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Having heart surgery? Watch your blood sugar, especially if you're overweight or older

People with no history of diabetes may have sustained high glucose levels even after surgery, and need treatment

ANN ARBOR, Mich. · Nearly half of all heart surgery patients may experience blood sugar levels high enough to require temporary insulin treatment after their operation, even though they've never had diabetes, according to a new study from the University of Michigan Health System.

And a significant minority of those patients might need to take medicines for days or even weeks after they leave the hospital, to help their blood sugar levels reach normal again, the researchers show. Obese patients, older patients, and those whose blood sugar levels were still high two days after their operation are most likely to need this kind of treatment, they find.

Although the study didn't look at whether such patients later developed true diabetes or pre-diabetes, the results are striking enough to warrant a new U-M research project. It will recruit patients before their operations, and will include longer follow-up and more rigorous testing of pre-surgery and post-hospitalization blood sugar levels.

On Sunday at the American Diabetes Association's Scientific Sessions in San Francisco, a U-M team presented their findings in a poster that included retrospective data from 1,362 patients who had certain heart and vascular operations at U-M in 2006 and 2007.

Of them, 662 developed "stress induced hyperglycemia", or high blood sugar after surgery, and 87 needed blood sugar medicines when they left the hospital.

The study was possible because UMHS has a dedicated team of physicians, physician assistants and nurse practitioners called the Hospital Intensive Insulin Program who look for and treat elevated blood sugar in all heart and vascular surgery patients. Led by U-M endocrinologist Roma Gianchandani, M.D., the team gives insulin and oral medicines during these patients'

hospital stays, and prescribes medicines for the patients to take at home. They also recommend that such patients receive further blood-sugar testing from their primary care doctors.

But high blood sugar in non-diabetic patients after surgery hasn't been fully studied, says Sima Saberi, M.D., the U-M endocrinology fellow who presented at the ADA meeting.

Stress-induced hyperglycemia occurs when the body reacts to the double insults of having an operation on the heart or major blood vessels, and of being cooled down by the heart-bypass machine to protect the heart muscle during surgery.

Heart and vascular surgeons already know that high blood sugar during surgery itself is associated with worse recovery and a higher risk of infection and death. So, most heart and blood vessel surgery patients currently have their blood sugars monitored while they're in the operating room, and many patients receive doses of insulin while the operation is going on.

The new study looked at what happened after surgery, and what factors predicted a need for blood sugar treatment. By far, the most telling sign that a person was likely to need such treatment -- both in the hospital and as they went home -- was their average blood sugar two days after surgery.

Those patients whose glucose levels were still high at this point were more than two and a half times more likely to need post-hospital medicines, even after other factors were considered.

Patients who had a body mass index (BMI) over 35, which is consistent with a diagnosis of obesity, were also somewhat more likely to develop SIH, as were older patients. But these factors were not nearly as strongly predictive of SIH as was the glucose level on the second day after surgery.

Still, Saberi says, overweight patients who carry their excess weight mainly around their waists, in the form of belly fat, are more likely to have metabolic syndrome, which involves both increased cardiovascular risk and increased risk of diabetes.

The patients in the study had either a coronary artery bypass operation, a heart valve operation, or an operation on the upper part of their aorta, the major blood vessel that leads out of the heart to the rest of the body.

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The new project, to be led by Gianchandani and Rodica Pop-Busui MD PhD, a co-author of this study, is being proposed to start later this year at U-M.

This study will recruit hundreds of patients who are planning to have these operations and who agree to take oral glucose tolerance tests three months after their operation to measure how well their bodies recover from a blood sugar "challenge." The volunteers will also allow the researchers to monitor their blood sugars during and after surgery, and record other data about them.

The new study's authors are Roma Gianchandani MD, Rodica Pop-Busui, M.D.PhD, Sima Saberi MD, and Mary Fisher. Both Gianchandani and Pop-Busui are assistant professors in the Division of Metabolism, Endocrinology & Diabetes, part of the Department of Internal Medicine at the U-M Medical School.

More information on the UMHS Hospital Intensive Insulin Program is available at:

www.med.umich.edu/intmed/endocrinology/staff/HIIP.htm
