

ASH Clinical Practice Guidelines on Venous Thromboembolism (VTE):

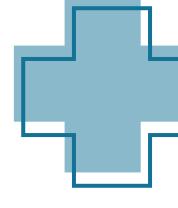
What You Should Know

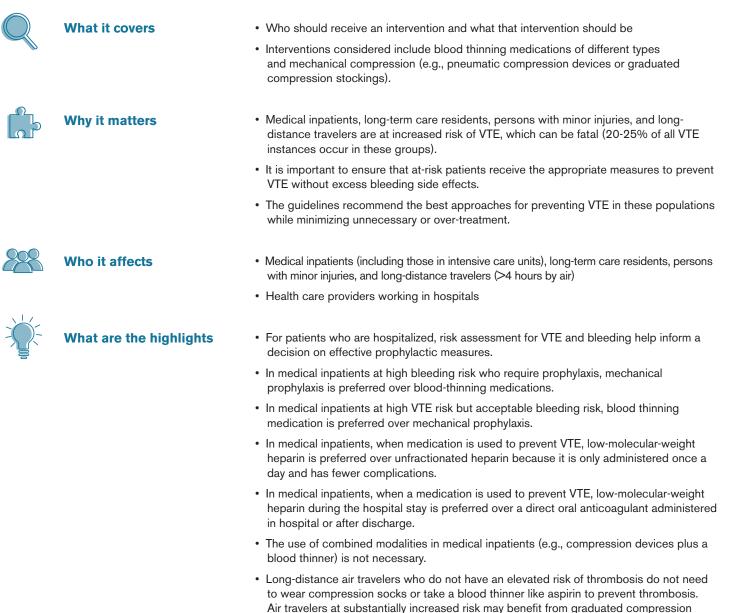
The American Society of Hematology (ASH) has long recognized the need for a comprehensive set of guidelines for hematologists and other clinicians on venous thromboembolism (VTE), a common and serious blood clotting condition that includes both deep-vein thrombosis (DVT) and pulmonary embolism (PE).

In partnership with the McMaster University GRADE Centre, a world leader in guideline development and an authority on thrombosis, ASH brought together more than 100 experts including hematologists, clinicians, specialists, and patient representatives to synthesize the research and develop clinical practice guidelines for VTE.



Prophylaxis for Hospitalized and Non-Hospitalized Medical Patients





Total number of panel recommendations: 21

stockings or low-molecular-weight heparin.

REFERENCE

Schünemann, H. J., Cushman, M., Burnett, A. E., Kahn, S. R., Beyer-Westendorf, J., Spencer, F. A., Rezende, S. M., Zakai, N. A., Bauer, K. A., Dentali, F., Lansing, J., Balduzzi, S., Darzi, A., Morgano, G. P., Neumann, I., Nieuwlaat, R., Yepes-Nuñez, J. J., Zhang, Y., & Wiercioch, W. <u>American Society of Hematology 2018 guidelines for management of venous thromboembolism:</u> prophylaxis for hospitalized and nonhospitalized medical patients. Blood Advances. 2018; 2:3198-3225

For more information on the ASH Clinical Practice Guidelines on Venous Thromboembolism, visit www.hematology.org/VTEguidelines



Diagnosis of VTE



Q	What it covers	 Efficient diagnostic strategies for evaluating patients with suspected VTE to provide accurate diagnosis and reduce the number of patients undergoing unnecessary and more invasive testing
ြို	Why it matters	 Accurate diagnosis of VTE is important due to the morbidity and mortality associated with missed diagnoses and the potential side effects, patient inconvenience, and resource implications of anticoagulant treatment given for VTE.
		 While a number of patients are initially suspected of having blood clots, many of them do not.
		 For patients at low likelihood of having VTE, it is important to rule out VTE without subjecting patients to unnecessary tests.
288	Who it affects	Patients with suspected VTE
1.		Clinicians and health care professionals
	What are the highlights	 These recommendations confirm previous guidelines through a rigorous review of existing evidence.
		 Unlike other VTE diagnosis guidelines, mathematical modelling was done to predict outcomes of various diagnostic pathways that have not been previously evaluated.
		 Before considering a test, categorizing patients into the likelihood that they have VTE will help achieve an accurate diagnosis without exposing the patient to unnecessary testing.
		 A D-dimer test is the best first step to check for VTE in patients with low pre-test probability; if results are negative, no further testing is required.
		 When possible, clinicians should use a VQ scan, which exposes patients to lower radiation risk, versus a CT scan. Older individuals or those with preexisting lung

Total number of panel recommendations: 10

disease are not ideal candidates for a VQ scan.

