, cross-sectional study, during which we compared two populations of patients hospitalized in the Hepato Gastro Enterology Department of the University Hospital Centre Ibn Rochd of Casablanca:

- Group 1 (G1) grouping patients hospitalised in the department before the appearance of Covid19 between July 2018 and December 2019. 1500 patients were included in this group;
- Group 2 (G2) grouping patients admitted in the department after the appearance of Covid19 between January 2021 and June 2022. 1210 patients were included in this group.

We described the clinical, epidemiological and etiological characteristics of the patients with thrombosis in the splanchnic territory in both groups and compared the prevalence of this thrombosis before and after the appearance of covid19. Statistical analysis was performed using Jamovi 2.0.0.

Results

In group 1, 10 patients had thrombosis in the splanchnic territory, a prevalence of 0.67%. Their average age was 47.5 years (+/- 18.9 years) with a female predominance (70%).

Among their medical histories: 3 patients were being followed for chronic liver disease (30%), 4 were on oral contraception (40%), and one patient was a chronic alcoholic (Table 1).

Medical history	Before Covid19	After Covid19
chronic liver disease	30%	47,6%
oral contraception	40 %	
Alcoholic-smoker	10%	14,3%
Follow-up for UC		4,7%

Table 1: Comparison of patient's medical history before and after Covid19.

90% of the patients had consulted for abdominal pain, 60% for diffuse abdominal pain and 30% for localised abdominal pain. Diarrhoea was present in 20% of patients.

Biologically, an inflammatory syndrome was present in the majority of these patients. Thus, C-reactive protein was increased in 90% of patients, thrombocytosis was observed in 20% of patients and hyperfibrinogenemia in 40% of patients (Table 2).

Biological parameter	Before Covid19	After Covid19
Increased CRP	90%	85%
Hyperplaquettosis	20%	19%
Hyperfibrinogenemia	40%	23,8%

Table 2: Comparison of biological parameters before and after Covid19.

On computed tomography angiography, 50% of patients had complete portal thrombosis (CPT) and 50% had partial portal thrombosis (PPT), 60% had extension to the superior mesenteric vein and 40% had extension to the splenic vein. Collateral venous circulation (CVC) was observed in 50% of patients, and intestinal suffering in 50% of patients (Table 3). All of these patients were treated with low molecular weight heparin (LMWH) and subsequently with anti-vitamin k.

Angioscan	Before Covid19	After Covid19
Complete portal thrombosis	50%	61,9%
Partial portal thrombosis	50%	38,1 %
Extension to the superior mesenteric vein	60%	61,9 %
Extension to the splenic vein	40%	57,1%
Collateral venous circulation	50%	38%
Intestinal suffering	50%	4,7%

Table 3: Comparison of computed tomography angiography data before and after Covid19.

The evolution was marked by long-term repermeabilisation in 40% of patients, clinical improvement in 30% of patients. One patient underwent surgery and one patient was lost to follow-up (Table 4).

Evolution	Before Covid19	After Covid19
Long-term repermeabilization	40%	4,8%
Clinical improvement	30%	19%
Surgery	10%	4,8%
Death		9,5%
Lost to follow-up	10%	61,9%

Table 4: Comparison of the evolution before and after Covid19.

In group 2, 21 patients had thrombosis in the splanchnic territory, a prevalence of 1.7%. Their average age was 60.8 years (+/- 13.2 years) with a female predominance (66.7%). Among their medical histories: 10 patients were being followed for chronic liver disease (47.6%), 3 patients were chronic alcoholics (14.3%), and one patient was being followed for ulcerative colitis (UC) (Table 1).

95% of the patients had consulted for abdominal pain, 52.4% for diffuse abdominal pain and 42.9% for localised abdominal pain. One patient had presented with rectal bleeding and one patient was asymptomatic.

Biologically, an inflammatory syndrome was present in the majority of these patients. Thus, the C-reactive protein was increased in 85% of the patients, thrombocytosis was observed in 19% of the patients and hyperfibrinogenemia in 23.8% of the patients (Table 2).

On computed tomography angiography, 61.9% of patients had complete portal thrombosis and 38.1% had partial portal thrombosis, 61.9% had extension to the superior mesenteric vein and 57.1% had extension to the spleno-mesenteric vein. Collateral venous circulation (CVC) was observed in 38% of patients, and intestinal suffering in 1 patient (Table 3).

71,4% of these patients were treated with LMWH followed by anti-vitamin k, 14,3% were treated with Direct Oral Anticoagulants, and 14,3% with LMWH alone.

The evolution was marked by long-term repermeabilisation in 1 patient, clinical improvement in 19% of patients. One patient underwent surgery, two patients died and 13 patients were lost to follow-up (Table 4).

Statistical analysis showed that Covid19 was a significant risk factor for the development of thrombosis in the splanchnic territory (p = 0.009).

The prevalence of diseased subjects after Covid19 was 1.7%, and the prevalence of diseased subjects before Covid19 was 0.67%. The prevalence ratio was 2.54 (Table 5).

