



STOP using antiembolism stockings to prevent DVT

START using prophylactic LMWH and/or pneumatic compression devices to prevent VTE

► **EXPERT COMMENTARY**



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FAST TRACK

All patients undergoing surgery—including cesarean delivery—should be considered at high risk for VTE

Venous thromboembolism (VTE)—deep vein thrombosis (DVT) and pulmonary embolism (PE)—remains a major cause of morbidity and mortality in the United States, resulting in an estimated 200,000 deaths each year.¹ VTE is especially common among inpatients; hospitalization increases the risk of VTE eightfold,² and VTE is the most common preventable cause of hospital-associated deaths.^{2,3} Most general medical and surgical inpatients have risk factors for VTE and, without prophylaxis, between 10% and 40% will develop DVT or PE.³ VTE is estimated to cost the US economy \$4 billion annually in direct costs and substantially more in indirect costs, including lost productivity and subsequent medical expenses.⁴ **There is no doubt that thromboprophylaxis is effective in preventing VTE in high-risk patients.**^{2,3,5-7} For this reason, the Agency for Healthcare Research and Quality ranks VTE prophylaxis as the single most important patient safety initiative deserving of more widespread implementation.⁸ The importance of this intervention has also been

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acknowledged by the Joint Commission,⁹ and by the Centers for Medicare & Medicaid Services, which include VTE prophylaxis in their Surgical Care Improvement Project (SCIP) quality measures that guide hospital reimbursement.¹⁰

All patients undergoing surgery (including cesarean delivery) should be considered at high risk for VTE. Additional risk factors include, among others:

- personal or family history of VTE
- known inherited or acquired thrombophilia
- obesity
- advancing age
- prolonged immobility or bed rest
- cancer.^{2,3,5-7}

Although there is general consensus that high-risk patients require thromboprophylaxis, exactly what form of prophylaxis to recommend remains controversial.

Graduated compression stockings may cause harm

Graduated compression stockings (also known as TED stockings) are commonly regarded as a safe and noninvasive method for preventing VTE. However, evidence in support of their efficacy is lacking. A recent consensus statement from the American College of Physicians recommended “against the use of mechanical prophylaxis with graduated compression stockings for prevention of venous thromboembolism (Grade: strong recommendation, moderate-



quality evidence)” in medical and stroke patients.⁵ In support of their recommendation, the authors of this consensus statement cite a lack of evidence of benefit and significant evidence of patient harm related to skin breakdown from compression stockings. This recommendation is likely relevant also for obstetric and gynecologic patients. **For this reason, I propose that the use of graduated compression stockings for DVT prophylaxis be abandoned.**

Chemoprophylaxis should be routine in high-risk inpatients

VTE chemoprophylaxis with low molecular weight heparin (LMWH; eg, dalteparin or enoxaparin) or low-dose unfractionated heparin remains the most effective prophylactic measure and should be routine in all high-risk obstetric and gynecologic inpatients.^{2,3,5-7} Pneumatic compression devices and chemoprophylaxis may provide synergistic protection against VTE.⁵

Cesarean delivery affects need for prophylaxis

Although pregnancy is an independent risk factor for VTE, the absolute risk of VTE in an otherwise healthy patient is only about 0.05% in both the antepartum and postpartum periods.¹¹ For this reason, routine VTE prophylaxis in pregnant patients would certainly cause more harm than good, and is not recommended. However, cesarean delivery doubles the risk of VTE, with an absolute risk in low-risk parturients of approximately 1 in 1,000 patients.¹² And 85% of fatal PE cases in pregnancy follow cesarean delivery. For these reasons, placement of pneumatic compression devices and/or administration of LMWH is recommended before cesarean delivery for all women not already receiving prophylaxis.⁷

One clarification. Although the use of graduated compression stockings to prevent VTE should be abandoned entirely, there is some evidence that compression stockings with an ankle pressure of 30 to 40 mm Hg may help reduce the risk of long-term phlebitis syndrome

STOP

STOP using antiembolism stockings to prevent DVT in all obstetric and gynecologic patients

START

START using prophylactic low-molecular weight heparin and/or pneumatic compression devices for patients at high risk for VTE

in patients with established DVT in pregnancy.¹³ Therefore, use of compression stockings may be considered in this setting.

References

1. Horlander KT, Mannino DM, Leeper KV. Pulmonary embolism mortality in the United States, 1979–1998: an analysis using multiple-cause mortality data. *Arch Intern Med.* 2003;163(14):1711–1717.
2. Michota F. Bridging the gap between evidence and practice in venous thromboembolism prophylaxis: quality improvement process. *J Gen Intern Med.* 2007;22(12):1762–1770.
3. Geerts WH, Bergqvist D, Pineo GE, et al. Prevention of venous thromboembolism: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. 8th ed. *Chest.* 2008;133(suppl 6):381S–453S.
4. Shorr A. The pharmacoconomics of deep venous thrombosis treatment. *Am J Med.* 2007;120(10 Suppl 2):35S–41S.
5. Qaseem A, Chou R, Humphrey LL, et al; Clinical Guidelines Committee of the American College of Physicians. Venous thromboembolism prophylaxis in hospitalized patients: a clinical practice guideline from the American College of Physicians. *Ann Int Med.* 2011;155(9):625–632.
6. Committee on Practice Bulletins—Gynecology, American College of Obstetricians and Gynecologists. Practice Bulletin No. 84: Prevention of deep vein thrombosis and pulmonary embolism. *Obstet Gynecol.* 2007;110(2 Pt 1):429–440.
7. Committee on Practice Bulletins—Obstetrics, American College of Obstetricians and Gynecologists. Practice Bulletin No. 123: Thromboembolism in pregnancy. *Obstet Gynecol.* 2011;118(3):718–729.
8. Shojania KG, Duncan BW, McDonald KM, Wachter RM, Markowitz AJ. Making health care safer: a critical analysis of patient safety practices. *Evid Rep Technol Assessment (Summ).* 2001;(43):1–x, 1–668.
9. The Joint Commission. 2011 Comprehensive Accreditation Manual for Hospitals: The Official Handbook. Oak Brook, IL: Joint Commission Resources; 2010.
10. Centers for Medicare & Medicaid Services (CMS). Medicare Program—Revisions to Hospital Outpatient Prospective Payment System and Calendar Year 2007 Payment Rates; Final Rule. Baltimore, Maryland: CMS; November 24, 2006.
11. Bourjeily G, Paidas M, Khalil H, Rosene-Montella K, Rodger M. Pulmonary embolism in pregnancy. *Lancet.* 2010;375(9713):500–512.
12. Macklon NS, Greer IA. Venous thromboembolic disease in obstetrics and gynaecology: the Scottish experience. *Scott Med J.* 1996;41(3):83–86.
13. Brandjes DPM, Buller HR, Heijboer H, et al. Randomised trial of effect of compression stockings in patients with symptomatic proximal-vein thrombosis. *Lancet.* 1997;349(9054):759–762.



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