REFERENCE

Lim, W., Le Gal, G., Bates, S. M., Righini, M., Haramati, L. B., Lang, E., Kline, J. A., Chasteen, S., Snyder, M., Patel, P., Bhatt, M., Patel, P., Braun, C., Begum, H., Wiercioch, W., Schünemann, H. J., & Mustafa, R. A. American Society of Hematology 2018 guidelines for management of venous thromboembolism: diagnosis of venous thromboembolism. Blood Advances. 2018; 2:3226-3256.

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Optimal Management of Anticoagulation Therapy



	What it covers	 Optimal care management of anticoagulation therapy in patients who have previously experienced a clot
	Why it matters	 Anticoagulant drugs must be used with skill in order to reduce risks of bleeding and developing another clot.
		 Health care providers often have to make the difficult decision to continue or stop anticoagulation therapy following a major bleeding event.
282	Who it affects	 Patients who have already had a blood clot and need to take anticoagulant drugs Pharmacists, clinicians, nurses, and health care policy makers
	What are the highlights	 Managing anticoagulation therapy is complex. Patients should receive care from specialized anticoagulation management service centers versus primary care physicians whenever possible.
		 Most patients needing to interrupt warfarin for invasive procedures do not require a short-acting injectable anticoagulant administered during the peri-operative period, so- called bridge therapy.
		 Management of life-threatening bleeding during anticoagulant therapy requires thoughtful use of anticoagulant reversal therapies.
		 Many patients who survive major bleeding during anticoagulant therapy should resume taking anticoagulants.

Total number of panel recommendations: 25

REFERENCE

Witt, D. M., Nieuwlaat, R., Clark, N. P., Ansell, J., Holbrook, A., Skov, J., Shehab, N., Mock, J., Myers, T., Dentali, F., Crowther, M. A., Agarwal, A., Bhatt, M., Khatib, R., Riva, J. J., Zhang, Y., & Guyatt, G. American Society of Hematology 2018 guidelines for management of venous thromboembolism: optimal management of anticoagulation therapy. Blood Advances. 2:3257-3291.

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Heparin-Induced Thrombocytopenia



What it covers	 A rare and serious adverse drug reaction that increases a patient's risk of developing venous or arterial thromboembolism, which may be limb- or life-threatening
Why it matters	 Suspected heparin-induced thrombocytopenia (HIT) cases in hospitalized patients is the most frequently requested hematologist consult by other physicians.
	 HIT can lead to amputation or death – for every day treatment is delayed, there is a ~6% risk of new thrombosis, amputation, and death.
	HIT is frequently misdiagnosed and over diagnosed.
	• 12 million U.S. patients receive heparin each year, up to 1% of whom will develop HIT.
Who it affects	 Surgical patients most commonly, especially those undergoing cardiac surgery Hospitalists, surgeons, and cardiologists
What are the highlights	 Using a clinical scoring system, the 4Ts score, rather than a gestalt approach will improve the accuracy of diagnosis and patient outcomes. Treatment options include not only conventional agents such as argatroban, bivalirudin, and danaparoid, but also newer agents such as fondaparinux and the direct oral anticoagulants.
	Why it matters Who it affects

Total number of panel recommendations: 32

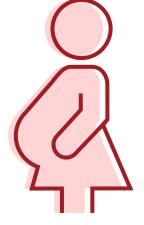
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Cuker, A., Arepally, G. M., Chong, B. H., Cines, D. B., Greinacher, A., Gruel, Y., Linkins, L. A., Rodner, S. B., Selleng, S., Warkentin, T. E., Wex, A., Mustafa, R. A., Morgan, R. L., & Santesso, N. (2018). American Society of Hematology 2018 guidelines for management of venous thromboembolism: heparin-induced thrombocytopenia. Blood Advances. 2:3360-3392.

