Minimally Invasive Mitral Valve Surgery
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Current guidelines recommend early surgical intervention to treat mitral valve disease. Early intervention is key for patients with severe mitral regurgitation or insufficiency even if they are currently asymptomatic.

Mitral valve insufficiency allows blood to flow backwards into the left atrium, forcing the heart to work harder to push blood out into the body. Pressure increases in the left atrium and the left ventricle. Over time, in chronic mitral valve insufficiency, the heart expands detrimentally as a response to the increased blood volume. Early intervention is necessary to prevent these harmful physical changes to the heart.

For decades, the standard approach to mitral valve repair has been a median sternotomy. But patients increasingly seek minimally invasive approaches.

A minimally invasive approach provides many benefits. The smaller incision means less pain and faster recovery. Transfusion rates, incidence of post-operative atrial fibrillation and infection are also lower.

A successful intraoperative repair using minimally invasive approaches is effective and immediate. It is also highly durable: Patients will likely not need subsequent surgeries. Robotic surgical techniques, which Stanford surgeons helped develop, can also be used with the minimally invasive approach.

Stanford Health Care offers, superior options in cardiac surgery, including the latest techniques and research for minimally invasive cardiac surgery. Advanced research and operative techniques give our patients a repair of their native valve with the use of their own natural heart tissue.

Normal Mitral Valve Anatomy
The small, right-sided incision in a minimally invasive procedure provides a more useful and direct view of the mitral valve. Because the mitral valve lies anatomically in an annular plane that nearly approximates the sagittal plane of the body, this right lateral approach provides an en face view of the valve that surpasses that available in a median sternotomy.

**Patient’s Experience With Minimally Invasive Mitral Valve Surgery**

Throughout a patient’s surgical procedure and hospital stay, our multidisciplinary cardiac surgery team provides highly skilled care rooted in our experience in minimally invasive surgery. Before surgery, patients are evaluated with standard echocardiogram and coronary catheterization.

During minimally invasive surgery, all mitral valve repairs or replacements are done under direct vision. With this clear view, the surgeon can access the entire surgical field and confirm that the repair has been successful before concluding the surgery. If needed, advanced techniques of leaflet repair and annuloplasty can also be accomplished within the small incision.

Not all patients are good candidates for minimally invasive mitral valve surgery, however. Eligibility factors include disease process, height, weight and physique.

**Patients generally have hospital stays of 5-6 days.**  
**On average, they return to normal activity in 2-3 weeks.**

Because our cardiac surgical team is equally skilled in sternotomies, patients can trust in the quality of care of whichever procedure they ultimately need.

**Candidates for Minimally Invasive Mitral Valve Surgery**

A broad range of patients are eligible for minimally invasive surgery, including:

- patients with mitral valve disease, mitral regurgitation or mitral stenosis, including those who require advanced-technique repair or replacement
- patients with atrial fibrillation, requiring a maze procedure
- patients in need of atrial sepal defect (ASD) or patent foramen ovale (PFO) repair or with tricuspid valve disease
Minimally Invasive Incision
Small 4cm mini right thoracotomy incision instead of the larger median sternotomy

Potential Benefits of Minimally Invasive Mitral Valve Surgery
- Avoids full sternotomy
- Eliminates risk of sternal wound complication
- Small, right-sided, 4-5 cm mini-thoracotomy incision
- Reduced transfusion rate and reduced post-operative bleeding
- Minimal scarring, especially for women whose scars can be hidden in the inframammary crease
- Facilitates a more effective immediate repair
- Shorter ventilation time
- Lower incidence of post-operative atrial fibrillation
- Shorter ICU stay
- Shorter hospital stay
- Lower risk of complications
- Reduction in post-operative pain
- Faster return to active life
- Long-term durability of mitral valve repair and freedom from re-operation
- Concomitant procedures are possible

Procedure Details
- Standard arterial and internal jugular vein lines
- Single-lung ventilation with double lumen endotracheal tube
- Right internal jugular venous cannula inserted for drainage of the superior vena cava (removed at completion of surgery, leaving a .5mm incision)
- Access to mitral valve via a 4-5 cm right-sided mini thoracotomy on the inframammary groove between the 3rd or 4th intercostal space, depending upon the patient’s size
- Femoral arterial and venous cannulation (removed at completion of surgery, leaving a 2-3 cm incision)
- Three or four 0.5 cm incisions for ports to position minimally invasive surgical instruments
- Post-operative TEE valve repair confirmation

Minimally Invasive Surgery Set-Up
Small, 4cm, mini right thoracotomy approach, port access, instruments & 2cm groin cannulation

Minimally Invasive Surgery Incision
Close up of 4cm, mini right thoracotomy incision, with retractor in place

Left: operative view of the mitral valve in a minimally invasive approach, with ring repair sutures in place. Right: operative view of the mitral valve in a minimally invasive approach, with ring in place, surpasses that of a standard sternotomy.