

# Trimodal venous thromboembolism prophylaxis in total knee replacement: A quality improvement project for best care practices

Justin J. Gwatorisa, DNP, MSN, BSC, ACNP-BC

*Venous thromboembolism (VTE) is a highly significant clinical and public health concern in the United States, particularly in the surgical population, where approximately 2 million patients of >30 million operative procedures performed annually in the United States experience postoperative complications. Previous well-documented research has revealed that longstanding national guidelines that call for risk stratification and trimodal VTE prophylaxis, a comprehensive modality incorporating 3 arms of prophylaxis—chemical, mechanical, and early ambulation—suffer from significant levels of nonadherence. The fallout includes a disconcerting magnitude of cases of preventable morbidity and mortality, and exertion of a weighty cost burden on the US health care system. This evidence-based quality improvement project investigated the level of adherence, and the causes of nonadherence, to national guidelines for VTE prophylaxis among total knee replacement patients at a prominent tertiary facility in central Massachusetts. Chief among the findings, analysis of documented data, augmented by data collected from unannounced mechanical prophylaxis adherence audits, identified frontline staff negligence as the principal cause of nonadherence in the mechanical arm. Overall, the project helped to underscore optimal VTE prophylaxis as a synergistic amalgamation of the trimodal methodology's complementary individual component efficacies. (J Vasc Nurs 2015;33:119-126)*

Each year, >30 million operative procedures are performed in the United States and approximately 2 million patients suffer postoperative complications.<sup>1</sup> Two common postoperative complications are deep vein thrombosis (DVT) and pulmonary embolism (PE). A DVT is a blood clot in the lower limb system that can transform into an embolus by dislodging and traversing the blood vessels to the lungs within the pulmonary system, causing a PE and the potential for morbidity and mortality.<sup>2</sup> Together, DVT and PE encompass the occurrence of venous thromboembolism (VTE), which has emerged as a highly significant and growing public health concern in the United States.<sup>3</sup>

VTE is the third most common vascular disorder after heart disease and stroke, occurring in nearly 1 million Americans every year. More than 100,000 Americans die from PE annually, making PE the most common preventable cause of hospital mortality in the United States.<sup>2</sup> VTE can occur during major surgeries such as total knee replacement (TKR), and albeit insidious, is avertable. VTE occurrence after TKR requires further treatment and longer hospitalization, consequently exerting a considerable economic burden on the US health care system, with expenditures exceeding \$1.5 billion annually.<sup>4</sup> The Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Projects' esti-

mates of incremental inpatient costs are \$10,000 per DVT and \$20,000 per PE. Therefore, an important patient care practice is maintaining standard guidelines for VTE prophylaxis for TKR patients, including anticoagulation with low-molecular-weight heparin (LMWH), bilateral sequential compression devices Intermittent Pneumatic Compression devices (IPC), and early postoperative ambulation to avert complications and adverse patient events.

The purpose of this project was to investigate whether the standard of care comprising Venodyne Boots (VDB) - a highly popular brand of IPC, chemical prophylaxis with LMWH (Lovenox), and early ambulation, collectively branded "trimodal VTE prophylaxis," was being met at a prominent 321-bed tertiary hospital in central Massachusetts. Data analysis at the hospital before revisions in standard care practices identified a concerning number of VTE events (24 DVTs in 6 months) in the TKR population alone. This project may help to inform and guide future interventions aimed at improving standard care adherence at the institution, and elsewhere, in the dawn of a new era in health care of achieving cost-effective, best care practices that yield high-quality patient outcomes.

## BACKGROUND AND EVIDENCE

The pathophysiology of DVT formation was first described by German physician Rudolph Virchow in 1856. Virchow's triad of events includes venous stasis, damage to the endothelial lining of blood vessels, and activation of circulating clotting factors. DVT can occur owing to any or all three predisposing factors.<sup>5</sup>

Although hospitalization and surgery are major risk factors for developing VTE, the majority of VTE events occurring among hospitalized patients are preventable.<sup>6,7</sup> Notwithstanding the availability of long-established evidence-based national

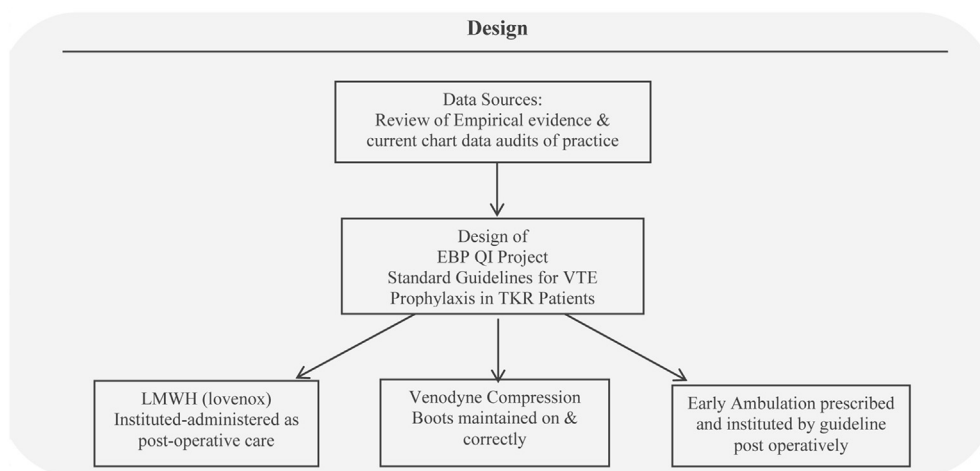
*From the UMASS Medical School, Worcester, Massachusetts.*

