ONOMY Science

American journal of Cardiology and Cardio vascular Diseases
ISSN 2641-2438

REGISTRY STUDY Open Access

THROMBO-PROPHYLAXIS PREVENTS THROMBOTIC EVENTS IN HOME-MANAGED COVID PATIENTS. A REGISTRY STUDY

G BELCARO, M CORSI, GB AGUS, MR CESARONE, U CORNELLI, R COTELLESE, FERAGALLI B.

[1] IRVINE 3 LABS, OOLEX CENTER FOR COVID Dept Or Biomed Scinces, CH- PE UNIVERSITY, PE. ITALY

***Corresponding Author: G BELCARO**, IRVINE 3 LABS, OOLEX CENTER FOR COVID Dept Or Biomed Scinces, CH- PE UNIVERSITY, PE. ITALY: Email: cardres@abol.it ;

Citation: THROMBO-PROPHYLAXIS PREVENTS THROMBOTIC EVENTS IN HOME-MANAGED COVID PATIENTS. A REGISTRY STUDY. Am J of Card and Cardiovas Disc.2019; 3(1): 01-06.

Submitted: 28 April 2020; **Approved:** 29 April 2020 ; **Published:** 29 April 2020

Abstact

This pilot registry analyzes data from subjects with COVID-19 infection and mild symptoms, followed and treated at home. Antithrombotic prophylaxis was used in all subjects. A comparison was made with comparable cases that had not used anthrombotic prophylaxis.

A control group (36 subjects) without prophylaxis was compared to a prophylaxis group (67 subjects using LMWH and 35 using defibrotide).

At two weeks there were no DVTs or thrombotic disease in the prophylaxis groups. Also, the evolution of the main respiratory symptoms was significantly better in the prophylaxis groups ($p<0.05$). No patients went to ITU: 4 out of 36 patients in the comparative group went briefly to hospitals. In subjects using LMWH 1 went to hospital as in the defibrotide group. None was put in ventilation. D-dimer values were fluctuating and not usable to define the presence of a thrombotic condition. This aspect is under further evaluation.

No significant side effects were observed.

Conclusions.

Antithrombotic prophylaxis should be started as soon as possible (home patients) and used during all the high-risk conditions. The importance of venous thromboembolism in medical patients with severe respiratory disease (as COVID), even in the early phases, has been stressed and it is well known; it cannot be considered a new observation and requires adequate, immediate prophylaxis.

Introduction

All acutely ill medical patients should be managed with thromboprophylaxis. In particular, patients >40 years, with acute medical illness, reduced mobility with one or more morbidities (acute heart failure NYHA class III/IV, respiratory disease with respiratory failure with or without ventilation or an exacerbation of respiratory disease, active cancers requiring management, acute infective disease including severe lung infection and sepsis). This list fully covers COVID pneumonia, even in the early phases and with limited symptoms. Also, thrombophilia, rheumatic disease, ischemic stroke, acute myocardial infarction should be considered for prophylaxis.

In acutely ill medical patients, prophylaxis with LMWH for 6-14 days – or until the patient is fully mobile - is strongly recommended (1). Single daily doses of 2.5 mg of fondaparinux is an alternative to LMWH. LMWH is now preferred to LDUH (low dose unfractionated heparin) because it requires one/two injection per day and is associated with less hemorrhagic complications and less heparin-induced thrombocytopenia (HIT).

Fondaparinux, given as one injection/day and is associated with lower HIT occurrence. Extended thrombophylaxis may be considered according to the evolution of the problem (1-5).

This pilot registry analyzes data from subjects with COVID-19 infection and mild symptoms, followed and treated at home. Antithrombotic prophylaxis was used in all subjects. A comparison was made with comparable cases that had not used anthrombotic prophylaxis.

PATIENTS

This registry includes a nonhomogeneous sample collected by observation of COVID-19 patients who were exclusively treated at home. All subjects reported mild, early symptoms that could be managed with symptomatic treatments at home with their full collaboration and in an environment that was connsidered suitable for this management. Their age was <75 and BMI was between 24.5 and 26.6 (including all subjects).

There subjects were otherwise healthy, did not use other drugs and had no metabolic conditions or handicaps. They never had lung or respiratory problems or any chest surgery.

Group A. LMWH Clexane as the first choice or what was available in the local pharmacies) was used 2 times daily at a dose between 4000 and 6000 Units, broadly according to weight.