Splanchnic thrombosis		Exposure at Covid19			Prevalence ratio	Significance
		No	Yes	Total		
No	Headcount	1490	1190	2680		
	%	99,33%	98,3%	98,9%		
Yes	Headcount	10	21	31	2,54	P = 0,009
	%	0,67%	1,7%	1,1%		
Total	Headcount	1500	1211	2711		
	%	100%	100%	100%		

Table 5: Contingency table showing the rate of splanchnic thrombosis according to Covid19 exposure.

Discussion

Covid-19 is caused by Sars-CoV-2, an RNA virus belonging to the beta-Coronavirus family. This virus enters the body through the airways and binds, via its glycoprotein Spike, to ACE2 receptors on the surface of host cells.

At the vascular level, the consequence of the viral infection is an activation of coagulation and endothelial lesions, leading to thrombotic, venous and arterial complications [1].

Covid-19 induces a major prothrombotic state due to:

- Activation of coagulation linked to the cytokine storm;
- A decrease in fibrinolysis;
- Endothelial activation with inflammatory infiltrate, increased Willebrand factor and procoagulant soluble thrombomodulin (associated with poor prognosis) and endothelial damage;
- Platelet activation with a strong increase in P-selectin;
- Microthrombosis and microhemorrhage in the pulmonary epithelium.

In patients with Covid-19, we therefore observe a global increase in coagulation with an excess of thrombin formation, explaining the increase in thrombotic phenomena in the lung and periphery [1].

Thrombosis in the splanchnic territory constitutes the third thrombotic location after pulmonary and limb involvement [2]. The venous occlusion may be consecutive to multiple diseases with pro-thrombotic state [3].

Many studies have reported thromboembolic complications associated with Covid19 infection [4-7]. In a study by Klok, *et al.* the incidence of thrombotic complications in critically ill patients with Covid19 was 31% and pulmonary embolism (PE) was the most com-

mon thrombotic complication among all patients [8]. However, only one case report in the literature described a patient with suspected Covid19 infection, but without RT-PCR confirmation, who developed portal vein thrombosis during hospitalisation [9].

Portal vein thrombosis usually occurs in association with cirrhosis, malignancy or in patients with hereditary or acquired thrombophilia.

Portal thrombosis due to viral infection is a rare complication.

Like several recent studies [10-13], our study may also suggest that Covid19 infection increases the risk of systemic thrombosis and thrombosis in the splanchnic system.

Conclusion

Covid19 constitutes an increased risk of thrombosis. Our study, which compares two groups of patients: one group before the Covid19 era and one group during the Covid19 era, suggests that there is a significant increase in thrombosis in the splanchnic territory since the onset of the pandemic.

Conflict of Interest

There is no conflict of interest.

Bibliography

1. El mile C. "Risque thrombotique de la Covid-19". *Option/Bio* 32.629 (2021): 20-21.
2. Seguin P and Malledant Y. "Ischémie mésentérique aiguë". *Urgence Pratique* 83 (2007): 5-11.
3. Higgins R., et al. "Mesenteric infarction secondary to tumor emboli from primary aortic sarcoma". *Cancer* 68.7 (1991): 1622-1627.
4. Lodigiani C., et al. "Venous and arterial thromboembolic complications in COVID-19 patients admitted to an academic hospital in Milan, Italy". *Thrombosis Research* 191 (2020): 9-14.
5. Llitjos J-F., et al. "High incidence of venous thromboembolic events in anticoagulated severe COVID-19 patients". *Journal of Thrombosis and Haemostasis* 18 (2020): 1743-1746.
6. Middeldorp S., et al. "Incidence of venous thromboembolism in hospitalized patients with COVID-19". *Journal of Thrombosis and Haemostasis* (2020).
7. Bikdeli B., et al. "COVID-19 and thrombotic or thromboembolic disease: implications for prevention, antithrombotic therapy, and follow-up: JACC state-of-the-art review". *Journal of the American College of Cardiology* 75 (2020): 2950-2973.
8. Klok FA., et al. "Incidence of thrombotic complications in critically ill ICU patients with COVID-19". *Thrombosis Research* 3848 (2020): 30120-30121.
9. De Barry O., et al. "Arterial and venous abdominal thrombosis in a 79-yearold woman with COVID-19 pneumonia". *Radiology Case Reports* 15 (2020): 1054-1057.
10. N Tang., et al. "Anticoagulant treatment is associated with decreased mortality in severe coronavirus disease 2019 patients with coagulopathy". *Journal of Thrombosis and Haemostasis* 18.5 (2020): 1094-1099.

11. FA Klok, *et al.* "Incidence of thrombotic complications in critically ill ICU patients with COVID- 19". *Thrombosis Research* 191 (2020): 145-147.
12. Y Zhang, *et al.* "Clinical and coagulation characteristics of 7 patients with critical COVID-2019 pneumonia and acroischemia". *Zhonghua Xue Ye Xue ZaZhi* 41 (2020): E006.
13. Y Zhang, *et al.* "Coagulopathy and antiphospholipid anti bodies in patients with Covid19". *The New England Journal of Medicine* 382.17 (2020): e38.

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