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## Feature Article

# Venous thromboembolism knowledge among older post-hip fracture patients and their caregivers



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## ABSTRACT

Patient education about venous thromboembolism (VTE) prevention is needed to prevent complications and costly re-hospitalization. Nurses are uniquely positioned to provide vital education as patients transition from the inpatient setting to after discharge. Still, little is known about patient knowledge deficits and those of their caregivers. The purpose of this study was to explore VTE prevention knowledge in a sample of older hip fracture patients and family caregivers. At the time of hospital discharge, surveys were completed by hip fracture surgery patients ( $\geq 65$ ;  $n = 30$ ) and family caregivers ( $n = 30$ ). Participants reported needs for more prophylactic anticoagulation and side effects education. Mean education satisfaction was 3.49 out of 5 among patients and 3.83 among caregivers. Focused patient education regarding the wisdom of VTE prevention, potential risks involved, and patient and caregiver roles in advocating for better prevention measures is needed for these patients at risk for hospital readmission secondary to VTE.

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## Introduction

Venous thromboembolism (VTE) is a disease that encompasses deep vein thrombosis (DVT) and pulmonary embolism (PE) with significant morbidity and mortality.<sup>1</sup> VTE often develops in patients during their hospitalization but can also develop in patients anytime in the 30 days post-hospitalization.<sup>2</sup> The risk for VTE among patients undergoing major orthopedic surgery, particularly hip fracture surgery, is the highest among all surgical patients.<sup>3</sup> The incidence of VTE ranges from 36% to 60% after hip fracture surgery and 45–57% after total hip replacement surgery.<sup>4</sup> Deaths from VTE among these patients still occur although not very frequently.<sup>3</sup> Even if there is adequate thromboprophylaxis during hospitalization, the risk for VTE remains high during post-hospitalization due to advanced age of hip fractured patients, multiple comorbid conditions, and immobilization during early rehabilitation period.<sup>5</sup> VTE is said to be an under-recognized risk factor for readmission.<sup>6</sup>

Hip fracture surgery is an urgent surgical procedure that should be performed as soon as possible after fracture trauma. Moreover, patients with hip fracture are likely to be older than patients who plan to have elective hip or knee replacement surgeries and to have more severe comorbidities.<sup>7</sup> Hip fracture surgery is often delayed for 48 h or more after the fracture trauma occurs, and because of this, these patients can even develop DVT preoperatively.<sup>7</sup>

Hospital readmissions after hip fracture are not uncommon primarily due to on-going comorbid conditions and complications in older patients.<sup>8–10</sup> The most common reason for emergency admission after total hip arthroplasty (THA), a major orthopedic surgery as is hip fracture surgery, is thromboembolic disease.<sup>8,10</sup> A multicenter epidemiological study of a cohort of patients undergoing hip fracture surgery (7019 patients from 531 medical centers in France) showed that the rate of confirmed symptomatic VTE at 3 months post-hip fracture surgery was 1.34% (95% CI: 1.04–1.64) and 16 PE cases (including 3 fatal PEs) were reported.<sup>11</sup> Another study using nationally representative data on adverse drug events demonstrated that warfarin (33.3%) was the leading medication to cause emergency hospitalization in older Americans, followed by insulin (13.9%), and oral antiplatelet agents (13.3%).<sup>12</sup>

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Older patients after hip fracture surgery require continuous management and complex care from a diverse range of health care professionals in an assortment of settings. While transitioning from hospitals to next care settings, VTE-related risks still remain in these patients. A retrospective cohort study examined the impact of discharge destination in patients undergoing either THA or hip fracture. After adjusting for important socio-demographic factors, patients who were discharged to inpatient rehabilitation settings (4.2%) had the lowest readmission rate within 180 days compared to those to home (5.1%), home with home care (10.5%), and skilled nursing facility (12.3%).<sup>8</sup> An epidemiological study of VTE prevalence reported nursing home confinement to be one of several independent VTE risk factors.<sup>13</sup> Other factors include surgery, hospitalization for acute medical illness, trauma, and cancer.<sup>13</sup> There is little research on the safety of anticoagulation therapy in long-term care settings. Moreover, little is known about the level of VTE knowledge in patients and caregivers who will manage VTE prevention in the home and may need to monitor VTE prevention in some lower level care settings.

There is little doubt about what needs to happen to prevent VTE, and patients, community caregivers, and professionals in every care setting should be aware of what they are. First and primary, VTE can be prevented by the proper use of anticoagulants.<sup>3</sup> There have been national calls to action to prevent VTE by public agencies and private organizations, including the Centers for Medicare and

Medicaid Services (CMS), the Joint Commission, National Quality Forum (NQF), the Agency for Healthcare Research and Quality (AHRQ), the Institute for Healthcare Improvement (IHI) and Leapfrog group.<sup>14</sup> Evidence based clinical guidelines and quality improvement strategies for VTE prevention and treatment in patients during hospitalization and after discharge were developed by the collaborative work.<sup>14</sup>