Group B. Defibrotide BID, IM (10 000 UI BID) was also use in a number of patients that did not want to be treated with LMWH or subjects who preferred to use defibrotide.

DIAGNOSTIC CRITERIA.

COVID-19 was diagnosed clinically as swabs were and are still basically unavailable for all patients (1-5). Many patients have been symptomatic at home without being able to get a swab. Most physicians still operate in a condition of great scarcity of masks and protective elements.

Criteria to diagnose COVID-19 were:

1.Increased temperature (>37.5 C° for at least 2 days)
2.Cough and upper respiratory symptoms
3.Fatigue
4.Malaise
5. Other (pain, vasospastic symptoms)

The follow up was at least of 3 weeks.

Most patients lost contact with their physicians of with the health authorities during this period.

Management: the management was based on clinical targets as described in our recent paper (2-4) (as in Table 1):

1.Symptoms resolution or improvement
2.No DVT or thrombotic disease
3.No need for hospital, oxygen and no intensive care units (ITU).
4.Outcome at 6 weeks (in progress).

TYPE OF STUDY.

This study was a noninterventional, observational registry.

The main management (or standard, SM) included symptomatic management and WHV (warm humid vaporization) with a Prontex Vaporizer for at least 10 min, 3 times daily (with Calyptol, Sanofi), respiratory exercise with a Triflo assistant for improving respiration, careful diet and hours of rest/sleep, soft exercise (at least 20 minutes once daily) according - with what was possible at home – i.e. small weights, roll-cycling or treadmill, free-body exercises (i.e. Pilates or yoga or dancing) individualized according to the house environment and patient's characteristics.

Vitamins and energy drinks were also used according to individuals' needs.

An information/instruction book was given to all patients (5). This book, explaining in simple terms and not-obsessively the problems and stimulating full collaboration was considered the pillar of the standard management in this situation.

Two main groups resulted at the end of the registry:

A Comparative group (36;11 females), no prophylaxis same SM (age 56.7;4.4)

B Prophylaxis group (67; 14 females), prophylaxis A (age 56;3.8)

;7 females) prophylaxis B (age 55.2;5.3).

The two types of prophylaxis (6) were defined on the basis of the informed choice of single patients and not prescribed.

In case of more complex thrombogenicity risk TED (Thrombo-embolic deterrent stocking. Tyco) were used.

In case of suspected DVT a non-contact thermogram (Flir 4440, Flir, Sweden) was made (with clinical evaluation) and the presence/absence of a DVT was excluded.

RESULTS

Table 1 shows the results in the prophylaxis and in the comparative group.

At two weeks there were no DVTs of thrombotic disease in the prophylaxis groups.

Also, the evolution of the main respiratory symptoms was significantly better in the prophylaxis groups ($p<0.05$). No patients went to ITU: 4 out of 36 patients in the comparative group went briefly to hospitals.

Cite this article: THROMBO-PROPHYLAXIS PREVENTS THROMBOTIC EVENTS IN HOME-MANAGED COVID PATIENTS. A REGISTRY STUDY**.** Am J of Card and Cardiovas Disc.2019; 3(1): 01-06.

In subjects using LMWH 1 went to hospital as in the defibrotide group. None was put in ventilation.

D-dimer values were fluctuating and not usable to define the presence of a thrombotic condition. This aspect is under further evaluation.

No significant side effects were observed.

Platelet alterations were limited and within the normal values in all prophylaxis subjects.

	Comparative group, no prophylaxis, SM		SM+ Prophylaxis groups		
Targets ----------					%
	CASES %		CASES %		DIFFERENCE
1.Symptoms resolution	23/36 63.9%	A	56/67	83.6%	19.7%
Improvement		B	30/35	86.7	22.8
2.No DVT or	32/36 88.9	A	67/67	100	11.1
thrombotic disease		B	35/35	100	11.1
3.No hospital	32/36 88.9	A	66/67	98.5	9.6
		B	34/35	97.14	8.24
(no ITU)	100			100	
4.Outcome at 6 weeks	not available in progress		not available in progress		

Discussion

COVID pneumonia with massive lung alterations that inevitably alter venous flow and predispose to thrombotic events not only at peripheral level but also at central levels.

The Risk. Acute medical conditions (stroke, congestive heart failure, respiratory disease, infections, or myocardial infarction are associated with a high risk of venous thromboembolism (VTE). Any Infection, erythropoiesis-stimulating agents, blood transfusions are clear risk factors (3). The patients' overall risk is affected by reduced mobility, cancer with or without chemotherapy, or by patient-related risk factors such as prior VTE, advanced age, obesity, and coagulation disorders (5-9).