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VTE in the Context of Pregnancy



What it covers

Why it matters

Who it affects





What are the highlights

- The diagnosis, prevention, and treatment of VTE during and after pregnancy, which are particularly challenging issues due to the need to consider fetal as well as maternal well-being
- Pregnancy-associated VTE is a leading cause of maternal morbidity and mortality in Western countries.
- Factors such as prior VTE, inherited clotting disorders, increasing age, cesarean delivery, co-existent diseases (e.g., sickle cell disease, lupus), and obesity also increase risk.
- Pregnant women are more likely to be older, overweight, have additional medical conditions, and undergo a cesarean delivery than in the past.
- Pregnant women, especially those who have previously experienced a blood clot or have other risk factors for blood clots
- · Obstetrician-gynecologists, maternal fetal specialists, and internists
- A conservative approach to prescribing prophylaxis, in which prophylaxis is given only to those patients for whom the available research suggests benefit, is key to minimize potential harm from over treatment.
- In the majority of cases, low-molecular-weight heparin is likely to be the best approach for managing superficial thrombosis.
- For treatment of pulmonary embolism and deep-vein thrombosis with low-molecularweight heparin, it is acceptable to do weight-based dosing instead of using regular blood tests to adjust the dose.
- A majority of pregnant women with newly diagnosed VTE at low risk of complications can be treated as outpatients, rather than admitted to hospital, as long as the right supports are in place.

Total number of panel recommendations: 31

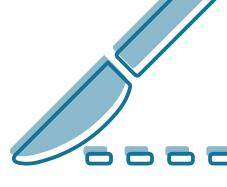
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Bates, S. M., Rajasekhar, A., Middeldorp, S., McLintock, C., Rodger, M. A., James, A. H., Vazquez, S. R., Greer, I. A., Riva, J. J., Bhatt, M., Schwab, N., Barrett, D., LaHaye, A., & Rochwerg, B. American Society of Hematology 2018 guidelines for management of venous thromboembolism: venous thromboembolism in the context of pregnancy. Blood Advances. 2:3317-3359.

For more information on the ASH Clinical Practice Guidelines on Venous Thromboembolism, visit www.hematology.org/VTEguidelines



Prophylaxis for Surgical Patients



Q	What it covers	 Evidence-based research that supports decision-making to prevent venous thromboembolism (VTE) – also known as blood clots in the veins – in patients undergoing several different kinds of major surgical procedures requiring hospitalization.
	Why it matters	 Before prevention measures were put into place, VTE was a common cause of death in surgery and even with such measures, blood clots can be fatal.
		 Prevention of VTE is used as an important factor in assessing and measuring the quality of surgical care delivered by hospitals.
		 The guidelines focus on the outcomes that are most relevant and important to patients.
288	Who it affects	 Hematologists: Along with other consultants who may be tapped to provide counsel about prevention of VTE following different types of surgery.
		 Surgeons: Those seeking the latest information on recommended types of prevention and the timing of prevention methods.
		 Hospital Systems: VTE prevention is a common quality benchmark for the authoritative bodies who accredit hospitals.
		• Patients: Patients undergoing major surgical procedures requiring hospitalization after surgery to understand the risk of developing clots and the various types of prevention methods recommended for specific kinds of surgery.
	What are the highlights	 Not all surgery requires measures to prevent blood clots, and the guidelines make recommendations for circumstances when the risks associated with potential bleeding may outweigh the benefits.
		 The risks of blood clots associated with surgery depend on multiple factors including patient characteristics and the type of surgery. The panel made recommendations based on these factors. This includes when to consider prevention, and which type

Total number of panel recommendations: 30

might be the most suitable - mechanical or pharmacologic.

REFERENCE

Anderson DR, Morgano GP, Bennett C, et al. American Society of Hematology 2019 guidelines for management of venous thromboembolism: prevention of venous thromboembolism in surgical hospitalized patients. Blood Adv. 2019; 3(23):3898-3944.

