

Your doctor is one of a growing number of surgeons worldwide offering *da Vinci*® Surgery.

For more information and to find a *da Vinci* Surgeon near you, visit: www.daVinciSurgery.com

The clinical evaluation of the *da Vinci* Surgical Systems (Models S1200, IS2000, IS3000) supporting its use for mitral valve repair was not performed totally endoscopically. Introduction and manipulation of the endoscopic instruments were controlled by the *da Vinci* Surgical Systems through port incisions (< 1 cm) while accessory technologies, e.g., atrial retractor and cardioplegia line, etc, were introduced through a mini-thoracotomy. Performance characteristics for conduct of totally endoscopic mitral valve repair using the *da Vinci* Systems have not been established.

¹ American Heart Association. Mitral Valve Disease. Available from: <http://circ.ahajournals.org/content/109/6/e38.long>. ² National Institutes of Health. Mitral Valve Prolapse. Available from: <http://www.nlm.nih.gov/medlineplus/ency/article/000180.htm>. ³ Woo YJ, Nacke EA. Robotic minimally invasive mitral valve reconstruction yields less blood product transfusion and shorter length of stay. *Surgery* 2006;140 (2):263-67. ⁴ Kam JK, Cooray SD, Kam JK, Smith JA, Almeida AA. A cost-analysis study of robotic versus conventional mitral valve repair. *Heart Lung Circ*. 2010 Jul;19(7):413-8. Epub 2010 Mar 30. ⁵ Folliguet T, Vanhuyse F, Constantino X, Realli M, Laborde F. Mitral valve repair robotic versus sternotomy. *Eur J Cardiothorac Surg*. 2006 Mar;29(3):362-6. Epub 2006 Jan 19. ⁶ Mihaljevic T, Jarrett CM, Gillinov AM, Williams SJ, DeVilliers PA, Stewart WJ, Svensson LG, Sabik JF 3rd, Blackstone EH. Robotic repair of posterior mitral valve prolapse versus conventional approaches: potential realized. *J Thorac Cardiovasc Surg*. 2011 Jan;141(1):72-80.e1-4. Epub 2010 Nov 19. ⁷ Felger JE, Chitwood WR Jr, Nifong LW, Holbert D. Evolution of mitral valve surgery: toward a totally endoscopic approach. *Ann Thorac Surg*. 2001 Oct;72(4):1203-8; discussion 1208-9. ⁸ Suri RM, Antiel RM, Burkhart HM, Huebner M, Li Z, Eton DT, Topilsky T, Sarano ME, Schaff HV. Quality of life after early mitral valve repair using conventional and robotic approaches. *Ann Thorac Surg*. 2012 Mar;93(3):761-9. ⁹ National Institutes of Health. Mitral Valve Surgery. Available from: <http://www.nlm.nih.gov/medlineplus/ency/article/007411.htm>

The Enabling Technology: *da Vinci* Surgical System

The *da Vinci* Surgical System is designed to provide surgeons with enhanced capabilities, including high-definition 3D vision and a magnified view. Your doctor controls the *da Vinci* System, which translates his or her hand movements into smaller, more precise movements of tiny instruments inside your body.



Though it is often called a “robot,” *da Vinci* cannot act on its own. Surgery is performed entirely by your doctor. Together, *da Vinci* technology allows your doctor to perform complex procedures through just a few small openings, similar to thoracoscopic surgery. As a result, you may be able to get back to life without the usual recovery following major surgery.

The *da Vinci* System has been used successfully worldwide in approximately 1.5 million various surgical procedures to date.

Facing Mitral Valve Surgery?

Learn about minimally invasive *da Vinci*® Surgery

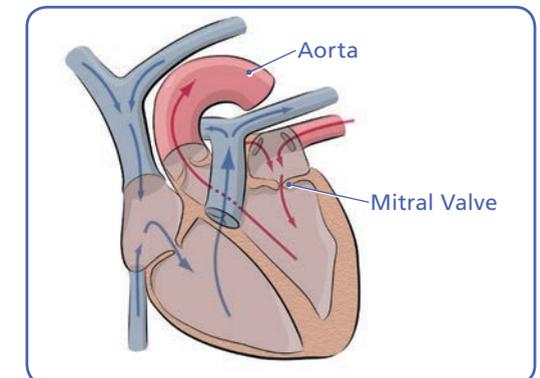


The Condition: Mitral Valve Prolapse

Your mitral valve separates the upper and lower chambers of the left side of your heart. Your mitral valve has two flaps that control blood flow. When the valve opens, it allows blood to flow into your heart's main pumping chamber. When this chamber contracts to push blood out of your heart, your mitral valve closes to stop blood from flowing backwards.

If your mitral valve flaps do not work properly, some blood flows backwards. This is called regurgitation or prolapse. It makes the heart work harder and can increase the risk of heart failure.

