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Persistent Gaps in VTE Prophylaxis in Orthopedic Surgery: Will New Educational Strategies Help?

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In 2008, a call to action from the US Surgeon General stated that too few health care professionals are aware of evidence-based practices for preventing venous thromboembolism (VTE).[1] As a consequence, deep-vein thrombosis (DVT) and pulmonary embolism (PE) affect an estimated 350 000 to 600 000 patients annually in the United States and result in at least 100 000 fatalities.[1] PE is the most common preventable cause of hospital mortality in the United States, and the Agency for Healthcare Research and Quality has called VTE thromboprophylaxis "the number one patient safety practice."[2]

Although most surgical patients have an increased risk of VTE, major orthopedic procedures carry the highest risk; if no prophylaxis is given, 40% to 60% of patients who undergo hip or knee replacement surgery may develop venographic DVT.[3] With thromboprophylaxis, the incidence of fatal PE is rare. However, symptomatic VTE continues to be reported in 1.3% to 10% of orthopedic surgery patients, and VTE remains the most common cause for readmission following hip replacement surgery.[3]

Clearly, systemwide measures are needed to decrease the incidence of VTE. In recent years, national health care quality organizations have become increasingly aware that VTE is a widespread public health crisis. The US Surgeon General's call to action asks stakeholders to create a coordinated, multifaceted plan to reduce VTE incidence by implementing evidence-based practices for the screening, prevention, diagnosis, and treatment of VTE.[1] The importance is also highlighted by national consensus standards from the National Quality Forum and The Joint Commission as well as required reporting measures from the Surgical Care Improvement Project.[4] As of 2009, the Centers for Medicare and Medicaid Services no longer reimburses hospitals for VTE that is not present on admission in hip and knee surgery patients, categorizing it with 12 other hospital-acquired conditions as a "never event."[4]

Orthopedic surgeons have been pivotal in the controversy around appropriate prophylaxis. Generally, they have demonstrated a greater awareness and use of thromboprophylaxis than other specialists. Although the ENDORSE (Epidemiologic International Day for the Evaluation of Patients at Risk for Venous Thromboembolism in the Acute Hospital Care Setting) study reported that only 58.5% of at-risk surgical patients receive guideline-recommended thromboprophylaxis, a 2008 American Association of Hip & Knee Surgeons survey found that more than 90% of respondents reported routine use of both pharmacological and mechanical prophylaxis for patients undergoing major orthopedic surgery.[5,6]

These survey results, however, may not reflect the true variability of thromboprophylaxis use among orthopedic surgeons. For example, in a review of more than 7500 medical records, only 23% of hip fracture patients received thromboprophylaxis.[7] The duration of prophylaxis also remains suboptimal. Guidelines recommend postdischarge prophylaxis for up to 6 weeks because the majority of VTE events occur after hospitalization.[3] In the NABOR (National Anticoagulation Benchmark and Outcomes

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Report) study, however, the mean duration of prophylaxis after orthopedic surgery ranged from 3.2 to 4.7 days, and about one third of total joint replacement (TJR) patients and nearly one half of hip fracture patients did not receive a prescription for postdischarge prophylaxis.[8]

Internal survey data from Med-IQ, an Accreditation Council for Continuing Medical Education-accredited continuing medical education (CME) company, reveals knowledge gaps among orthopedic specialists. For instance, preactivity survey data from a 2008-2009 Web-based CME program found that, among the 90 orthopedic surgeons who completed the activity, almost half (47%) of the participants could not correctly identify VTE risk factors, 37% could not identify guideline-recommended prophylaxis regimens, and 15% could not identify clinical effects of extended prophylaxis in orthopedic surgery patients (Med-IQ, unpublished data, May 4, 2009).

In a subsequent 2009 CME series on VTE for orthopedic specialists launched by Med-IQ in collaboration with Joint Commission Resources, preliminary preactivity data of orthopedic surgeons (n = 83) revealed similar findings. Fewer than one half (45%) could identify VTE prophylaxis candidates, one third failed to appropriately identify VTE risk factors following TJR, and 65% could not appropriately identify guideline-recommended VTE prevention strategies. More than 30% failed to select appropriate prophylaxis recommendations for patients undergoing TJR, and only 37% identified effective strategies for improving VTE use (Med-IQ, unpublished data, January 9, 2010).

Several key obstacles to VTE prevention in the orthopedic setting have been documented in the recent literature.[9,10] Med-IQ survey data provide further confirmation that orthopedic surgeons perceive these factors as true obstacles to VTE prevention. In a 2008 survey, 41% of orthopedic surgeons (n = 84) said that identification of appropriate candidates for VTE prophylaxis was a significant barrier, and 80% identified bleeding concerns as a significant barrier. Approximately 25% identified both disagreement with clinical guidelines and a lack of appropriate hospital system support as significant barriers (Med-IQ, unpublished data, May 22, 2008). Other barriers include an underestimation of the true incidence and importance of VTE resulting from the low absolute numbers of patients with symptomatic VTE and a perceived lack of need for thromboprophylaxis because of the low prevalence of clinically significant events that occur during the initial hospitalization.[9,10]