*Corresponding author: Dr. Justin J. Gwatorisa, DNP, MSN, BSC, ACNP-BC, UMass Medical School, Worcester, MA (E-mails: [justin.gwatorisa@umassmed.edu](mailto:justin.gwatorisa@umassmed.edu), [jgwats@gmail.com](mailto:jgwats@gmail.com)).*

*1062-0303/\$36.00*

*Copyright © 2015 by the Society for Vascular Nursing, Inc.*

*<http://dx.doi.org/10.1016/j.jvn.2015.05.039>*



**Figure 1.** Design. EBP QI = evidence-based quality improvement project; LMWH = low-molecular-weight heparin; TKR = total knee replacement; VTE = venous thromboembolism.

guidelines, intended to inform and guide prophylactic care practices, adoption and adherence by hospitals across the United States has been suboptimal. Lack of adherence to established guidelines spawns inconsistencies and wide variations in VTE prophylaxis across the country. The fallout includes poor outcomes for millions of patients, and hundreds of thousands of easily preventable deaths.<sup>8</sup>

In recent years, a push at the national level for implementation of VTE prophylaxis guidelines to promote adherence has occurred. The 2009 conference by the American College of Chest Physicians presented evidence based national guidelines on VTE prophylaxis. VTE prophylaxis now ranks in the top 10 patient safety practices recommended by the AHRQ and the National Quality Forum.<sup>9</sup>

Current evidence and national guidelines recommend that all patients undergoing operative procedures receive risk stratified trimodal prophylaxis—the most optimal methodology, comprising chemical and mechanical prophylaxis augmented by early ambulation. Optimal VTE prophylaxis consists of LMWH, IPC, and early ambulation.<sup>10–12</sup>

The preferred chemical prophylaxis for VTE in patients after major orthopedic procedures, especially TKR and total hip replacement, is LMWH which demonstrated superior efficacy over low-dose unfractionated heparin. However, in cases of renal failure/insufficiency, it should be administered in smaller doses or replaced with low-dose unfractionated heparin.<sup>11</sup> Patients should also receive full treatment with LMWH for  $\geq 5$  weeks after the procedure.<sup>12</sup> The recommended mechanical prophylaxis is IPC, which carries efficacy similar to LMWH and is superior to graduated compression stockings.<sup>13,14</sup>

The detrimental effects of immobilization after major orthopedic surgery such as TKR include orthostatic hypotension, pneumonia, soft tissue contractures, and VTE.<sup>15</sup> Given the clinical benefits of mobility, clinicians may avoid these complications by prescribing early ambulation for surgical patients, including those with existing DVTs. In the latter, no studies to date have demonstrated an increased risk for PE from ambulation.<sup>15–17</sup>

This project was implemented based on the plan–do–study–act model of translational research and quality improvement

(QI) developed by Dr Edwards Deming in the 1950s. It has since undergone several revisions and evolved into a simple yet powerful tool for accelerating QI, leading to its adoption as a premier QI model by the Institute for Healthcare Improvement.<sup>18</sup>

## METHODS

### Project design

An evidence-based QI project (EBP QI) was designed and implemented as a review of paper and electronic charts and documentation (Figure 1), with subsequent data analysis. The project examined to what extent the standard care practice of trimodal VTE prophylaxis among TKR patients was being adhered to at a tertiary care facility in central Massachusetts. The clinical objective was stated as follows: In the adult population at high risk for VTE aged  $\geq 40$  undergoing TKR, to what extent is the standard of trimodal VTE prophylaxis being adhered to during the postoperative hospitalization course?

### Sample and setting

Eligibility criteria for participation in the EBP QI project included a sample of 30 English-speaking adult male and female patients age  $\geq 40$  undergoing TKR surgery and receiving (1) LMWH (Lovenox) postoperatively, (2) bilateral VDB, and (3) early ambulation. Exclusion criteria included use of continuous passive motion machines, or knee immobilizers postoperatively, which were not part of standard practice. The setting was a 321-bed tertiary care center located in central Massachusetts.

### Data collection and procedure

Data on a total of 30 patients were extracted from charts and medical records over a 3-month period in late 2012 and 2013. A total of 65 random VDB adherence audits were conducted on sample and nonsample patients after data integrity issues regarding documentation of VDB placement arose. Patients in the sample ranged in age from 58 to 87, with a mean of 72.6 and a standard deviation of 7.70. The majority of the sample was Caucasian and female. A predominant portion of the sample, 93.3%, was overweight, obese, or morbidly obese. Home mobility was mainly independent without use of devices, followed by independent with the use of a cane.

Download English Version:

<https://daneshyari.com/en/article/2672667>

Download Persian Version:

<https://daneshyari.com/article/2672667>

[Daneshyari.com](https://daneshyari.com)