

Assessment tool predicts blood clot risk after plastic surgery

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Patients undergoing plastic or reconstructive surgery should receive a risk assessment before their procedure to predict whether they'll develop potentially fatal blood clots in the legs or lungs, according to research at the University of Michigan Medical School. Researchers also found that 1 in 9 patients at highest risk based on that assessment will develop clots if not given clot-preventing medications after surgery.

Published in the November 2010 [Journal of the American College of Surgeons](#), the study evaluated the Caprini Risk Assessment Model, a standard measurement tool used to assess the likelihood a patient will develop dangerous clots in the deep veins of the legs or lungs after surgery. While all patients admitted to U-M for surgery receive a Caprini risk assessment, it is not standard practice among plastic surgeons nationwide.

"Our data demonstrates that the Caprini Risk Assessment Model is a useful and effective tool for predicting how likely a patient is to develop venous thromboembolism (VTE) after [plastic surgery](#)," says Christopher J. Pannucci, M.D., M.S., resident in the U-M Section of Plastic and Reconstructive Surgery and the study's lead author.

Because past studies have shown that some plastic and reconstructive surgery patients are at high risk for developing clots and only about 50 percent of surgeons administer clot-preventing medications after surgery, Pannucci and fellow researchers sought to specifically validate whether the Caprini model was an effective tool for predicting risk and

whether administering clot-preventing medications after surgery can reduce their risk.

"We found that the higher a patient's Caprini score, the more likely the patient is to develop blood clots after surgery. We also found that patients with the highest scores were at disproportionately greater risk for developing clots if no clot-preventing medications were administered within 60 days after surgery," Pannucci says.

For the study, researchers reviewed medical record data from 1,126 patients who had plastic or reconstructive surgery and who received no clot-preventing medicines after surgery.

Findings include:

The Caprini Risk Assessment tool is effective in predicting which plastic and [reconstructive surgery](#) patients will develop VTE. This study is the first time this theory was tested for plastic and reconstructive surgical patients.

A specific, high-risk group was identified. Patients with a Caprini score greater than 8 are at disproportionately higher risk for developing late VTE; 1 in 9 of these patients can expect to have an event if no clot-preventing medication is given within 60 days after the surgery.

"We used to think people developed blood clots while still on the operating table," Pannucci says. "But we showed that patients with lower risk scores tend to develop VTEs within two weeks after surgery, while patients with higher risk scores continue to be at risk 20, 40 and even 60 days after their operation."

The appropriate frequency and duration, and subsequent effectiveness of administering clot-preventing medications after surgery are currently

being studied.

Risk Factors: The most common risk factors for developing blood clots after surgery are age, obesity, surgery duration, pregnancy or oral contraceptive use, cancer, personal or family history of clots, and when a person's blood clots easier than most due to genetically abnormal clotting factors.

Once an injury or surgery occurs, additional risk factors that increase clot risk include multi-system trauma, lower extremity fractures, immobility, multiple operations, need for indwelling central venous catheters, and various post-operative complications like systemic infection.

Effects of VTE: Patients who develop deep vein thrombosis (blood clots deep in the arteries of the legs) are at risk for developing pulmonary embolism. Pulmonary embolism occurs when a deep clot is pushed with the flow of blood toward the heart. This clot can subsequently pass through the heart and obstruct the pulmonary artery – main artery of the lungs responsible for carrying oxygen-rich blood to the rest of the body - resulting in major heart and [lung](#) dysfunction and sometimes death.

Ten percent of patients who develop pulmonary embolism will die within one hour of the onset of symptoms. For patients who survive a PE event, 50 percent suffer strain to the right ventricle of the heart and 5 percent eventually develop chronic pulmonary hypertension.

Patients who develop DVT may suffer damage to the valves in the veins of their legs which can cause venous reflux and post-thrombotic syndrome, a condition where blood pools in the lower extremities causing chronic swelling, tenderness and painful ulcers.

Statistics: In 2008, members of the American Society for Plastic

Surgeons performed 1.7 million cosmetic/plastic surgical procedures and 4.9 million reconstructive procedures.

VTE occurs with particularly high frequency after post-bariatric body contouring surgery, including circumferential abdominoplasty (7.7 percent), abdominoplasty (5 percent), and breast or upper body contouring (2.9 percent) and certain types of breast reconstruction (2.2 percent) procedures.

More information: Validation of the Caprini Risk Assessment Model in Plastic and Reconstructive Surgery Patients: Journal of the American College of Surgeons - 18 November 2010.

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