Journal of Thrombosis and Thrombolysis (2020) 50:211–216
https://doi.org/10.1007/s11239-020-02146-z

Systematic assessment of venous thromboembolism in COVID-19 patients receiving thromboprophylaxis: incidence and role of D-dimer as predictive factors

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Background

- Coagulopathy in COVID-19 is a burning issue and strategies to prevent thromboembolic events are debated and highly heterogeneous.
- The International Society of Thrombosis and Haemostasis has recommended systematic pharmacological thromboprophylaxis in all patients who require hospital admission for COVID-19.
- However, the incidence of venous thromboembolism (VTE) in patients hospitalized for COVID-19 is unclear, particularly under thromboprophylaxis. Whether some clinico-biological parameters could predict venous thromboembolism risk and guide thromboprophylaxis management is also unknown.

Aim of the study

- The objectives of the study were to determine the frequency and to identify predictive factors of venous thromboembolism in COVID-19 in-patients receiving pharmacological thromboprophylaxis.

Methods

- Retrospective cohort study
- 71 patients included: all underwent thromboprophylaxis with daily administration of weight-appropriate enoxaparin following institutional recommendations (40 mg/day for BMI < 30 kg/m2, 60 mg/day for BMI 30 to 40 kg/m2 and 40 mg twice daily for BMI > 40 kg/m2) and covered the whole hospital stay.
- All patients were systematically examined for deep-vein thrombosis (DVT) by low limb venous duplex ultrasonography at hospital discharge or earlier if thrombosis was clinically suspected. Chest angio-CT scan was performed in case of suspicion of pulmonary embolism (PE).

Results (I)

- 71 patients
- The median age was 64 years (25th–75th percentile, 46–75 years).
- The majority of patients were males (61%).
- The most frequent comorbidities were hypertension in 41% of cases and diabetes in 20%.
- The median body mass index was 27.3 kg/m2 (25th–75th percentile, 25.0–31.2 kg/ m2).

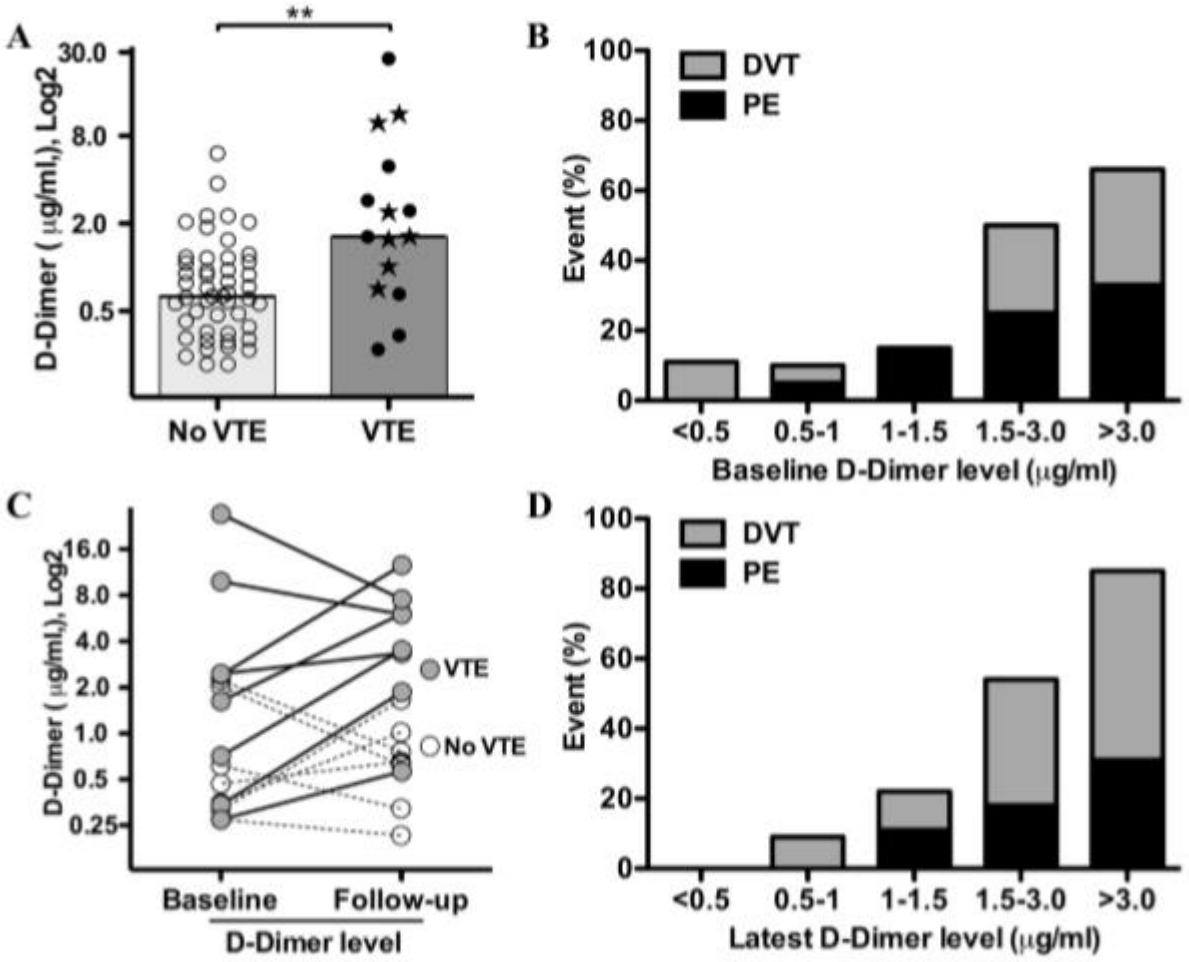
Results (II)

- VTE incidence was 22.5%.
- DVT was detected in 15 of 71 patients (21.1%); PE in 7 of 71 patients (9,8%), 1 fatal.
- Demographics, disease manifestations, comorbidities and baseline COVID-19 severity were similar in patients with and without venous thromboembolism.
- No significant differences were observed with regards to baseline complete blood counts, inflammatory markers hepatic or renal parameters.

Results (III)

- D-dimer level at hospital admission was significantly higher in patients who developed VTE during hospitalization.
- The negative predictive value of a baseline D-dimer level < 1.0 μg/ml was 90% for VTE and 98% for PE.
- The positive predictive value for venous thromboembolism was 44% and 67% for D-dimer level ≥ 1.0 μg/ml and ≥ 3.0 μg/ml, respectively.
- Taking into account the latest available D-dimer level prior to venous thromboembolism diagnosis enhanced the predictive value of this marker.

Correlation between D-dimer levels and venous thromboembolic events in the 65 COVID-19 patients who had a D-dimer level measurement on admission



Conclusions

- VTE is a key concern in patients with COVID-19 hospitalized in medical wards with an high incidence even under thromboprophylaxis.
- At admission, D-dimer < 1.0 μg/ml has an excellent negative predictive value for VTE whereas the risk of thromboembolic events is strikingly high in patients with D-dimer level ≥ 3.0 μg/ml.
- D-dimer level-guided more aggressive thromboprophylaxis regimens using higher doses of heparin should be evaluated in prospective studies and may improve patients outcome.