Venous thromboembolism bundle: Risk assessment and prophylaxis for obstetric patients

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A B S T R A C T

While venous thromboembolism (VTE) is a leading cause of severe maternal morbidity and mortality, maternal death from VTE is amenable to prevention. Thromboprophylaxis is the most readily implementable means of systematically reducing the maternal death rate, and protocols that identify at-risk women have led to a significant reduction in maternal deaths from VTE. Strategies to prevent VTE require minimal resources. A multidisciplinary working group convened as part of American Congress of Obstetricians and Gynecologists’ District II Safe Motherhood Initiative reviewed research evidence and major society thromboprophylaxis guidelines and identified clinical strategies to reduce maternal VTE risk. This review provides recommendations for VTE prophylaxis and describes suggested clinical strategies for office and hospital-based implementation.

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Introduction

The American Congress of Obstetricians and Gynecologists’ District II Safe Motherhood Initiative is a regional, multidisciplinary working group focused on reducing severe maternal morbidity and mortality in New York State. This group is comprised of leaders from multiple specialties from community and referral hospitals across New York state. To identify opportunities to reduce maternal VTE, the Subcommittee on Thromboembolism reviewed epidemiology on risk factors for VTE, prophylaxis strategies, evidence supporting specific clinical approaches, and safety guidelines for pharmacologic thromboprophylaxis. This article presents the findings and recommendations of this subcommittee: the obstetric thromboembolism bundle, a comprehensive strategy to reduce obstetric VTE risk distributed to all hospitals in New York State.

This article, which reviews the SMI thromboembolism bundle, includes the following:

(1) Assessment tools to determine risk for VTE for the following patient populations:
- patients receiving outpatient prenatal care;
- patients hospitalized for an antepartum indication;
- patients hospitalized for a cesarean or vaginal delivery; and
- patients discharged home postpartum.

Protocols and suggested dosing schedules for patients at high-risk for VTE for whom prophylaxis with unfractionated (UFH) or low-molecular-weight heparin are indicated.

(2) Anesthesia recommendations for pharmacologic prophylaxis administration in the context of neuraxial anesthesia.

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Background and rationale

Venous thromboembolism (VTE) is a leading and preventable cause of maternal mortality. A systematic review of maternal mortality performed by the World Health Organization found embolism to be responsible for 14.9% of maternal deaths in developed countries. The United Kingdom’s Confidential Enquiries into maternal death implicated thromboembolism in 31.1% of deaths directly related to pregnancy from 2003 to 2005. In the United States, strategies to reduce VTE have primarily focused on two populations: (i) women undergoing cesarean delivery and (ii) women identified during prenatal care as being at particularly high-risk for events during pregnancy. Despite these efforts (including increasing use of mechanical prophylaxis during cesarean delivery), obstetric thromboembolism has increased 72% during delivery hospitalizations between 1998 and 2009 according to data from the Nationwide Inpatient Sample. This increasing risk may be due in part higher prevalence of risk factors for VTE, with advanced maternal age, major medical conditions, and obesity increasingly common during pregnancy.

In comparison, guidelines from the United Kingdom similarly recommend pharmacologic prophylaxis for women with prior venous thromboembolic events or thrombophilias. Additionally, these guidelines recommend prophylaxis for other common risk factors including obesity, maternal age >35 years, smoking, pre-eclampsia, postpartum hemorrhage, and prolonged labor. As a result, the UK guidelines recommend more frequent pharmacologic prophylaxis than the U.S. guidelines. In the setting of a comprehensive strategy to reduce VTE, death from this cause in the UK decreased by more than half from 1.94 maternal deaths per 100,000 deliveries in 2003–2005 to 0.79 maternal deaths per 100,000 in 2006–2008. Based on the success of reducing thromboembolism in the UK, the VTE bundle from the Safe Motherhood Initiative integrates recommendations for prophylaxis from the Royal College of Obstetricians and Gynecologists (RCOG) with recommendations from major American societies such as the American Congress of Obstetricians and Gynecologists (ACOG), the American College of Chest Physicians (ACCP), and the American Society of Regional Anesthesia and Pain Medicine (ASRA).

Risk assessment recommendations and tools

The Safe Motherhood Initiative recommends that all obstetric patients be assessed for VTE risk at multiple time points in pregnancy including during

- presentation for prenatal care;
- hospitalization for an antepartum indication;
- during a delivery hospitalization (in-house postpartum);
- discharge home from a delivery hospitalization.

VTE prophylaxis with low-molecular-weight heparin (LMWH) or unfractionated heparin (UFH) may be based on risk factors or in some situations may be empiric. While the Joint Commission states that all hospitalized patients should receive VTE prophylaxis or have documentation why no prophylaxis was given, this set of recommendations (and Joint Commission quality measure) has generally not been extended to obstetric patients. Given the increasing incidence of VTE and risk factors for events, the SMI recommends that obstetric patients be included in this Joint Commission recommendation.

![Fig. 1 – Initial assessment during pregnancy.](image-url)
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