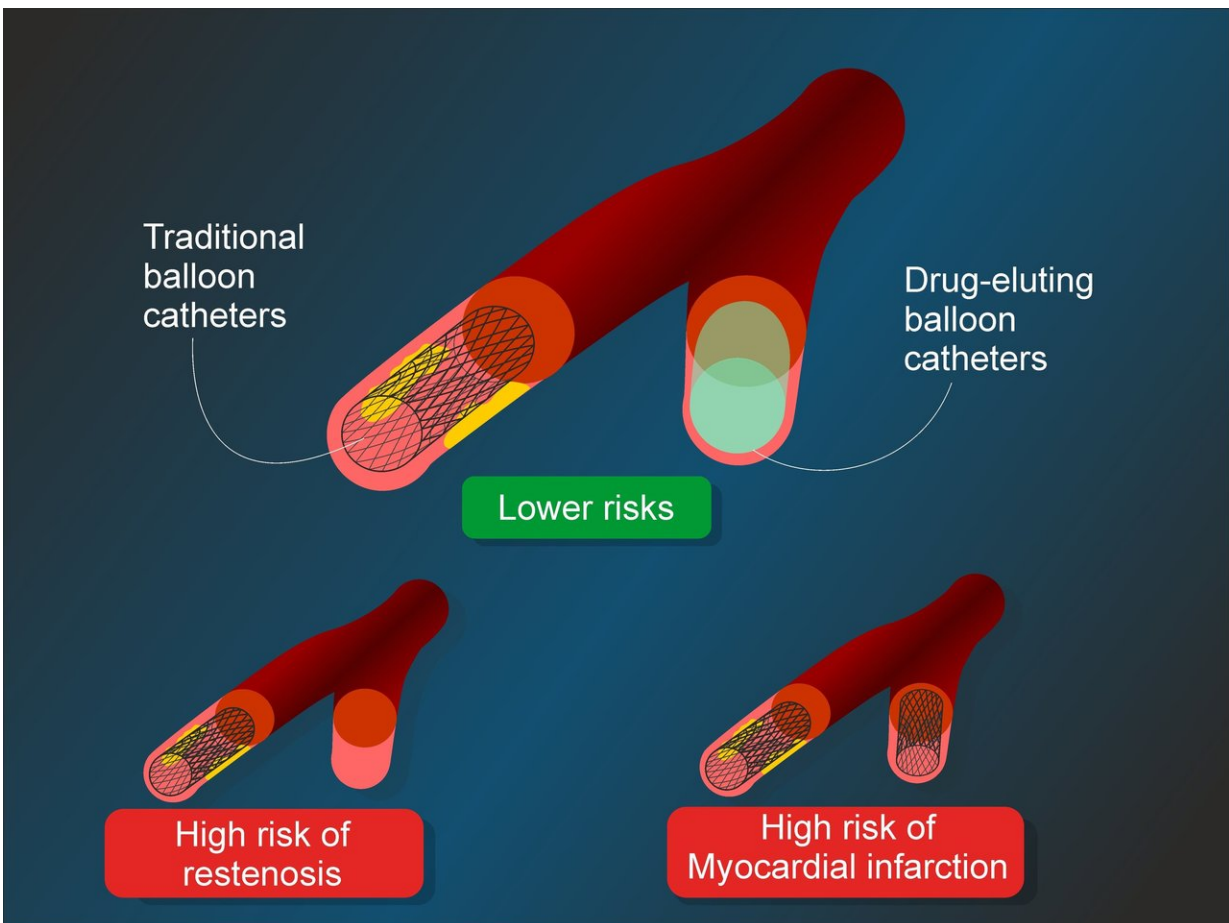


Medics suggest modifications to coronary artery stenting

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An alternative surgical technique combines the advantages of currently existing methods and has fewer disadvantages. Credit: Natalia Deryugina

Bifurcation lesions are a challenge, even for an experienced cardiac surgeon. Currently, there are two surgical techniques for dealing with them, but no medical consensus on which one applies to which case. Russian scientists have now successfully tested a new surgical technique involving stents and drug-eluting balloon catheters on 128 patients.

"We decided to study a new method using a drug-eluting [balloon catheter](#) with a cytostatic agent that prevents cellular growth and may improve the results of the treatment. It is the first time this method is used in patients with true left main bifurcation lesions," said a co-author of the study Daniil Maximkin, candidate of medical sciences, and assistant professor of the department of hospital surgery with a course of pediatric surgery and the department of cardiovascular surgery at the Faculty of Additional Training for Medical Personnel, Institute of Medicine, RUDN.

Coronary artery disease is one of the most common heart conditions associated with blood supply of the heart. The heart is supplied by special blood vessels called coronary arteries. They bifurcate asymmetrically, causing complex vortex currents to form in the blood flow. These turbulent currents put additional friction on internal blood vessel walls, irritating them mechanically. This is why the internal walls of coronary arteries are prone to inflammations which may lead to the formation of atherosclerotic plaques. Plaques cause luminal occlusion, and as a result a patient suffers from ischemia.

RUDN surgeons pointed out that 20 to 30 percent of patients with CAD have damage at bifurcation points of coronary [arteries](#). "Despite the growing number of [surgical techniques](#) addressing this type of damage, none of them is perfect," explains Daniil Maximkin. "To a great extent, everything depends on the anatomy of bifurcation itself. The angle between the vessel and its ramus, the presence of calcinosis (deposits of calcium salts), and the duration of the condition all play important roles.

Therefore, each case requires an individual approach."

For the vessel not to constrict too much, cardiac surgeons use a stent—a thin and flexible wire tube that unfolds in a vessel and expands its diameter. A stent is delivered to an artery in a folded-up form via a catheter tube in a patient's hip or arm. After that surgeons unfold the stent using a special [balloon](#) that expands the stent until it reaches the required diameter. Then the balloon is removed, and the stent remains in the blood vessel. If arterial plaques clog the lumina of the left [coronary artery](#), the surgeons can stent only the left main (in this case the stent is unfolded using two balloons by means of the so-called "kissing balloons" technique) or put in two [stents](#)—into the main and its ramus. Both options have disadvantages: double stenting is associated with high risk of complications (including heart attack) in the long term, and in the case of one stent method the plaque may grow back.

Following the new procedure, RUDN cardiac surgeons used only one stent for the left main coronary artery, and a balloon without a stent was unfolded in the ramus to protect it from recurring formation of plaques. The balloon released a cytostatic agent (a medicinal drug preventing cell growth) to block inflammatory processes and plaque growth. This technique was compared with the single-stent method in clinical trials, and the patients that underwent the new surgical procedure showed lower rates of repeated luminal occlusion.

"The results after the use of a drug-eluting balloon catheter were much better than after the single-stent method with regular balloon catheters. Namely, there were less complications in the long term, and the state of the lumina was better. This is virtually an alternative to the double-stent technique," summarized Daniil Maximkin. The scientists plan to monitor long-term consequences of surgeries and collect data to understand whether this method can be implemented into common surgical practice.

More information: Daniil Maximkin et al, TCT-290 Drug-Eluting Balloon Catheters in the Endovascular Treatment of Patients with True Left Main Bifurcation Lesions, *Journal of the American College of Cardiology* (2018). [DOI: 10.1016/j.jacc.2018.08.1427](https://doi.org/10.1016/j.jacc.2018.08.1427)

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