

Statewide quality improvement program helps lower rates of trauma complications

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As health insurers place more emphasis on paying for quality outcomes rather than for specific services provided by doctors and hospitals, several quality improvement programs have been developed as a way to help health care providers identify problem areas and share best practices. While some studies have evaluated how well these quality improvement programs achieve their goals, not many have focused on the area of trauma care. But now a team of trauma surgeons at the University of Michigan in Ann Arbor have reported how data from a statewide quality collaborative helped them reduce the rate of a serious trauma complication by more than half. The investigators' results appear as an "article in press" on the website of the *Journal of the American College of Surgeons (JACS)*, in advance of print publication.

The researchers examined the rate of venous thromboembolism (VTE) events in [trauma patients](#). VTEs include [blood clots](#) forming inside veins, also known as deep venous thrombosis (DVT). Patients with a DVT can have the blood clot break loose and travel through the circulatory system resulting in a pulmonary embolism, if the blood clot becomes lodged in the lungs. A pulmonary embolus can be fatal as it may impair lung function and reduce blood circulation by the heart. Past studies of trauma patients have put the rates of pulmonary embolism at 1.5 percent and DVT as high as 11 percent.

By participating in the Michigan Trauma Quality Improvement Program (MTQIP), a statewide program of 27 ACS Level 1 and 2 [trauma centers](#), the [trauma surgeons](#) at the University of Michigan noticed that their rate

of VTE events was higher than the collaborative average, study coauthor David A. Machado-Aranda, MD, FACS, explained. Specifically, when drilling down into the data, they also noted that VTE rates were doubled among their trauma patients who received the anti-clotting agent unfractionated heparin as opposed to a different agent, [enoxaparin](#).

Blue Cross Blue Shield of Michigan and Blue Care Network sponsor MTQIP. Participants in MTQIP receive feedback reporting on a statewide basis through MTQIP and on a national level from ACS TQIP.

After the University of Michigan Trauma Center switched from using unfractionated heparin as its first-line anti-clotting agent to enoxaparin, the rate of VTE dropped from 6.2 percent (about 36 cases a year) to 2.6 percent (14 cases a year).

"What we've done is to use the collaborative as our mission control to see where we're heading and what our trajectory is," Dr. Machado-Aranda said. "Once we saw ourselves deviating from a favorable trajectory, we used the data derived from the collaborative to investigate our problem. We also accessed many different resources to review best practices, receive suggestions from other collaborative participants, and perform root cause analysis. An action plan was formulated, approved, and implemented to get our trauma service off of an unfavorable trajectory for VTE complications."

This study should not be interpreted as a head-to-head comparison of unfractionated heparin versus enoxaparin to prevent blood clots in trauma patients, Dr. Machado-Aranda explained, but rather as a model of how hospitals and physicians can use [quality improvement](#) data in a real-world setting.

Existing medical evidence has shown both heparin and enoxaparin can be effective in preventing blood clots depending on factors like how the

agents are dosed and administered. "Based on our data, the enoxaparin regimen was more effective than heparin," Dr. Machado-Aranda said.

"Now this result could be different in another institution, another collaborative, another geographical area, or another patient population based on the circumstances encountered." The point is that MTQIP provided a "dashboard" that allowed the institution to identify a problem, investigate the data, formulate an action plan, and monitor how the change in regimen influenced outcomes, he said.

"We are using the data that's derived from MTQIP as a guide of where we are, what we need to do, and where we should be heading to in the future," he said. "That's the most important thing: the process that was involved, and this same process can be applied to respiratory complications, urinary tract infections, and other problems in hospitals."

Dr. Machado-Aranda acknowledged that the trauma team did encounter some challenges in changing its protocol for trauma patients. Hospital administration and other departments were concerned about the higher cost of enoxaparin. In the end, "the increased costs of using enoxaparin were more than offset by savings generated by reducing the rate of venous thromboembolism complications," he said.

The trauma surgeons reviewed the data with the neurosurgeons and orthopedic surgeons on staff to understand and alleviate their concerns about enoxaparin and potential higher rates of bleeding complications. The neurosurgical colleagues had previously published a study that found higher rates of intracranial bleeding in patients undergoing brain tumor surgery who received enoxaparin compared with sequential compression devices alone. "These results became extrapolated into the trauma setting, and it took us some time convincing our neurosurgeons to consider changing their practice for [trauma](#) patients," Dr. Machado-Aranda said.

More information: Reduction in Venous Thromboembolism Events: Trauma Performance Improvement and Loop Closure through Participation in a State-Wide Quality Collaborative. *Journal of the American College of Surgeons*.

Velmahos GC, Kern J, Chan LS, et al. Prevention of venous thromboembolism after injury: an evidence-based report—part I: analysis of risk factors and evaluation of the role of vena caval filters. *J Trauma*.2000 Jul; 49(1):132-8.

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