

LETTER TO THE EDITOR

eThrombosis: A new risk factor for venous thromboembolism in the pandemic era

In this pandemic era, we read with great interest the article in which Beasley et al¹ advocated the concept of “eThrombosis” in 2003. Beasley et al reported a case of acute pulmonary thromboembolism with syncope in a 32-year-old man sitting in front of a computer for 18 hours. We strongly agree with their opinion that it may be possible to reduce the potential considerable burden of eThrombosis. The basic pathophysiology of eThrombosis is immobility, which corresponds to the stagnation of blood flow in Virchow’s triad by prolonged sitting. There have been several case reports on the association between immobility associated with prolonged television watching and pulmonary embolism.^{2,3} A later study revealed that the multivariable hazard ratio for mortality from pulmonary embolism according to hours spent watching television was 2.5 (>5 hours per day spent watching television).⁴ Thus, television watching is recognized as a risk factor for venous thromboembolism (VTE).⁵ The results of this previous study are consistent with the Nurses’ Health Study data, in which show a close association between time spent sitting at home and the incidence of pulmonary thromboembolism.⁶

Other similar times in history have seen increased rates of pulmonary embolism due to immobilization. One such case was a subway shelter during the 1940 London air raid. At this time, due to the lack of air-raid shelters in London, the narrow premises of the subway station became a spontaneous shelter, and the evacuees slept in a narrow subway platform (Figure 1, upper-left panel). Simpson et al⁷ reported that the number of deaths from pulmonary embolism at autopsy was sixfold higher in 1940 than in the previous year and appealed for the introduction of cots at evacuation centers. Pulmonary thrombosis after travel was first reported in 1977.⁸ Traveling for 4 hours or more by plane or bus is said to double the risk of the development of VTE⁹ (Figure 1, upper-right panel). In the subacute stage after a disaster, the time spent in evacuation centers is prolonged, potentially causing VTE¹⁰; this has become a social problem. Regarding the characteristics of many earthquakes, the number of aftershocks at night is very high. Therefore, many victims are afraid to return to their homes and choose to evacuate. Although some people evacuate to a public evacuation shelters provided by the administrations, many victims are forced to stay in their vehicles due

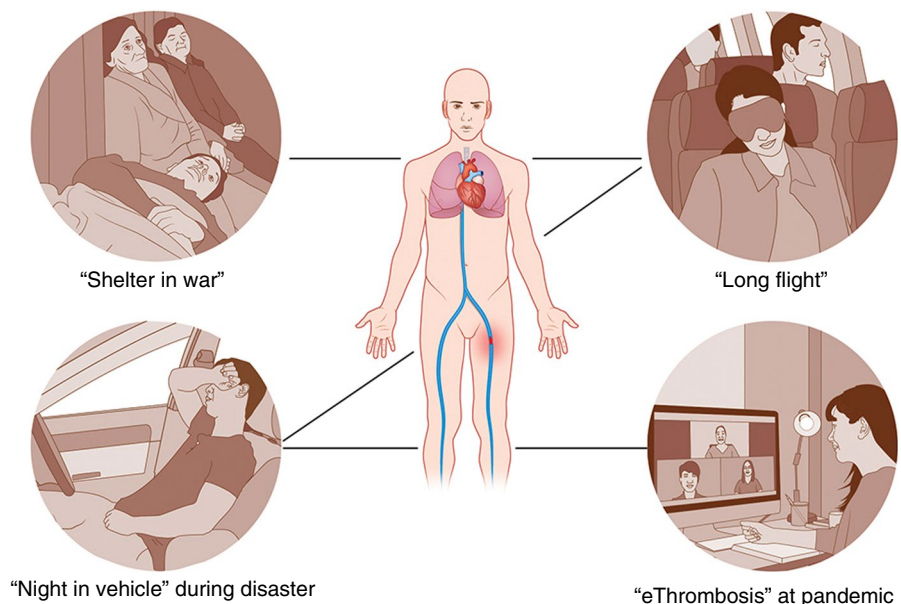


FIGURE 1 Changes in the causes of pulmonary embolism due to immobility

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to the need for privacy. We have already reported that “night in vehicle” might be a risk factor for developing severe VTE^{11,12} (Figure 1, lower-left panel).

In 2020, the infectious power of coronavirus disease 2019 (COVID-19) is rampant, and the World Health Organization has advocated the avoidance of “the three Cs (confined and closed spaces, crowded places, and close-contact setting).¹³” Therefore, we are forced to engage in telework (telecommuting) (Figure 1, lower-right panel). Another form of pandemic-related immobility occurs particularly among elderly people in nursing homes or assisted living, where quarantining is necessary to protect other residents from possible infection after residents attend appointments or leave the facility. People in the oldest age groups have the largest annual incidence of VTE and are particularly susceptible to a form of immobility. The literature reports that sedentary time related to television watching and “immobility in the home” among elderly people is a risk factor for VTE.¹⁴ While the onset of VTE due to COVID-19 infection has become a problem,¹⁵ the onset of eThrombosis due to telework during the pandemic era may become a modern disease. Computer users, such as passengers on an airplane, should exercise their legs while sitting, be well hydrated, and stand up and walk around when possible.

The concept of eThrombosis was proposed in 2003. The authors have described it as a 21st-century variant of VTE associated with immobility¹; unexpectedly, eThrombosis has regained attention in 2020 due to the outbreak of the COVID-19 pandemic. Therefore, further pathophysiological and molecular physiological studies, including animal experiments, are warranted. Additional detailed, prospective, large-scale, long-term surveillance may be required to verify our hypothesis about eThrombosis in the pandemic era.


The changes in the causes of pulmonary embolism due to immobility are described in Figure 1.

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RELATIONSHIP DISCLOSURE

The authors declare no conflicts of interest..

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