Mitral valve prolapse is a very common condition and occurs in women more often than men.¹ It can occur over time or your mitral valve can be abnormal at birth. Many people have no symptoms at all and treatment is never needed.² If you do have symptoms, they may include rapid heartbeat, chest pain, fatigue, difficulty breathing after activity, or shortness of breath.¹



The Heart: Arrows show direction of blood flow in and out of the heart.

da Vinci Surgery

The Surgery: Mitral Valve Surgery

Treatment and surgical options for mitral valve prolapse depend on how severe your symptoms are and your overall health. If your symptoms are mild, your doctor may suggest medication or lifestyle changes. If your symptoms become worse, your doctor may recommend mitral valve surgery. The goal of surgery is to allow your valve to open and close properly. There are two common types of mitral valve surgery: valve repair and valve replacement.

With valve replacement, your surgeon cuts out the damaged valve and replaces it with a new, artificial valve. The new valve may be mechanical (from man-made materials) or biological (from human or animal tissue). With valve repair, your surgeon rebuilds one or more of the valve flaps/leaflets using your own tissue.

Your doctor will fully explain the pros and cons of replacing your valve versus repairing your valve.



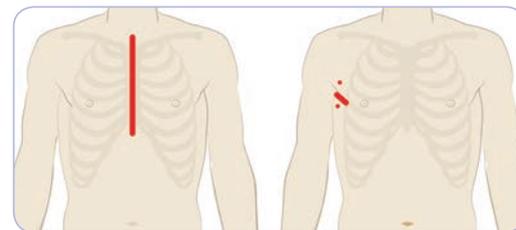
During mitral valve surgery, a heart-lung machine is used. This machine temporarily takes over the function of your heart and lungs during surgery. It provides surgeons with a still surface.

Whether repairing or replacing your valve, surgery may be performed using open surgery through a large incision or minimally invasive surgery through a few small incisions.

During open surgery, doctors make a large chest incision and cut through your breastbone (sternum) to reach your heart. The incision must be large enough for your surgeon to fit his or her hands and surgical instruments inside your chest. Open surgery allows your surgeon to see and touch your heart and tissues.

During minimally invasive surgery, specifically thoracoscopic surgery, doctors repair or replace your valve through one or more small incisions instead of a large incision. Long, thin surgical instruments and a tiny camera are inserted through the incisions to reach your heart. The camera sends images to a video monitor to guide surgeons as they operate.

Another minimally invasive option for patients facing valve surgery is *da Vinci* Surgery.



Open Surgery
Incision

da Vinci Mitral Valve
Repair Incisions

da Vinci Surgery: A Minimally Invasive Surgical Option

Using the *da Vinci* Surgical System, your surgeon makes a few small incisions between your ribs - similar to thoracoscopic (minimally invasive) surgery. The *da Vinci* System features a magnified 3D high-definition vision system and tiny wristed instruments that bend and rotate far greater than the human wrist. These features enable your doctor to operate with enhanced vision, precision, dexterity and control.

As a result of *da Vinci* technology, *da Vinci* Mitral Valve Repair Surgery offers the following potential benefits compared to open surgery:

- › Less blood loss and need for transfusions³
- › Less time in intensive care⁴
- › Shorter hospital stay^{3,4,5,6,7}
- › Lower rate of atrial fibrillation after surgery (rapid/irregular heartbeat)⁶
- › Lower rate of pleural effusions after surgery (excess fluid around the lung)⁶
- › Faster recovery and return to normal daily activities, including work⁸
- › Faster improvement of physical & mental health following surgery⁸
- › Small incisions for minimal scarring



Risks & Considerations Related to Mitral Valve Repair Surgery & *da Vinci* Surgery:

Potential risks of mitral valve repair surgery include:

- Heart attack or stroke
- Heart rhythm problems
- Infection in the kidneys, chest, valves or bladder
- Fever and chest pain (together called post-pericardiotomy syndrome)
- Memory loss and/or loss of mental clarity

In addition to the above risks, there are risks related to

minimally invasive surgery, including *da Vinci* Mitral Valve Repair Surgery, such as damage to nearby organ or nerves.⁹

Important Information for Patients:

All surgery presents risk, including *da Vinci* Surgery. Results, including cosmetic results, may vary. Serious complications may occur in any surgery, up to and including death. Examples of serious and life-threatening complications, which may require hospitalization, include injury to tissues or organs; bleeding; infection, and internal scarring that can cause long-lasting dysfunction or pain. Temporary pain or nerve injury has been linked to the inverted position often used during abdominal and pelvic surgery. Patients should understand that risks of surgery include potential for human error and potential for equipment failure. Risks specific to minimally invasive surgery may include: a longer operative time; the need to convert the procedure to other surgical techniques; the need for additional or larger incision sites; a longer operation or longer time under anesthesia than your surgeon originally predicts. Converting the procedure to open could mean a longer operative time, long time under anesthesia, and could lead to increased complications. Research suggests that there may be an increased risk of incision-site hernia with single-incision surgery. Patients who bleed easily, have abnormal blood clotting, are pregnant or morbidly obese are typically not candidates for minimally invasive surgery, including *da Vinci* Surgery. Other surgical approaches are available. Patients should review the risks associated with all surgical approaches. They should talk to their doctors about their surgical experience and to decide if *da Vinci* is right for them. For more complete information on surgical risks, safety and indications for use, please refer to <http://www.davincisurgery.com/safety>.

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