

Similar recovery seen for patients receiving minimally invasive and conventional surgery for mitral valve repair

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In the largest randomized trial conducted to compare minimally invasive and conventional cardiac surgical techniques for repairing a poorly

functioning mitral valve, improvements in physical activity, as well as surgical outcomes and quality of life, were similar in both groups of patients at 12 weeks post-surgery. The research was presented at the American College of Cardiology's Annual Scientific Session Together With the World Congress of Cardiology.

"Speed of recovery of physical function and ability to return to normal activities after surgery is important to patients," said Enoch Akowuah, MD, of Newcastle University in Newcastle, England, and lead author of the study. "Our results show that at three months, physical recovery is equivalent in both groups of patients. In addition, we show that when both surgical procedures are performed by expert surgeons, minimally invasive [mitral valve](#) surgery is as safe and effective as conventional surgery."

Patients in the study had severe degenerative [mitral valve regurgitation](#). The mitral valve separates the two chambers on the left side of the heart, the left atrium and the left ventricle, and its job is to allow blood to flow from the left atrium to the left ventricle and prevent it from flowing back the other way. Mitral valve regurgitation occurs when the valve doesn't close completely, permitting blood to flow back into the left atrium. Severe mitral regurgitation causes the affected heart chambers to enlarge; can cause symptoms such as [chest pain](#), dizziness, fatigue and shortness of breath; and can lead to serious complications such as blood clots, heart failure, stroke and high blood pressure in the lungs.

Conventional surgery to repair the mitral valve, via a sternotomy, involves opening the chest completely from the collarbone to the bottom of the breastbone. Recovery from conventional surgery generally takes about three months, Akowuah said. By contrast, the minimally invasive surgical procedure, known as a mini-thoracotomy, involves making an incision about two inches long in the chest to gain access to the heart and then using a camera and special instruments to repair the valve. This

procedure is more complex and time consuming to perform, Akowuah said, and [early studies](#) suggested it might lead to higher rates of complications, including stroke. Until now, the two [surgical techniques](#) had never been directly compared in a large, randomized trial.

In the trial, 330 patients (average age 67, 30% women) treated at 10 centers in the U.K. were randomly assigned to undergo [mitral valve repair](#) by either sternotomy or mini-thoracotomy. Expertise-based randomization was a key feature of the trial design, Akowuah said—a decision that was based on patient feedback that the researchers sought before designing the trial.

When patients were asked what factors would influence their choice of surgical approach, they were clear that they would prefer to avoid a sternotomy if possible, but they also wanted reassurance that the minimally invasive surgical procedure would be as complete, as expertly done and as safe as the conventional open-chest approach.

"There's a learning curve to performing mitral valve surgery, and expertise is important," Akowuah said. "We used expertise-based randomization to remove the impact of the learning curve and assure patients that, regardless of which study arm they were assigned to, they would receive a high-quality procedure performed by an expert."

Surgeons participating in the trial performed only one type of operation (i.e., either sternotomy or mini-thoracotomy) and were required to have performed that operation at least 50 times before the trial.

The study's primary endpoint was the change in patients' physical functioning and ability to return to usual activities at 12 weeks after the operation. Changes were assessed via periodic questionnaires and with a Fitbit-like device (called an accelerometer) that patients wore on their wrists. Secondary endpoints included patient deaths at one year; surgical

outcomes such as hospitalization for heart failure and the need for repeat mitral valve surgery; echocardiogram findings, including mitral valve leakage; adverse events, including stroke; length of hospital stay; and patient quality of life.

At 12 weeks, recovery of physical function levels compared to pre-surgery levels was similar in both groups. However, at six weeks, patients in the mini-thoracotomy group had recovered physical function compared to pre-surgery levels whereas patients in the sternotomy group had not. Devices patients wore on their wrists to measure [physical activity](#) and sleep showed that at six weeks mini-thoracotomy patients were spending more time doing moderate to vigorous physical activity such as walking, running and cycling. Sleep efficiency was also higher in the mini-thoracotomy group.

At one year, secondary outcomes including rates of death, hospitalization for [heart failure](#), repeat mitral valve surgery, adverse events (including stroke) and quality of life were not significantly different in the two groups. One mini-thoracotomy patient needed a second operation due to bleeding, compared with four sternotomy patients. Mini-thoracotomy patients were in the hospital for a median of five days (compared with a median of six days for sternotomy patients) and were twice as likely to be discharged home within four days of surgery.

"The study has also answered two key questions about the mini-thoracotomy approach—the valve repair rate and the quality and durability of valve repair performed using this approach," Akowuah said. "Valve repair rates were excellent [at 96%] and similar to those obtained with sternotomy. Moreover, at one year after surgery more than 92% of patients in both groups had no or mild valve leakage."

Uptake of the mini-thoracotomy technique has been slow worldwide because of a lack of evidence that it was as safe and effective as

sternotomy, Akowuah said.

"[Guidelines for the treatment of valve disease](#) now recommend that patients with a severely leaking mitral valve but no symptoms can also be offered surgery," he said. "Because these patients are often younger and still working, the benefits of a shorter hospital stay and increased physical activity at six weeks may be important factors for them. We hope that the results of this trial will give confidence to both clinicians and patients and drive uptake of the mini approach."

Follow-up of patients enrolled in the trial will continue for five years. The study had several limitations. Blinding wasn't possible because it was comparing two surgical procedures, meaning that both patients and surgeons knew which procedure was assigned. However, assessment of patients' physical activity levels, symptomatic improvement and valve function by echocardiography was performed by independent researchers who didn't know each patient's treatment assignment. The findings may also not apply to patients treated by surgeons or at centers with less experience performing mitral [valve](#) repair procedures.

More information: Conference:

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