Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Education of healthcare professionals and the public about thrombosis and COVID-19

The last 18 months have presented extraordinary new challenges for the global thrombosis community.

Eighteen months ago, I stood in the critical care unit at Guy’s and St. Thomas’ Hospital in London looking at changes I had never seen before in all my 30 years of working here. The critical care service had expanded to take over multiple wards, staff had been re-deployed to work with ventilated patients, and it was noisy with constant activity. Scrubs were replaced by full head and body protective coverings. Among this, we discussed thrombotic issues: many patients ventilated for COVID-19 pneumonia had clinical symptoms of pulmonary emboli (PE) and deep vein thromboses (DVT), and multiple changes were seen on computer topography (CT) pulmonary angiograms. Haemodialysis circuits were clotting off within minutes of being perfused with blood despite conventional anticoagulation, and coagulation tests showed very high levels of fibrinogen and spectacular levels of D-dimer. Beneath the personal protective equipment (PPE) were the faces of exhaustion, unease, and alarm. Yet also, theirs were faces of determination and altruism.

It was March 2020. The first wave of the COVID-19 pandemic was in full swing, not just across the city of London, but throughout the world. We quickly learnt that what we were seeing — the high rates of both venous and arterial thromboembolism and marked prothrombotic states in those with severe COVID-19 — were also experienced in every critical care unit across the world. Moreover, the increased risk of thrombosis existed for those with COVID-19 pneumonia on the wards too.

There were subtleties that we learnt over the next months. For example, the “clots” seen on CT pulmonary angiograms were not all pulmonary emboli. We recognized that the segmental and sub-segmental changes were probably due to microvascular thrombosis, also known as “immune-thrombosis,” a known feature of acute respiratory distress syndrome (ARDS). We also found that often when patients became suddenly and unexpected hypoxic, this was COVID-19 itself causing these episodes, not PE. Yet through all this, arguably, for the first time ever in the hospital community, COVID-19 forced recognition of hospital-associated venous thromboembolism. It moved up on the international healthcare agenda, and the public too wanted to know everything there was to know about thrombosis.

1 | WHEN THE ALARM SOUNDS

So, what did we do back in those early months of 2020? At the International Society on Thrombosis and Haemostasis (ISTH), in recognition that the understanding and research into the mechanisms and management of the prothrombotic state of severe COVID-19 came from ISTH members, and required dissemination to other members, physicians and across multiple disciplines, multiple educational webinars were set up to provide information among healthcare professions. The ISTH Scientific and Standardization Committee (SSC) leadership and structure also played a part and allowed for quick collaboration to develop initial guidance documents that were published in 2020 on the management of coagulopathy and thromboprophylaxis in patients with COVID-19. ISTH members around the world were publishing research in hospitalized patients with COVID-19 at incredible speeds and setting up groundbreaking clinical trials to better understand COVID-19, clotting, and thromboprophylaxis.

The thirst for early understanding was significant, and there were astonishingly large audiences for these Zoom webinars. The first webinar on April 9, 2020, entitled “Thrombosis, Thromboprophylaxis & Coagulopathy in COVID-19 Infections,” with Marcel Levi and myself speaking drew in registration from more than 4000 ISTH members with more than 16,000 people watching it after the event. The programme of COVID-19 webinars has continued with a further seven more events up to now.

With World Thrombosis Day being ISTH’s public-facing awareness program about blood clots and in my role as chair of the World Thrombosis Day Steering Committee, I worked with the team to disseminate information about COVID-19 and clots to the public, conducting multiple interviews with the press, who were very receptive to this topic. Indeed, we recognized what a critical opportunity this was for getting the public to recognize what thrombosis is and how common it is in patients in the hospital in general, and especially those with COVID-19. Together with the ISTH COVID-19 Task Force and the World Thrombosis Day Steering Committee members, as well as Thrombosis UK and other partners, we went to work, while also continuing our work on the front lines.

Today, through international research and collaboration, we now have a much better understanding of how to manage patients with moderate and severe COVID-19. Randomised controlled trials looking at the utility of thromboprophylaxis in hospitalised patients with COVID-19 are published or shortly due for publication. We have worked to understand the importance of “sticky blood” and why this is such a critical factor in COVID-19 pneumonia. This stickiness is a combination of what COVID-19 is doing to the
patient, as well as the fact that people who tend to get moderate to severe COVID-19 tend to be older and obese—both of which are associated with an increased prothrombotic and inflammatory state.

I shared with BBC News earlier in the year that I cannot think of another virus that has such a potent effect on the stickiness of the blood. One of the listeners, David Hare, a British playwright, was inspired to write a play about his experience of COVID-19, mixed with a critique of the British government’s response. It was initially entitled “Sticky Blood” but eventually went on the London stage called “Beat the Devil” now available as a script.* It was wonderful to hear an excellent monologue on the signs and symptoms of DVT and PE from the mouth of Ralph Fiennes when the show went live—yet another way to increase awareness of venous thromboembolism (VTE).