The oversimplified thinking about VTE as a venous disease with red thrombus versus coronary artery disease as a separate arterial disease (white thrombus) is outmoded. Four years after acute pulmonary embolism (PE), fewer than half of those who initially survive will remain free of myocardial infarction, stroke, peripheral arterial disease, recurrent VTE, cancer, or chronic thromboembolic pulmonary hypertension (10). VTE and athero-thrombosis share a common pathophysiology including inflammation, hypercoagulability and endothelial injury (11,12) as also seen in COVID patients. VTE is part of a panvascular syndrome that includes coronary artery disease, peripheral arterial disease, and cerebrovascular disease. VTE risk factors (smoking, hypertension, diabetes, obesity overlap with risk factors for atherosclerosis) (13,14).

A high prevalence of DVT (28%-33%) has been detected in medical intensive care patients (15-17). The prevalence of symptomatic VTE ranges from 3.4% to 6.6% (18-20).

In hospitalized medical patients; asymptomatic proximal DVT is associated with a higher mortality rate (21). Fatal PE is the leading cause of sudden death in hospitalized medical patients. Approximately 25% of the patients dying from PE in general hospitals had recent surgery and the rest were immobilized with medical illnesses (22).

Overall mortality in medical patients admitted to hospitals is about 10%;1 in 10 hospital deaths is due to PE (22,23). In the absence of VTE prophylaxis, 1 of 20 hospitalized medical patients may have a fatal PE (24,25). A model predicts patients with a very high risk of VTE; it helps to identify medical patients at high risk of VTE and optimize the prevention (Padua Score). (26) COVID are not different.

Prophylactic Methods. Recommendations (5). For acutely ill medical patients low-density unfractionated heparin (LDUH) has been used to prevent DVT (27-29) decreasing its rate from 21% to 5.5% (30,31). LMWH) prevents asymptomatic DVT reducing the incidence of DVT from 13% to 4.7%. There is no increased bleeding (33).

Several studies confirm the efficacy and safety of LMWH (34-40).

Prophylaxis is generally underutilized in medical patients compared to surgical patients (1,6,41-43). VTE prophylaxis is frequently withheld in high-risk medical patients; causes are are not known. This is possibly due to a stronger legal pressure in surgical patients.

Failure to implement VTE prophylaxis is a global problem (44,45). In one study, patient refusal was the most common reason for lack of VTE anticoagulant medication adherence (46). All hospitalized medical patients should be assessed for risk of VTE and those at moderate (immobilized patients with active disease) or high risk (stroke, age > 70, cardiac failure, shock, history of previous VTE, malignancy, or thrombophilia) should receive prophylaxis (47-49).

Duration of prophylaxis.

During hospitalization, nurses and therapists ''push'' patients to ambulate and minimize immobilization. Patients often receive less physical therapy after discharge leading to a paradoxical worsening of immobility and a higher risk of VTE. Patients treated at home for any reason, do not use prophylaxis according to their risks.

According to the international Consensus Recommendations (50) all acutely ill medical patients (including home patients) should be considered for thromboprophylaxis. Patients >40 years with acute medical illness and/or reduced mobility with one of the following morbidities - acute heart failure NYHA class III/IV, respiratory disease (respiratory failure with or without ventilation or exacerbation of respiratory disease), active cancer requiring therapy, acute infective disease including severe infection and sepsis (this fully covers COVID), thrombophilia, rheumatic disease, ischemic stroke, or acute myocardial infarction should be always considered for prophylaxis.

For acutely ill medical patients, prophylaxis with LMWH for 6 to 14 days is
recommended. Single daily doses of 2.5 mg of fondaparinux is an important alternative.
Extended duration of thrombophylaxis may be considered on an individual basis.

Conclusions:

our study (in progress) indicates and confirm that home patients using prophylaxis do not produce thrombosis that may worsen the clinical condition.
From the International Consensus (will all its updates) **medical patients should be always considered for prophylaxis (50).**

COVID; comments. Cases of severe pulmonary infections are well covered in the consensus (50) and in international guidelines (51).

Any infection possibly linked to vaculitis is an important thromboembolic risk and patients must be immediately protected with prophylaxis (52) considering that LMWH is safe, well known and poses very limited risks.

