Venous Thromboembolism: Mechanisms, Treatment, and Public Awareness

National Heart, Lung, and Blood Institute Programs for Deep Vein Thrombosis

Rebecca P. Link

The National Heart, Lung, and Blood Institute (NHLBI) supports research in deep vein thrombosis (DVT) and pulmonary embolism (PE), common medical events that, if not diagnosed and treated effectively, may cause significant disability and death. DVT and PE are thought to result from a combination of genetic, environmental, and behavioral risk factors and are associated with many medical conditions. They occur as a major complication of surgeries, severe trauma, chronic illnesses, hormone therapy, pregnancy, obesity, and advanced age. Thus, venous thromboembolism (VTE) affects many and involves a variety of health care specialties.

In May 2006, NHLBI cosponsored the Surgeon General’s Workshop on Deep Vein Thrombosis which focused attention on this serious public health issue. The workshop provided an opportunity for scientific experts to share recent research advances and to identify areas that would advance DVT and PE research. Key topics discussed at the workshop included epidemiology, risk factors, diagnosis, prevention, and therapy. Among the research and education priorities cited by the workshop attendees were identification of biomarkers to predict primary or recurrent DVT and postthrombotic syndrome, determination of efficacy of specific therapies in selected risk populations (ie, pediatric, elderly, obese), and advanced age. Thus, venous thromboembolism (VTE) affects many and involves a variety of health care specialties.

There is a long history of NHLBI support for research related to VTE. In 1986 NHLBI sponsored a NIH consensus development conference on Prevention of Venous Thrombosis and Pulmonary Embolism. Since that conference there have been major advances in the understanding the basic mechanisms of thrombus formation and dissolution, improved diagnostic tools, and expanded therapeutic options. Additional research is needed to make a significant impact on the incidence of DVT and its devastating long-term consequences. Through workshops and targeted Request for Applications (RFA) the NHLBI is working to build on the strong investigator-initiated thrombosis and vascular biology research programs to expand VTE research. Partnering with other institutes and agencies has provided additional support for both basic and clinical research. In 2004, an RFA entitled “Inflammation and Thrombosis” was released with the Canadian Institutes of Health Research to support studies for innovative research approaches of the molecular and cellular interactions between the hemostatic and inflammatory systems to identify novel therapeutic agents for thrombotic disorders including DVT and PE. The RFA “Critical Issues in Postphlebitic Syndrome” was released in 2005 with the objective to support research on venous postthrombotic response and valve function changes that will result in better management of postphlebitic syndrome. The collaborative RFA between the National Institute of Aging, Office of Dietary Supplements, and NHLBI, titled “Venous Thrombosis and Thromboembolism in the Elderly” was released in 2007 with the goal of promoting translational and clinical research on venous thrombosis and venous thromboembolism in older persons.

The NHLBI has also supported clinical trials which provided evidence for improved diagnosis and therapy. The Prospective Investigation of Pulmonary Embolism Diagnosis (PIOPED) II trial was a multicenter investigation to assess multidetector computed tomographic angiography (CTA) alone and combined with venous-phase multidetector CT venography (CTV) for diagnosing pulmonary embolism. This study demonstrated that combined CTA-CTV has greater sensitivity that may improve diagnosis for patients with suspected PE. The Prevention of Recurrent Venous Thromboembolism (PREVENT) was a randomized, double-blind, placebo-controlled trial to test whether long-term low-dose warfarin therapy could reduce the risk of recurrent VTE in patients with a previous idiopathic VTE. This study found low-dose warfarin to be safe and highly effective for preventing the recurrence of DVT and PE.

In November 2007, NHLBI released the RFA “Deep Vein Thrombosis and Venous Disease” to support research that would lead to improved diagnosis, therapy, and prevention of venous thrombotic diseases. The focus of this initiative is to support clinical and translational studies on VTE and to explore the mechanisms of VTE initiation, progression, and recurrence. This initiative was based on recommendations of the NHLBI Working Group on Thrombosis and Thrombophilia, June 27, 2005, Surgeon General/NHLBI Workshop on Thromboembolic Disorders, May 8–9, 2006, and American Society of Hematology Workshop on Thrombosis in the Elderly, June 8–9, 2005. It was developed with The Division of Blood Disorders, Center for Disease Control and Prevention (CDC) and plans to encourage interaction between investigators supported by this RFA and the CDC Thrombo-
sis and Hemostasis Centers. Collaboration between the NHLBI and CDC should leverage the resources and the strengths of the two organizations to achieve the most impact in this area of national health.

The NHLBI has worked with physicians, research investigators, and patient advocate groups to better understand the needs of these communities. Working together helps identify the areas where additional research can have the greatest impact and facilitates the success of new programs. Public education is also a critical component for improvements in diagnosis and treatment of DVT. Consumer and patient materials containing information on risk, symptoms, diagnosis, treatment, and prevention of DVT and PE are available at the NHLBI web sites: http://www.nhlbi.nih.gov/health/dci/Diseases/Dvt/DVT_WhatIs.html and http://www.nhlbi.nih.gov/health/dci/Diseases/pe/pe_what.html. These sites also contain links to other resources and information on active clinical trials through clinicaltrials.gov.

The NHLBI has supported basic and clinical VTE studies, providing a strong science foundation on which research can advance. In the future, the NHLBI will continue its policy of working with the scientific community in designing its DVT and PE research and education programs aimed at improving the health of those suffering with thromboembolic disease.

Disclosures
None.

References
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