For more information on the ASH Clinical Practice Guidelines on Venous Thromboembolism, visit www.hematology.org/VTEguidelines



ASH Recommendations for Treatment of Deep Vein Thrombosis and Pulmonary Embolism

	What it covers	 Evidence-based support for decision-making during each of the treatment phases of venous thromboembolism (VTE) and the recommended approach for the treatment in those phases 		
		VTE treatment phases:		
		Initial management: from diagnosis until the first weeks of therapy	Primary treatment: typically a minimum of three months	Secondary prevention: extends for a prolonged, usually indefinite, period of time after the primary treatment phase
	Why it matters	There is not a single approact	h to VTE treatment and prev	ention.
		There have been many recent of the various stages.	t clinical studies that inform/	guide treatment at each
	Who it affects	 Emergency department physi management decisions for pa pulmonary embolism (PE). 		
		Vascular medicine and interventional specialists who treat patients with acute, severe VTE		
		 Thrombosis specialists and anticoagulation providers who implement and manage the antithrombotic therapies for patients with VTE 		
		 Hematologists who consult about risks for recurrent thrombosis and hemorrhagic complications in patients on anticoagulant therapy 		
		 All specialists and primary ca complications that these patie chronic thromboembolic pulm 	ents can develop, including	and manage the chronic post-thrombotic syndrome and
	What are the highlights	 The guidelines emphasize the and consider patients' perspective choosing anti-coagulation the 	ectives that include the finan	
		Strong recommendations from the panel include:		
		Use thrombolytic therapy to treat patients with pulmonary embolism who are hemodynamically compromised	Use anticoagulant therapy to treat patients in secondary prevention	Use indefinite anticoagulation therapy to treat patients with recurring VTE
			treatment of uncomplicated there is a low risk for compl	ssing a preference for home d cases of DVT and PE. Home ications as well as a preference
		Total number of panel rec	commendations: 28	

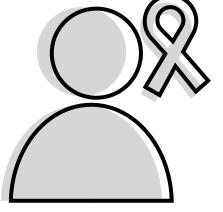
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Thomas L. Ortel, Ignacio Neumann, Walter Ageno, Rebecca Beyth, Nathan P. Clark, Adam Cuker, Barbara A. Hutten, Michael R. Jaff, Veena Manja, Sam Schulman, Caitlin Thurston, Suresh Vedantham, Peter Verhamme, Daniel M. Witt, Ivan D. Florez, Ariel Izcovich, Robby Nieuwlaat, Stephanie Ross, Holger J. Schünemann, Wojtek Wiercioch, Yuan Zhang, Yuqing Zhang; American Society of Hematology 2020 guidelines for management of venous thromboembolism: treatment of deep vein thrombosis and pulmonary embolism. Blood Adv 2020; 4 (19): 4693–4738. doi: https://doi.org/10.1182/bloodadvances.2020001830

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Prevention and Treatment in Patients with Cancer



Q	What it covers	• Evidence-based recommendations for the prevention of venous thromboembolism (VTE) in patients with cancer, including those who are hospitalized, undergoing surgery, ambulatory, and/or have a central venous catheter, and for the treatment of VTE in this patient population.
ြို	Why it matters	 VTE is a common complication among patients with cancer, who account for approximately 20% of all VTE cases.
		• Patients with cancer and VTE are at a markedly increased risk of recurrent VTE and early death.
		 While VTE is common in this population, clinicians often do not discuss the risk with their patients.
		 The occurrence of VTE in patients with cancer may interfere with planned chemotherapy regimens, worsen patient quality of life, use scarce health care resources, and increase the risk of mortality.
282	Who it affects	 Hematologists, oncologists, pharmacists, nurses, hospitalists, and other specialists managing care for people with cancer.
		Surgeons requiring guidance for the prevention of VTE in cancer patients undergoing surgery.
		 Individuals receiving cancer treatment and/or preparing for surgery.
		 Researchers seeking to address potential gaps in current guidelines.
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	What are the highlights	 The guidelines emphasize the importance of stratifying patients according to their underlying risk of VTE in low-, intermediate-, and high-risk groups.
		 When being used in cancer patients undergoing surgery, the guidelines recommend the use of low-molecular-weight-heparin (LMWH) over unfractionated heparin for the prevention of VTE.
		 While other guidelines have suggested that the use of anticoagulation for the prevention of VTE in surgical patients undergoing cancer-related abdominal surgery start prior to an operation, the ASH guidelines suggest a post-operative start and make a conditional recommendation to continue prevention treatments for a month afterward.
		 For ambulatory patients receiving systemic treatment who are at high risk of VTE, the ASH guidelines suggest use of oral or injectable anticoagulation treatment. However, for those ambulatory patients at low risk of VTE, use of drugs for prevention is not recommended.
		 For cancer patients needing short-term treatment for VTE (initial 3 to 6 months), the guidelines recommend either LMWH or direct oral anticoagulants.

