# Post-surgical bleeding associated with more deaths when compared to blood clots after surgery

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Post-surgical bleeding is associated with more deaths than blood clots from surgery, according to a Vanderbilt University Medical Center study published in the journal *Anesthesia & Analgesia*.

Researchers used nearly 15 years of data on millions of patients from the American College of Surgeons' National Surgical Quality Improvement Program database, and some very advanced computer techniques, to do a direct comparison of bleeding versus clotting after surgery for patients in the U.S.

"We wanted to do a head-to-head comparison of those two in a large surgical population and look at the tradeoff in terms of mortality. We found, in every single year, a consistent signal for bleeding," said senior author Robert Freundlich, MD, assistant professor of Anesthesiology and Biomedical Informatics at Vanderbilt University Medical Center.

"Bleeding had very, very high attributable mortality, meaning death that you could say statistically was related to the occurrence of bleeding. Whereas, in every single year, we didn't see that same signal for blood clots," he said.

The America College of Surgeons tracks bleeding for the first 72 hours after surgery in their database whereas blood clots are tracked for up to 30 days after surgery. Most bleeding related to the surgery itself is

generally early, in the first three days, whereas blood clots, even if they are related to the surgery itself, can takes weeks or up to a month to occur.

"Clinically we often think of bleeding and blood clots as competing interests so a lot of the things that we do to decrease bleeding can increase the risk of blood clots," Freundlich said. "And, conversely, a lot of the things that we do to treat blood clots can increase the risk of bleeding.

Adjustments were made for patients' baseline risk of dying after surgery, what procedure they were having, and for other complications which may have happened after surgery.

Freundlich and first author Melissa Bellomy, MD, clinical fellow, Division of Cardiothoracic Anesthesiology, noted that clotting has been studied very intensely in recent years, with a number of large national groups putting out recommendations for how best to treat and prevent blood clots after surgery.

"I think people are doing a really good job of addressing blood clots after surgery, making sure that even when blood clots do happen they aren't bad enough to lead to a patient dying," Freundlich said. "And I would like to think that current medical therapy is probably working well, which is what we see in the database. Really just very, very undetectable mortality."

But bleeding remains a very concerning complication after surgery, based on the what he and colleagues found in the database.

"The mortality attributable to bleeding in the time period around surgery was significantly higher than from blood clots in every year that we studied," Bellomy said. "This raises the important questions of why

bleeding is associated with more death and how can we best treat patients to prevent death associated with bleeding."

Treatments depend on the source of the bleeding but can include going back and re-exploring or revising the initial surgery, giving blood products to help prevent bleeding, and pharmacologic therapies used to try to prevent bleeding after surgery.

"What is most important is having a team of expert providers who know when they need to be very aggressive in treating these post-operative complications, particularly with bleeding," Freundlich said.

**More information:** Melissa L. Bellomy et al, The Attributable Mortality of Postoperative Bleeding Exceeds the Attributable Mortality of Postoperative Venous Thromboembolism, *Anesthesia & Analgesia* (2020). DOI: 10.1213/ANE.0000000000004989

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