Given that VTE poses a serious—and preventable—public health problem, what provider- and institution-based strategies are effective in overcoming these barriers and knowledge gaps in orthopedic surgery? Passive strategies, such as distributing copies of written guidelines to clinicians, have failed to demonstrate improved adherence to thromboprophylaxis recommendations.[10] However, active strategies, which include interactive education, audit and feedback systems, documentation aids, standardized protocols/orders, and computer-based clinical decision-support systems, can significantly improve adherence to guidelines.[10] High levels of success require layered, multiple interventions that are well incorporated into point-of-care processes and include a mechanism for oversight and feedback.[2,10]

Traditional CME activities have demonstrated improvements in confidence, knowledge, and competence among orthopedic surgery specialists but are limited in their ability to produce sustained improvement or evaluate higher level outcomes. Med-IQ's 2008-2009 interactive Web-based CME activity resulted in an improvement from 53% to 87% ($P < .001$) in orthopedic surgeons correctly identifying risk factors for VTE. Orthopedic surgeons choosing a guideline-recommended VTE prophylaxis regimen increased to 93% at posttest from 63% at pretest ($P < .001$). Participants who correctly identified the clinical effects of extended prophylaxis in orthopedic surgery patients also significantly increased at posttest (99% vs 85%, $P < .001$; Med-IQ, unpublished data, May 4, 2009). Despite these encouraging results, by 30 days postprogram, most increases in VTE prevention knowledge had been lost, with percentages of correct responses nearing baseline values.

To address these limitations and gaps in knowledge, novel approaches to education and outcomes evaluation are needed. In this issue of the journal, we report the results of a hospital-specific quality improvement initiative that combined traditional clinical education with principles of human culture, communication, teamwork, and leadership borrowed from the aviation industry. Traditional pre–post surveys of confidence and knowledge gains were supported by retrospective patient chart reviews to evaluate change in processes of care relating to thromboprophylaxis in the surgical setting.

Additionally, in May 2010, Med-IQ and Duke University School of Medicine launched a performance improvement initiative in VTE prophylaxis in orthopedic surgery. Performance improvement is an American Medical Association–standardized CME platform that uses an active educational strategy, in which participants evaluate gaps in their own practice, implement corrective changes, and then evaluate the effects of such changes. Although results are not yet available, initial participation and satisfaction rates are promising, with 270 orthopedic surgery specialists registering for the activity, 54 starting the activity, and 41 submitting improvement plans to date. These are encouraging numbers for a platform that requires a more substantial commitment than traditional CME.

Active educational approaches such as these, combined with other process improvement tools for VTE recognition and prevention, are needed to help transform VTE in the orthopedic setting into a true "never event." Efforts must be focused on finding innovative educational strategies that "stick," resulting not only in knowledge retention but also in improved performance that is sustained in the long term. It is essential to include robust outcomes analyses of various CME models to prove that they can translate into improved processes of care and patient outcomes. Finally, prevention of VTE in the orthopedic setting requires close coordination of the entire surgical care team—surgeons as well as nurses, physician assistants, pharmacists, and risk managers. Thus, future CME strategies should aim to target all involved health care personnel.

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References

1. US Department of Health and Human Services. Surgeon general's call to action to prevent deep vein thrombosis and pulmonary embolism 2008. http://www.surgeongeneral.gov/topics/deepvein/calltoaction/call-to-action-on-dvt-2008.pdf. Accessed September 20, 2010.
2. Maynard G, Stein J. *Preventing Hospital-Acquired Venous Thromboembolism: A Guide for Effective Quality Improvement*. Rockville, MD: Agency for Healthcare Research and Quality; 2008. AHRQ Publication No. 08–0075.
3. Geerts WH, Bergqvist D, Pineo GF, et al; American College of Chest Physicians. Prevention of venous thromboembolism: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). *Chest*. 2008;133(6, suppl):381S-453S.
4. Amin AN, Deitelzweig SB. Optimizing the prevention of venous thromboembolism: recent quality improvement initiatives and strategies to drive improvement. *Jt Comm J Qual Patient Saf*. 2009;35:558-564.
5. Cohen AT, Tapson VF, Bergmann JF, et al; ENDORSE Investigators. Venous thromboembolism risk and prophylaxis in the acute hospital care setting (ENDORSE study): a multinational cross-sectional study. *Lancet*. 2008;371:387-394.
6. Markel DC. Venous thromboembolism (VTE) screening, prophylaxis, evaluation & management in adult hip & knee arthroplasty: results of the 2008 survey of American Association of Hip & Knee Surgeons (AAHKS) members. Poster presented at: American Association of Hip & Knee Surgeons Annual Meeting; November 7-9, 2008; Dallas, TX.
7. McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. *N Engl J Med*. 2003;348:2635-2645.
8. Tapson VF, Hyers TM, Waldo AL, et al. Antithrombotic therapy practices in US hospitals in an era of practice guidelines. *Arch Intern Med*. 2005;165:1458-1464.
9. Kakkar AK, Davidson BL, Haas SK; Investigators Against Thromboembolism (INATE) Core Group. Compliance with recommended prophylaxis for venous thromboembolism: improving the use and rate of uptake of clinical practice guidelines. *J Thromb Haemost*. 2004;2:221-227.
10. Tooher R, Middleton P, Pham C, et al. A systematic review of strategies to improve prophylaxis for venous thromboembolism in hospitals. *Ann Surg*. 2005;241:397-415.