 For patients with active cancer, long-term anticoagulation (indefinite duration) is suggested to prevent recurrent VTE.

Total number of panel recommendations: 34

REFERENCE

Citation: Gary H. Lyman, Marc Carrier, Cihan Ay, Marcello Di Nisio, Lisa K. Hicks, Alok A. Khorana, Andrew D. Leavitt, Agnes Y. Y. Lee, Fergus Macbeth, Rebecca L. Morgan, Simon Noble, Elizabeth A. Sexton, David Stenehjem, Wojtek Wiercioch, Lara A. Kahale, Pablo Alonso-Coello; American Society of Hematology 2021 guidelines for management of venous thromboembolism: prevention and treatment in patients with cancer. Blood Adv 2021; 5 (4): 927–974. doi: https://doi.org/10.1182/bloodadvances.2020003442

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Testing for Thrombophilia

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Wha	at it covers	 Recommendations to guide testing for hereditary and/or acquired thrombophilia (a condition characterized as a tendency to form blood clots). 			
		 The guidelines, developed using a case-based approach and modeling, are founded on three potential treatment decisions based on the outcome of testing: 			
		Whether to continue or discontinue treatment for secondary prevention of VTE.	Whether to provide anticoagulant prophylaxis for prevention of VTE in patients with risk factors.	Whether to avoid hormonal treatments, such as oral contraceptive pills (OCP) or hormone replacement therapy (HRT).	
) Why	v it matters	 Hereditary and acquired thro risk for venous thromboembo 	ombophilia are blood coagulati olism (VTE) and affect approxi		
		 Thrombophilia testing is cost is controversial. 	tly and whether testing helps i	n guiding treatment decisions	
		However, lifelong anticoagulative treatment might be cost effective.		testing to withhold	
Who	o it affects	 Clinicians and health care professionals including hematologists, internists care physicians, obstetricians and gynecologists, clinical laboratory physic emergency care physicians. 			
		Patients with VTE and individ	duals with a family history of th	rombophilia and/or VTE.	
		 Women considering using combined oral contraceptives or hormone replacement therapy, women who are planning pregnancy, and patients with cancer who are classified to be at low or moderate risk of VTE. 			
Wha	at are the highlights	The ASH panel suggests limiting testing for thrombophilia to specific situations:			
		Patients with VTE provoked by non-surgical risk factors, including pregnancy, postpartum, or use of oral contraceptives.	Patients with VTE at unusual sites within the body, if the standard of care is to treat patients for three to six months.	Individuals with a family history of VTE and high-risk thrombophilia (antithrombin, protein C, or protein S deficiency) in order to determine if pharmacological thrombosis prophylaxis during transient thrombosis risk factors is necessary.	
		Women with a family history of VTE and high-risk thrombophilia (antithrombin, protein C, or protein S deficiency), in order to avoid use of hormone treatments, such as birth control pills.	Women with a family history of VTE and high-risk thrombophilia (antithrombin, protein C, or protein S deficiency), in order to determine if postpartum and/or antepartum prophylaxis is necessary.	Ambulatory cancer patients with a family history of VTE and who are otherwise at low or intermediate risk for VTE, to guide decisions on use of pharmacological thromboprophylaxis.	
		In all other instances, the part	nel suggests not testing for th	rombophilia.	
		Nearly all recommendations	are based on very low certaint	ty in the evidence resulting	

Total number of panel recommendations: 23

in only one strong recommendation (against testing the general population before

REFERENCE

Middeldorp S, Nieuwlaat R, Baumann Kreuziger L, et al. American Society of Hematology 2023 Guidelines for Management of Venous Thromboembolism: Thrombophilia Testing [published online ahead of print 17 May 2023]. Blood Advances. doi: https://doi.org/10.1182/bloodadvances.2023010177.

starting combined oral contraceptives).

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