




EDITORIAL

Thrombosis Risk Assessment in the COVID-19 Era*

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The appearance of the coronavirus pandemic has prompted a renewed interest in thrombosis risk assessment, particularly since this disease is associated with a high risk of thrombotic events¹. It is known that the number one preventable cause of death in hospitalized patients including those having surgical procedures is fatal pulmonary emboli². There is also high-quality data that the use of anticoagulant drugs in the proper dose, and for the period of time shown to be efficacious, will prevent most fatal events³. It is true that even with the use of the best anticoagulant regimes venous thromboembolic events (VTE) can still occur but are rarely fatal. We also realize that providing adequate anticoagulant prophylaxis for the entire period of risk is the key to preventing these deaths. Thrombosis risk scoring identifies who's at risk for these emboli and guides physician choices for appropriate preventive measures.

Every individual has unique risk factors that may predispose him/her to develop a VTE event. Examples include obesity, cardiac or pulmonary disease, cancer, family history of blood clots or stroke, diabetes requiring insulin, hormonal therapy, and personal past history of a thrombotic event. A thrombosis risk score can be calculated based on these risk factors and is predictive of a thrombotic event if surgery, injury, or illness occurs. Informing healthcare providers about this personal information is critical especially if a person contracts the coronavirus, experiences a disabling stroke, or requires

emergency surgery.

There are a number of validated risk assessment tools that can be used for this purpose. We prefer using the Caprini score since it is the most comprehensive list of risk factors that predicts a thrombotic event⁴. This score represents a thorough history and physical examining 40 possible risk factors. We know that the risk of a thrombotic event increases according to the number of risk factors present. It is also true that some risk factors have a greater propensity to produce a clot than others. This score combines the number of risk factors along with their relative power to be associated with thrombosis and calculates a simple numerical score. A non-linear increase in clinical venous thromboembolic events occurs with increasing Caprini scores. Several categories of risk from low to very high have been developed in many specialties. The dividing line between high and very high risk will vary according to the population studied.

This scoring system has been very successful, but critics have appropriately commented that a thorough evaluation of 40 elements is a time-consuming process. Patients urgently admitted to the hospital with the coronavirus or other emergencies may require immediate and complex treatment that does not allow the healthcare provider time to conduct a lengthy interview. We do know that many patients are willing to contribute to their own healthcare. A patient friendly document has been created that allows an individual along with family and loved ones to complete a risk assessment before any illness occurs⁵. Once this document is completed and verified by the family physician, this information can be stored as part of the patient's medical record available to family and others to present at the time of admission for illness, injury, or a surgical procedure. This is particularly important when a patient presents with an aphasic stroke, loss of consciousness, or otherwise is severely ill and unable to personally provide this information. Loved ones who accompany the patient can inform the healthcare team regarding the patient's baseline risk score.

Data obtained over the past several months from coronavirus victims indicate that those patients who are elderly or have medical co-morbidities are at the highest risk of experiencing serious or fatal events. Results to date indicate that all individuals with the coronavirus infection

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admitted to the hospital are at increased risk of thrombosis and should receive anticoagulant thrombosis prophylaxis unless they are at high risk of bleeding.

Clinical experience has shown that breakthrough thrombosis occurs in some of these patients, particularly those who have multiple comorbidities. Many physician groups have doubled the standard dose of prophylaxis in these patients on an empiric basis⁶. Some current guidelines advocate this approach⁷ while others do not, citing the lack of randomized controlled clinical trial data⁸. We know that existing data in patients without a viral infection indicate an increased level of risk especially if they have a BMI of over 35, cardiac or pulmonary failure, past history or family history of thrombosis, cancer, or other serious problems. Many clinicians routinely increase the dose of prophylaxis in coronavirus patients based on past data⁹. Exceptions to this policy occur when patients are at increased risk of bleeding. Intermittent pneumatic compression devices (IPC) should be used in these individuals. Many clinicians use IPC in addition to anticoagulants, particularly in those individuals in Intensive Care and on ventilators.

Modifications of the Caprini score are suggested by our group based on the high incidence of thrombotic events in these patients. We feel that any patient diagnosed with a coronavirus who is asymptomatic should be given a score of two. If the patient becomes symptomatic, we increase the score to three, and if this patient also has an elevated D-dimer level, we assign a score of five. Using these modifications, anticoagulant prophylaxis may be considered in some individuals who are outpatients and not admitted to the hospital.

The Caprini score is a dynamic instrument that needs to be updated during hospitalization when complications occur such as infection, need for a central line, reoperation or other problems. Often this revised score will dictate a change in the thrombosis prophylaxis protocol. A typical example would be a patient admitted for a routine gallbladder removal but postoperatively develops a bile leak, requiring a stenting procedure,

antibiotics for peritonitis and insertion of a central line. What started as a low-risk patient not requiring anticoagulant prophylaxis has changed into a very high-risk patient needing not only anticoagulant prophylaxis during hospitalization but, more than likely, continued prophylaxis following discharge.

It has been known for a number of years according to a large database of patients with thrombosis (RIETE), that over 70% will develop VTE following hospital discharge and half of these events occur when anticoagulants are discontinued¹⁰. This problem appears to be worse in coronavirus patients due to the high incidence of thrombotic events. We advocate rescoring the patient at discharge and continuing their anticoagulant prophylaxis as an outpatient depending on their level of risk¹¹. Patients with elevated D-dimers, BMI greater than 35, those with limited ambulation, history or past history of VTE, cancer, or a combination of comorbidities should be protected. This includes patients with a Caprini score greater than eight which will capture most of the above risk factors. Prophylaxis should be continued for a minimum of six weeks and perhaps longer should some of the more serious risk factors persist such as heart failure, elevated D-dimer levels, or restricted ambulation. The use of one of the new oral anticoagulants, although not advocated during hospitalization, may be appropriate for use in these discharged high-risk patients⁷.

In conclusion, we recommend that all individuals perform a thrombosis risk assessment using the patient-friendly version assisted by their loved ones. These results should then be shared with the family doctor to establish a validated baseline score. These results should be saved as part of the medical record accessible to other family members in an emergency. It should be noted that if one develops COVID-19 as an outpatient, anticoagulant prophylaxis may be appropriate in those with multiple comorbidities. We advise everyone to do their risk score as soon as possible.

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