Prophylaxis should be started as soon as possible and used during all the high-risk conditions. The importance of venous thromboembolism in medical patients with heart failure or severe respiratory disease (as COVID), even in the early phases, has been stressed (36-39) and it is well known; it cannot be considered a new observation (52) and requires adequate prophylaxis.

References

1. Goldhaber SZ, Turpie AG. Prevention of venous thromboembolism among hospitalized medical patients. Circulation. 2005;111(1):e1-e3.
2. Belcaro G, Cornelli U, Cesarone MR, Feragalli B, Bombardelli E, Dugall M. Spread of Respiratory Viruses: Temperature and Physical Environment. Temperature Control May Exploit Virus Hypo-Thermolabity; A Possibile, Immediate Solution for COVID-19. Med Clin Res, 2020; Vol 5; 3;30-33
3. Belcaro G, Cornelli U, Cesarone MR, Feragalli B, Bombardelli E, Dugall M. Possible, Immediate Solution for COVID-19: Temperature control may exploit virus hypo-thermolability. ASIA PACIFIC BIOTECH NEWS, www.asiabiotech.com , 202, April 19:22-26
4. Belcaro G, Cornelli U, Cesarone MR, Feragalli B, Bombardelli E, Dugall M et al. 7 IMMEDIATE STRATEGIES TO CONTROL THE CORONAVIRUS. EXPLOITING VIRAL THERMOLABITY. POSSIBILE, IMMEDIATE SOLUTIONS FOR COVID-19. A position paper. SSRN, ELSEVIER: 2020, APR.22: http://ssrn.com/abstract=3575496
5. Bergqvist D, Bonnar J, Caprini J, Carter C, Comerota A, Conard J et al (International Faculty). Prevention and Treatment of Venous Thromboembolism International Consensus Statement 1(Guidelines according to scientific evidence) Clinical and Applied Thrombosis/Hemostasis 2013;19(2) 116-225
6. Belcaro G, Cesarone MR, Cornelli U, Corsi M. Viral Revolution, Oolex, Pescara, April 2020
7. Goodnough LT, Saito H, Manni A, Jones PK, Pearson OH. Increased incidence of thromboembolism in stage IV breast cancer patients treated with a five-drug chemotherapy regimen. A study of 159 patients. Cancer. 1984;54(7):1264-1268.
8. Spyropoulos AC. Emerging strategies in the prevention of venous thromboembolism in hospitalized medical patients. Chest. 2005; 128(2):958-969.
9. Zakai NA, Wright J, Cushman M. Risk factors for venous thrombosis in medical inpatients: validation of a thrombosis risk score. J Thromb Haemost. 2004;2(12):2156-61.
10. Klok FA, Zondag W, van Kralingen KW, et al. Patient outcomes after acute pulmonary embolism. A pooled survival analysis of different adverse events. Am J Respir Crit Care Med. 2010; 181(5):501-506.

Cite this article: THROMBO-PROPHYLAXIS PREVENTS THROMBOTIC EVENTS IN HOME-MANAGED COVID PATIENTS. A REGISTRY STUDY. Am J of Card and Cardiovas Disc.2019; 3(1): 01-06.

