

Higher blood clot risk in longer surgeries

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The longer the duration of surgery, the higher the risk of a life-threatening blood clot, according to the first large-scale, quantitative national study of the risk across all surgical procedures.

The Northwestern Medicine study was published Dec. 3 in *JAMA Surgery*.

The finding will help guide surgical decision-making by enabling surgeons and patients to better understand the potential risk of procedures. These findings may also spur surgeons to take more aggressive preventative measures such as giving a patient blood thinner to reduce the risk of clots and limiting longer surgeries by splitting up procedures.

The association between longer surgical procedures and blood clots, or [venous thromboembolism](#), has been widely accepted but it is largely based on anecdotal evidence and had not been rigorously quantified.

More than 500,000 hospitalizations and 100,000 deaths are associated each year with blood clots.

"Minute by minute, hour by hour, the trend is much more pervasive and consistent than any of us believed it could be," said senior study author Dr. John Kim, associate professor of surgery at Northwestern University Feinberg School of Medicine and a surgeon at Northwestern Memorial Hospital. "It was true across all procedures, specialties and hospitals."

Blood clots in surgery are a risk for the same reason they are on long plane rides. "If you're not moving, your blood flow slows down, and your blood cells are more prone to clumping and forming a clot," said Nima Khavanin, a study co-author and Feinberg student. "This can cause a fatal pulmonary embolism."

Kim and colleagues analyzed data from the American College of Surgeons National Surgical Quality Improvement Program to look at the association between surgical duration and the incidence of clots. The study included more than 1.4 million patients who had surgery under general anesthesia at 315 U.S. hospitals from 2005 to 2011.

In the most common surgeries—including gall bladder removal, appendix removal and gastric bypass for weight loss—every additional hour of surgery duration resulted in an 18 to 26 percent increase of developing a clot, the study found.

Patients that underwent the longest surgeries had a 50 percent increase in the odds of developing a blood clot compared to the shortest, regardless of the surgical procedure.

The overall impact is greatest in longer, more invasive operations such as heart surgery, but the relationship between operative time and blood clots exists regardless of the procedure or surgical specialty and even applies to shorter procedures such as laparoscopic [gall bladder](#) or appendix removal.

The findings may affect how surgeons plan procedures.

"There may be times when we have the option of cobbling together a couple of surgeries," Kim said. "If you know longer surgeries have a higher risk, depending on the variables, splitting up those surgeries may be the best option."

Venous thromboembolism is designated by the U.S. Department of Health and Human Services as a "never event," because it is considered an unacceptable outcome of surgery.

- Surgeons can take preventive measures, limit longer surgeries
- Study included more than 1.4 million patients
- Patients undergoing longer procedures had 50 percent increase in risk of [blood](#) clots
- More than 500,000 hospitalizations and 100,000 deaths a year associated with [blood clots](#)

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