

Remote ischemic preconditioning fails to improve heart bypass outcomes

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Patients who underwent a simple conditioning procedure involving the inflation and deflation of a blood pressure cuff on the upper arm before coronary artery bypass grafting, known as heart bypass surgery, had no better long-term health outcomes than bypass patients who did not receive the conditioning, according to research presented at the American College of Cardiology's 64th Annual Scientific Session in San Diego.

The study, the first large randomized controlled trial to investigate the effectiveness of remote ischemic preconditioning on long-term [clinical outcomes](#) in bypass [patients](#), revealed no significant improvements in the study's primary endpoint, a composite of cardiovascular death, non-fatal heart attack, stroke or the need for subsequent surgery or angioplasty to clear blocked arteries, after one year.

"Remote ischemic preconditioning is a simple, non-invasive, low-cost intervention that has no obvious downsides," said Derek Hausenloy, M.D., Ph.D., professor in cardiovascular medicine at University College London and at Duke-National University of Singapore, and the study's lead author. "But although it has been shown to help reduce injury to the heart during surgery and in other medical contexts, unfortunately it showed no benefit on long-term clinical outcomes in our study of patients undergoing [cardiac bypass surgery](#)."

Current guidelines recommend heart bypass for patients with substantial narrowing of two or more arteries due to extensive plaque buildup, a condition known as multivessel coronary artery disease. It is one of the most common heart surgeries, with more than 500,000 performed in the U.S. each year.

Remote ischemic preconditioning is performed by placing a blood pressure cuff on the upper arm and alternately inflating and deflating it to restrict and restore blood flow before a medical procedure.

Past studies have suggested it can help protect the heart and other organs against acute ischemia/reperfusion injury, a type of tissue damage that can occur when blood is returned to a tissue that had been temporarily deprived of oxygen.

The researchers designed the study, called Effect of Remote Ischemic Preconditioning on Clinical Outcomes in Coronary Artery Bypass Grafting Surgery (ERICCA), in an effort to find new ways to improve bypass outcomes for high-risk patients. "With the aging population, increasing prevalence of co-morbidities and a growing need for concomitant valve surgery, heart bypass is being performed in an increasingly high-risk patient population. As such, novel therapeutic interventions are needed to protect the heart from injury and improve clinical outcomes in this patient group," Hausenloy said.

The study included more than 1,600 patients undergoing [heart bypass surgery](#) in 29 hospitals in the United Kingdom. Half of the patients were randomly selected to receive four five-minute inflations and deflations of the blood pressure cuff while the other half received a simulated version of the procedure. The procedure was performed after anesthesia was administered but before the first surgical incision was made.

After one year, cardiovascular death, non-fatal heart attack, stroke, or the need for subsequent surgery or angioplasty to clear blocked arteries occurred in 26.6 percent of the group receiving remote ischemic preconditioning and 27.7 percent of the control group, a difference with no statistical significance.

However, the study did reveal a statistically significant 15 percent reduction in heart injury occurring within the first 72 hours after surgery in the remote ischemic preconditioning group as compared to the control.

"This finding suggests remote ischemic preconditioning protected the heart muscle against injury during [bypass surgery](#), though unfortunately this effect was not associated with improved long-term clinical outcomes," Hausenloy said. "This may be due in part to the degree of injury being relatively low in the setting of [heart bypass](#), which may of course be different in patients with an acute heart attack where the levels of injury to the [heart](#) muscle are more substantial."

As a result, Hausenloy said the results suggest the procedure may still be beneficial in other medical settings of acute ischemia/reperfusion injury, such as when treating [heart attack](#) patients or in organ transplantation.

No differences were shown in the other secondary endpoints, which included the incidence of acute kidney injury, incidence of post-operative atrial fibrillation, quality of life and duration of stay in the intensive therapy unit and in the hospital.

The study's primary limitation is that the sample was not large enough to detect differences in the components of the primary endpoint, only a composite of these outcomes.

Provided by American College of Cardiology

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