11. Piazza G, Goldhaber SZ. Venous thromboembolism and atherothrombosis: an integrated approach. Circulation. 2010;121(19): 2146-2150.
12. Prandoni P, Bilora F, Marchiori A. An association between atherosclerosis and venous thrombosis. N Engl J Med. 2003; 348(15):1435-1441.
13. Goldhaber SZ. Risk factors for venous thromboembolism. J Am Coll Cardiol. 2010;56(1):1-7.
14. Folsom AR, Lutsey PL, Astor BC, Cushman M. C-reactive protein and venous thromboembolism. A prospective investigation in the ARIC cohort. Thromb Haemost. 2009;102(4): 615-19.
15. Hirsch DR, Ingenito EP, Goldhaber SZ. Prevalence of deep venous thrombosis among patients in medical intensive care. JAMA. 1995;274(4):335-37.
16. Fraisse F, Holzapfel L, Couland JM, et al. Nadroparin in the prevention of deep vein thrombosis in acute decompensated COPD. The association of Non-University affiliated intensive care specialist physicians of France. Am J Respir Crit Care Med. 2000; 161(4 Pt 1):1109-14.
17. Geerts W, Selby R. Prevention of venous thromboembolism in the ICU. Chest. 2003;124(suppl 6):357S-63S.
18. Samama MM, Cohen AT, Darmon JY, et al. A comparison of enoxaparin with placebo for the prevention of venous thromboembolism in acutely ill medical patients. Prophylaxis in 49. Fiumara K, Piovella C, Hurwitz S, et al. Multi-screen electronic alerts to augment venous thromboembolism prophylaxis. Thromb Haemost. 2010;103(2):312-17.
19. Leizorovicz A, Cohen AT, Turpie AG, Olsson CG, Vaitkus PT, Goldhaber SZ. Randomized, placebo-controlled trial of dalteparin for the prevention of venous thromboembolism in acutely ill medical patients. Circulation. 2004;110(7):874-79.
20. Cohen AT, Davidson BL, Gallus AS, et al. Efficacy and safety of fondaparinux for the prevention of venous thromboembolism in older acute medical patients: randomised placebo controlled trial. BMJ. 2006;332(7537):325-29.
21. Vaitkus PT, Leizorovicz A, Cohen AT, Turpie AG, Olsson CG, Goldhaber SZ. Mortality rates and risk factors for asymptomatic deep vein thrombosis in medical patients. Thromb Haemost. 2005;93(1):76-9.
22. Sandler DA, Martin JF. Autopsy proven pulmonary embolism in hospital patients: are we detecting enough deep vein thrombosis? J R Soc Med. 1989;82(4):203-5.
23. Lindblad B, Sternby NH, Bergqvist D. Incidence of venous thromboembolism verified by necropsy over 30 years. BMJ. 1991;302(6778):709-11.
24. Heit JA, Silverstein MD,Mohr DN, Petterson TM, O'Fallon WM, Melton LJ, 3 rd. Risk factors for deep vein thrombosis and pulmonary embolism: a population-based case-control study. Arch Intern Med. 2000;160(6):809-15.
25. Spyropoulos AC, Anderson FA, Jr, Fitzgerald G, et al. Predictive and associative models to identify hospitalized medical patients at risk for venous thromboembolism. Chest. 2011;140(3):706-14.
26. Barbar S, Noventa F, Rossetto V, et al. A risk assessment model for the identification of hospitalized medical patients at risk for venous thromboembolism: the Padua Prediction Score. J Thromb Haemost. 2010;8(11):2450-457.
27. Gallus AS, Hirsh J, Tutle RJ, et al. Small subcutaneous doses of heparin in prevention of venous thrombosis. N Engl J Med. 1973;288(11):545-51.
28. Belch JJ, Lowe GD, Ward AG, Forbes CD, Prentice CR. Prevention of deep vein thrombosis in medical patients by low-dose heparin. Scott Med J. 1981;26(2):115-17.
29. Cade JF. High risk of the critically ill for venous thromboembolism. Crit Care Med. 1982;10(7):448-450.
30. Halkin H, Goldberg J, Modan M, Modan B. Reduction of mortality in general medical in-patients by low-dose heparin prophylaxis. Ann Intern Med. 1982;96(5):561-65.
31. Gardlund B. Randomised, controlled trial of low-dose heparin for prevention of fatal pulmonary embolism in patients with infectious diseases. The Heparin prophylaxis study group. Lancet. 1996;347(9012):1357-61.
32. Dahan R, Houlbert D, Caulin C, et al. Prevention of deep vein thrombosis in elderly medical in-patients by a low molecular weight heparin: a randomized double-blind trial. Haemostasis. 1986;16(2):159-64.
33. Lechler E, Schramm W, Flosbach CW. The venous thrombotic risk in non-surgical patients: epidemiological data and efficacy/safety profile of a low-molecular-weight heparin (enoxaparin).The Prime study group. Haemostasis. 1996;26(suppl 2):49-56.
34. Bergmann JF, Neuhart E. A multicenter randomized double-blind study of enoxaparin compared with unfractionated heparin in the prevention of venous thromboembolic disease in elderly inpatients bedridden for an acute medical illness. The Enoxaparin in Medicine Study Group. Thromb Haemost. 1996;76(4):529-34.
35. Harenberg J, Roebruck P, Heene DL. Subcutaneous lowmolecular- weight heparin versus standard heparin and the prevention of thromboembolism in medical inpatients. The Heparin

Cite this article: THROMBO-PROPHYLAXIS PREVENTS THROMBOTIC EVENTS IN HOME-MANAGED COVID PATIENTS. A REGISTRY STUDY**.** Am J of Card and Cardiovas Disc.2019; 3(1): 01-06.