2 | BUILDING AN ARSENAL OF RESEARCH AND PUBLIC AFFAIRS OUTREACH

For many years, ISTH has been working with the World Health Organisation (WHO), initially on setting up international biological standards for haemostatic measurements. Since WTD was formed, we have slowly built a further relationship with the WHO Patient Safety group around hospital-associated venous thromboembolism, with the ambitious aim of global uptake of VTE risk assessment and appropriate thromboprophylaxis in every country in the world. Early in the pandemic, we recognized the need to work more closely with the WHO to raise the visibility of clots in those with COVID-19 pneumonia and to help inform the guidance distributed globally. Without a hematologist part of the WHO’s response team, the ISTH issued a consensus statement on COVID-19 and VTE signed by 85 organizations. This outreach led to an invitation from the WHO for Claire McLintock and myself to serve on the WHO COVID-19 Task Team in late 2020. Since then I have been involved in updates to the WHO living COVID-19 guidelines and developing guidance on paediatric multi-inflammatory syndrome and long COVID-19.

The effects of lockdown have renewed interest in the consequences of “seated immobility syndrome” due to the effects of lockdown on weight gain (affectionately known by some as the COVID “tyre”) because of unhealthy diet choices and reduced physical activity.²

Since mid-March, the time and energy of the thrombosis community has focused on yet another novel thrombotic problem, a new syndrome occurring rarely post COVID-19 vaccination: vaccine-induced immune thrombocytopenia and thrombosis (VITT). The ISTH and SSC community have truly paved the way in global research on VITT and should be applauded. Research and knowledge sharing (once again through ISTH webinars, guidance, and other programs) to healthcare professionals is especially important as we learn more about the rare cases of VITT. Concurrently, we continue the message to the public to reassure them of the rarity of the condition and provide clarity of the symptoms and signs. Due to the fast dissemination of knowledge through multiple media, most clinicians are fully aware of the condition (listen to Insight Health via Radio BBC4 blog: https://www.bbc.co.uk/sounds/play/m000v2x4) and able to provide quality treatment. The continued mass vaccination roll out is vital to reducing COVID-19 infection and death.

3 | PREPARING FOR WHAT LIES AHEAD

When we launched the World Thrombosis Day campaign in 2014, a primary goal was to increase public awareness of the significant risks, signs, and symptoms of thrombosis. We often struggled with getting attention and interest in blood clots—whether it was interest from the media, healthcare professionals, policymakers, or the general public. COVID-19 has changed that. COVID-19 has spiked urgency and attention to understanding and preventing clots at an accelerated pace.

The COVID-19 pandemic has been undoubtedly devastating. It has affected us all in different ways both personally and professionally. So many of us have battled the disease and/or lost loved ones. We continue the daily fight whether it be new variants, VITT, lockdowns or quarantines—to name a few.

Despite this, I can say with certainty that I am proud of the efforts made by the ISTH and its leadership amid the pandemic. The world turned to the Society and its members when the many manifestations of clots associated with COVID-19 became a new discovery, and we continue to forge the path forward as the experts in the field. We have new challenges ahead such as the increasingly recognized “long COVID-19.” Many of these patients have increased levels of D-dimers. But we do not know why, and more importantly there is no research published as yet on thrombotic risk, if any, with long COVID-19.

Now, healthcare professionals around the world turn to the ISTH’s resources for guidance and insight on thrombosis. The media looks to us to provide updates and guidance, while the public relies on reassurance from our messages to understand their risks for COVID-19 related thrombosis, VITT, and other associated conditions. Policymakers lean on our expertise and guidance for global decision-making. Patients’ lives depend on our research and clinical care.

And that is something to be truly proud of.

Beverley Hunt

Guys and St Thomas NHS Foundation Trust, London, UK

Correspondence
Beverley Hunt, Guys and St Thomas NHS Foundation Trust, London, UK.
Email: beverley.hunt@gstt.nhs.uk

*https://www.amazon.co.uk/Beat-Devil-Monologue-David-Hare/dp/0571366082
REFERENCES

1. Spyropoulos Alex C, Levy Jerrold H, Ageno Walter, et al. Scientific and Standardization Committee communication: Clinical guidance on the diagnosis, prevention, and treatment of venous thromboembolism in hospitalized patients with COVID-19. *J Thromb Haemost*. 2020;18(8):1859-1865. https://doi.org/10.1111/jth.14929

2. Mulugeta W, Desalegn H, Solomon S. Impact of the COVID-19 pandemic lockdown on weight status and factors associated with weight gain among adults in Massachusetts. *Clin Obes*. 2021;11(4):e12453. https://doi.org/10.1111/cob.12453