Existing chest scans offer new opportunities for predicting surgical risks

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Instead of special heart scans, physicians can use images of the chest

captured months earlier for other reasons to estimate patients' risk of heart attack or death during several kinds of major surgeries, a new study shows.

Researchers at NYU Grossman School of Medicine analyzed existing computed tomography (CT) scans to estimate levels of hardened (calcified) fatty plaque deposits in the heart's three largest blood vessels. They found that patients with greater buildup of this plaque had higher chances of developing serious health issues following surgery.

Major surgeries, which usually involve vital organs, are known to put patients at risk for heart attack, stroke, and death. To determine the risk of such events, physicians frequently recommend additional cardiac tests, which can delay surgery and increase healthcare costs.

The study authors realized, however, that many patients already have chest images from prior screenings for lung conditions like pneumonia and lung cancer. As a result, the team explored whether physicians who had no formal training in imaging could identify coronary calcium well enough on these preexisting tests to make accurate predictions and skip the additional CT scans.

"Our findings show that imaging already on hand can help physicians make practical decisions about surgical risks, even though such tests may not be as precise as those designed for this purpose," said lead author Daniel Choi, MD, a cardiology fellow at NYU Langone Health. Choi adds that averting additional CT scans could reduce radiation exposure, as well as save time and money.

A report on the research is being presented at the annual conference of the American College of Cardiology (ACC) on March 5.

For their study, the researchers first accessed data from the electronic

health record of 2,650 men and women age 45 and older who had undergone surgery unrelated to the heart between January 2016 and September 2020 at NYU Langone hospitals. The information included the type of procedure and instances of death and heart attack, among other factors. All of the patients whose records were used also had undergone a general CT scan of their chests no more than a year before their surgical operations. Those with death or heart attack during the hospitalization for surgery were then identified.

Next, four members of the team who had no formal training in CT interpretation completed a 90-minute training session in which they learned to estimate coronary calcium severity from the imaging. In the scoring system used in the study, plaque buildup in each of the heart's three major coronary arteries was rated on a three-point scale ranging from "absent" to "severe." The scores were then combined to a final grade ranging from 0 to 9.

According to the results, patients with scores from 0 to 2 had a 4% or lower risk of major adverse cardiac events (MACE); those with scores from 3 to 5 had an 8% risk; and those with scores from 6 to 9 had an 13% risk. In addition, the calcium estimates were consistent among the physicians, suggesting that the rating system was reliable, the researchers say.

"Our coronary calcium assessment is easy to use and requires minimal training, and so offers a cost-effective tool that can be implemented in any medical practice," said study co-senior author and cardiologist Robert Donnino, MD. Donnino is an assistant professor in the Departments of Medicine and Radiology at NYU Langone.

"While evaluating cardiac risks before surgery is helpful, it will be important to find new strategies to prevent adverse events after the procedure and improve survival," added study co-senior author and

cardiologist Nathaniel Smilowitz, MD. "Future studies might explore ways to reduce heart attacks without causing additional bleeding at the surgical site, perhaps by studying therapies that reduce inflammation during surgery," said Smilowitz, an assistant professor in the Department of Medicine at NYU Langone.

More information: Conference: www.expo.acc.org/ACC23/Public/Enter.aspx

Provided by NYU Langone Health