Study in Internal Medicine Group. Haemostasis. 1996;26(3): 127-39.
36. Kleber FX, Witt C, Vogel G, Koppenhagen K, Schomaker U, Flosbach CW. Randomized comparison of enoxaparin with unfractionated heparin for the prevention of venous thromboembolism in medical patients with heart failure or severe respiratory disease. Am Heart J. 2003;145(4):614-21.
37. Dentali F, Douketis JD, Gianni M, Lim W, Crowther MA. Metaanalysis: anticoagulant prophylaxis to prevent symptomatic venous thromboembolism in hospitalized medical patients. Ann Intern Med. 2007;146(4):278-88.
38. Mismetti P, Laporte-Simitsidis S, Tardy B, et al. Prevention of venous thromboembolism in internal medicine with unfractionated or low-molecular-weight heparins: a meta-analysis of randomised clinical trials. Thromb Haemost. 2000;83(1):14-19.
39. Kakkar AK, Cimminiello C, Goldhaber SZ, Parakh R, Wang C, Bergmann JF. Low-molecular-weight heparin and mortality in acutely ill medical patients. N Engl J Med. 2011;365(26): 2463-72.
40. Lederle FA, Zylla D, MacDonald R,Wilt TJ. Venous thromboembolism prophylaxis in hospitalized medical patients and those with stroke: a background review for an American College of Physicians Clinical Practice Guideline. Ann Intern Med. 2011; 155(9):602-15.
41. Goldhaber SZ, Dunn K, MacDougall RC. New onset of venous thromboembolism among hospitalized patients at Brigham and Women's Hospital is caused more often by prophylaxis failure than by withholding treatment. Chest. 2000;118(6):1680-84.
42. Eikelboom JW, Mazzarol A, Quinlan DJ, et al. Thromboprophylaxis practice patterns in two Western Australian teaching hospitals. Haematologica. 2004;89(5):586-93.
43. Kucher N, Koo S, Quiroz R, et al. Electronic alerts to prevent venous thromboembolism among hospitalized patients. N EnglJ Med. 2005;352(10):969-77.
44. Cohen A, Tapson V, Bergmann J, et al. Venous thromboembolism risk and prophylaxis in acute hospital care setting (ENDORSE study): a multinational cross-sectional study. Lancet. 2008;371(9610):387-94.
45. Anderson FA, Jr, Goldhaber SZ, Tapson VF, et al. Improving Practices in US Hospitals to Prevent Venous Thromboembolism: lessons from ENDORSE. Am J Med. 2010;123(12):1099-1106 e8.
46. Fanikos J, Stevens LA, Labreche M, et al. Adherence to pharmacological thromboprophylaxis orders in hospitalized patients. Am J Med. 2010;123(6):536-41.
47. Piazza G, Goldhaber SZ. Improving clinical effectiveness in thromboprophylaxis for hospitalized medical patients. Am J Med. 2009;122(3):230-32.
48. Piazza G, Goldhaber SZ. Computerized decision support for the cardiovascular clinician: applications for venous thromboembolism prevention and beyond. Circulation. 2009;120(12):1133-37.
49. Fiumara K, Piovella C, Hurwitz S, et al. Multi-screen electronic alerts to augment venous thromboembolism prophylaxis. Thromb Haemost. 2010;103(2):312-17.
50. Bergqvist D, Bonnar J, Caprini J, Carter C, Comerota A, Conard J et al (International Faculty). Prevention and Treatment of Venous Thromboembolism International Consensus Statement 1(Guidelines according to scientific evidence) Clinical and Applied Thrombosis/Hemostasis 2013;19(2) 116-225
51. Bikdeli B, Madhavan M, Jimenez D, Chuich T, Dreyfus I, Driggin E ET AL. COVID-19 and Thrombotic or Thromboembolic Disease: Implications for Prevention, Antithrombotic Therapy, and Follow-up Journal of the American College of Cardiology April 2020 DOI: 10.1016/j.jacc.2020.04.031
52. Feragalli B, Mantini C, Sperandeo M, Galluzzo M, Belcaro G, Tartaro A et al. The lung in systemic vasculitis: radiological patterns and differential diagnosis. Br J Radiol. 2016;89(1061):20150992. doi: 10.1259/bjr.20150992. Epub 2016 Feb 15.

Cite this article: THROMBO-PROPHYLAXIS PREVENTS THROMBOTIC EVENTS IN HOME-MANAGED COVID PATIENTS. A REGISTRY STUDY**.** Am J of Card and Cardiovas Disc.2019; 3(1): 01-06.