Table 1 presents a summary of most recent recommendations for the prevention of VTE using the most recent evidence-based clinical practice guidelines for antithrombotic therapy and prevention of thrombosis.<sup>3,15</sup> According to these guidelines, it is highly recommended to use antithrombotic prophylaxis [e.g., low-molecular weight heparin (LMWH), fondaparinux, low dose unfractionated heparin (LDUH), adjusted-dose Vitamin K antagonist, or aspirin, and/or intermittent pneumatic compression device] for a minimum of 10–14 days for patients undergoing hip fracture surgery.<sup>3</sup> Extending thromboprophylaxis for up to 35 days from the day of surgery has also been recommended.<sup>3,16,17</sup>

Effective education of older patients and caregivers about anticoagulant medications may be critically important post-hospitalization in order to prevent adverse drug events and reduce mortality. Discharge instructions including follow-up monitoring, compliance issues, dietary restrictions, the potential for adverse drug reactions or interactions, and activity requirements or restrictions are key components in any education program for patients and their caregivers.<sup>18</sup>

**Table 1**

The summary of recommendations for the prevention of VTE in patients with hip fracture surgery from the 9th edition of evidence-based clinical practice guidelines for antithrombotic therapy and prevention of thrombosis by American Colleges of Chest Physicians (ACCP).

**Recommendations with evidence**

1. The ACCP expert panel recommends use of one of the following rather than no antithrombotic prophylaxis for a minimum of 10–14 days: LMWH, fondaparinux, LDUH, adjusted-dose VKA, aspirin (all Grade 1B), or an IPCD (Grade 1C).  
Remarks: The panel recommends use of only portable, battery-powered IPCDs capable of recording and reporting proper wear time on a daily basis for inpatients and outpatients. Efforts should be made to achieve 18 h of daily compliance of IPCDs. One expert panel member believed strongly that aspirin alone should not be included as an option.
2. In HFS patients receiving LMWH as thromboprophylaxis, the ACCP expert panel recommends starting either 12 h or more preoperatively or 12 h or more postoperatively rather than within 4 h or less preoperatively or 4 h or less postoperatively (Grade 1B).
3. In HFS patients, irrespective of the concomitant use of an IPCD or length of treatment, the ACCP panel suggests the use of LMWH in preference to the other agents that they have recommended as alternatives: Fondaparinux, LDUH (Grade 2B), adjusted-dose VKA, or aspirin (all Grade 2C).  
Remarks: For patients in whom surgery is likely to be delayed, the panel suggests that LMWH be initiated during the time between hospital admission and surgery but suggests administering LMWH at least 12 h before surgery. Patients who place a high value on avoiding the inconvenience of daily injections with LMWH and a low value on the limitations of alternative agents are likely to choose an alternative agent. Limitations of alternative agents include the possibility of increasing bleeding (which may occur with fondaparinux) or possible decreased efficacy (LDUH, VKA, aspirin, and IPCD alone). Furthermore, patients who place a high value on avoiding bleeding complications and a low value on its inconvenience are likely to choose an IPCD over the drug options.
4. Extending thromboprophylaxis in the outpatient period for up to 35 days from the day of surgery rather than for only 10–14 days (Grade 2B).
5. Using dual prophylaxis with an antithrombotic agent and an IPCD during the hospital stay (Grade 2C).
6. For patients with increased risk of bleeding, using an IPCD or no prophylaxis rather than pharmacologic treatment (Grade 2C).  
Remarks: Patients who place a high value on avoiding the discomfort and inconvenience of IPCD and a low value on avoiding a small absolute increase in bleeding with pharmacologic agents when only one bleeding risk factor is present (in particular the continued use of antiplatelet agents) are likely to choose pharmacologic thromboprophylaxis over IPCD.
7. For patients who decline or are uncooperative with injections or an IPCD, the panel recommends using apixaban or dabigatran (alternatively rivaroxaban or adjusted-dose VKA if apixaban or dabigatran are unavailable) rather than alternative forms of prophylaxis (all Grade 1B).
8. ACCP panel suggests against using inferior vena cava (IVC) filter placement for primary prevention over no thromboprophylaxis in patients with an increased bleeding risk or contraindications to both pharmacologic and mechanical thromboprophylaxis (Grade 2C).
9. For asymptomatic patients, ACCP panel recommends against Doppler (or duplex) ultrasound (DUS) screening before hospital discharge (Grade 1B).

**Abbreviations:** DUS = Doppler (or duplex) ultrasonography; GCS = graduated compression stockings; HFS = hip fracture surgery; IPCD = intermittent pneumatic compression device; IVC = inferior vena cava; LDUH = low-dose unfractionated heparin; LMWH = low-molecular-weight heparin; VKA = vitamin K antagonist.  
*Source:* Falck-Ytter Y, Francis CW, Johansen NA, et al. Prevention of VTE in orthopedic surgery patients: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest 2012;141(2 suppl):e278S–325S (Pages: e279S–e280S).

**Grade of Recommendations – Levels of Evidence:**

- Strong recommendation, high-quality evidence (Grade 1A).
- Strong recommendation, moderate-quality evidence (Grade 1B).
- Strong recommendation, low- or very low-quality evidence (Grade 1C).
- Weak recommendation, high-quality evidence (Grade 2A).
- Weak recommendation, moderate-quality evidence (Grade 2B).
- Weak recommendation, low- or very low-quality evidence (Grade 2C).

*Source:* Guyatt GH, Norris SL, Schulman S, et al. Methodology for the development of antithrombotic therapy and prevention of thrombosis guidelines: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest 2012;141(2 suppl):53S–70S (page 62S).

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