Coronavirus attacks the cardiovascular system

Richard Béliveau

Translated from Le Journal de Montréal, May 2nd, 2020

Recent observations indicate that a large proportion of patients affected by COVID-19 have heart and blood vessel damage and that these disorders contribute to the severity and mortality of the disease.

It is becoming increasingly clear that the coronavirus responsible for the current COVID-19 pandemic is not like any other respiratory virus. Of course, the lungs are the main organs affected by the virus, but the medical literature provides a description of extremely strange clinical cases that have never been described so far for this type of viral infection. Among the physiological systems affected, the heart and blood vessels are increasingly emerging as a target of choice for the virus, seriously complicating the treatment of the infection.

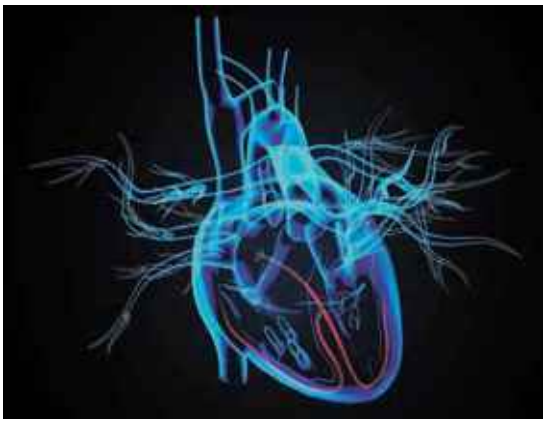
CLOT FORMATION

One of these curious phenomena is the high incidence of disorders of the coagulation process in patients affected by COVID-19. For example, the autopsy of patients who died of the disease showed the presence of hundreds of small clots in the lungs, a phenomenon very different from conventional pneumonia where the main characteristic is to present damage to the pulmonary alveoli involved in gas exchanges.

These thromboses (formation of clots) seem to represent a frequent complication of COVID-19: several studies have reported an abnormal increase in phenomena caused by a decrease in blood circulation, such as blue discolouration in the lower limbs (toes), as well as a high incidence of venous thrombosis (phlebitis) (1). A recent study also reports that 71% of patients who died from COVID-19 had multiple blood clots scattered throughout their network of blood vessels, a phenomenon observed in only 0.6% of patients who survived the disease (2). The presence of these blood clots is extremely dangerous, as they can migrate into the bloodstream and subsequently block vital arteries to cause pulmonary embolism, myocardial infarction or even stroke. In fact, a recent study showed that high levels of D-dimers, a marker of thrombosis, were associated with a very significant increase (18 times) in the risk of mortality from COVID-19 (3).

HEART ATTACK

It has also been observed that patients with COVID-19 often have clinical signs of heart problems, including a very significant increase in blood levels of cardiac troponin I, a very specific marker for myocardial injury (4). This phenomenon seems to be widespread and could affect almost a quarter of patients hospitalized for COVID-19.



In some cases, it seems that these heart attacks are even the first sign of infection: it has been reported that some patients had entered the emergency room of a hospital because of classic signs of heart attack, with no apparent symptoms of COVID-19 (cough, fever, breathing difficulties), to finally be diagnosed with viral disease.

Heart cells and blood vessels have large amounts of the ACE2 protein on their surface, the receptor used by the coronavirus to enter cells. It is therefore likely that the cardiovascular damage observed in a large proportion of infected patients is caused by a direct attack of the virus on these cells, accentuated by the strong inflammatory response triggered by the infection. These observations would also explain why people who have damage to the blood vessels caused by different pathologies (type 2 diabetes, hypertension, pre-existing cardiovascular disease) are at much higher risk of developing severe forms of COVID-19 infections.

(1) Llitjos JF et coll. High incidence of venous thromboembolic events in anticoagulated severe COVID-19 patients. J. Thromb. Haemost., (published online, April 22, 2020).

(2) Tang N et coll. Abnormal coagulation parameters are associated with poor prognosis in patients with novel coronavirus pneumonia. J. Thromb. Haemost. 2020; 18: 844-847.

(3) Zhou F et coll. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet 2020; 395: 1054-1062.

(4) Wang D et coll. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. JAMA 2020; 323:1061-1069.

You find the content of this column useful? Make a donation at www.richardbeliveau.org to speed up our research

You find the content of this column useful? Make a donation at www.richardbeliveau.org to speed up our research

You find the content of this column useful? Make a donation at www.richardbeliveau.org to speed up our research