

Surgeons report fewer postoperative blood clots using risk-based preventive measures

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Surgery patients are much less likely to get a blood clot in the lower extremities or lungs if they receive preventive treatment based on their individual clotting risk, in addition to walking soon after the operation. Results from a surgical quality improvement study, appearing in the June issue of the *Journal of the American College of Surgeons*, indicate that the odds of this common and potentially life-threatening postoperative complication steadily declined after the implementation of a multicomponent prevention program in a hospital's department of surgery.

Researchers at Boston Medical Center, Boston, Mass., reported that they lowered the frequency of deep venous thromboses—[blood clots](#) in a deep vein, usually in a lower extremity—by 84 percent two years after the prevention efforts began, compared with the results two years before the program. The occurrence of [pulmonary emboli](#), or blood clots that travel to the lungs, fell by 55 percent in the same period, according to study authors.

"We are encouraged by the success in reducing the frequency of these devastating events among our patients by implementing this [prevention program](#)," said co-investigator David McAneny, MD, FACS, vice chair of surgery at Boston Medical Center. Surgery patients have an increased risk of developing these blood clots, collectively known as venous thromboembolism (VTE). Pulmonary emboli can leave patients with pulmonary hypertension, which is high blood pressure in the arteries of the lungs. Deep venous thromboses can lead to debilitating swelling and

chronic pain of the affected limb.

Before this study, Dr. McAneny and colleagues found that their large medical center had higher-than-expected rates of postoperative VTE, when their outcomes were compared with other hospitals while adjusting for severities of illness. They obtained their information through the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database, the leading nationally validated, risk-adjusted, outcomes-based program to measure and improve the quality of surgical care in hospitals.

"ACS NSQIP was highly valuable in helping us realize the need for improvement in this area," Dr. McAneny said. "We then wanted to make sure the right patients were getting the right prophylaxis—preventive treatment—especially those at high risk for VTE." Among the many risk factors for VTE are older age, obesity, smoking, confinement to bed, a personal or family history of deep venous thromboses or pulmonary emboli, and a long operation.

Based on scientific evidence and national practice guidelines, the researchers developed a VTE prevention program that scored and totaled patients' individual risk factors. They then tested the program in all patients undergoing general surgery and vascular surgery procedures at their hospital.

Initially, there was an emphasis on early postoperative mobilization—getting patients up and walking three times a day, starting on the day of the operation when possible. The program later included these additional components:

- Standardized risk assessment using five categories of VTE risk based on scores of 0 (lowest risk) to more than 8 (highest risk)*
- Individualized, risk-based prophylaxis involving inflatable

pressure boots and/or low doses of anticoagulation medications, commonly called blood thinners

- Electronic physician orders that specified early mobilization, the requirement to score the patient's VTE risk, and the score-based appropriate preventive treatment along with the suggested duration of prophylaxis in the hospital and, for high-risk patients, continuing at home
- Patient education to explain the importance of preventing blood clots

Surgeons and their teams received mandatory electronic reminders regarding VTE prophylaxis before and after the operation and when the patient was discharged from the hospital. They could choose to opt out of the recommendation for preventive medication but needed to specify why. The researchers monitored the level of adherence to the automated recommendations.

Using the NSQIP database, the investigators tracked the occurrences of VTE in patients who underwent general surgery or vascular surgery procedures during the two calendar years before and then after implementing the electronic prevention program in February 2011.

Before the program was in place, the odds of a patient having a VTE after a general or vascular surgery procedure was 3.4 times greater than expected, when adjusted for patient risk, the authors reported. Two years after the program began, the risk of developing a VTE was less than one would expect (odds ratio of 0.94) according to Dr. McAneny. In that four-year period, the reported frequency of pulmonary emboli (lung clots) dropped from 1.1 percent of 1,569 patients to 0.5 percent of 1,323 patients. Meanwhile, the frequency of

DVT (limb clots) declined from 1.9 percent of 1,569 patients to 0.3 percent of 1,323 patients.

In addition, he said surgeons' adherence to ordering the recommended prophylaxis was high. Compliance rates ranged from 100 percent for patients at low or moderate risk for a VTE to 77 percent for patients in the highest risk category. Even when [patients](#) at highest risk did not receive prevention in accordance with the recommended measures, the electronic records contained an explanation for not using blood thinners (drug allergy, active bleeding, risk of hemorrhage outweighing risk of VTE, etc.).

Dr. McAneny attributed the success of their prevention efforts to the combination of early ambulation and individualized risk assessment and prophylaxis.

He said their VTE prevention program may serve as a model for other medical centers.

More information: *Journal of the American College of Surgeons*, May 2014: Vol 218(6):1095-1104.

*Adapted from the Caprini grading system (Caprini JA, Arcelus JJ, Hasty JH, et al. *Semin Thromb Hemost.* 1991; 17:304-312).

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