

Minimally Invasive Cardiac Surgery

We've made great strides in cardiology and cardiovascular surgery in the past 50 years. And some of the most exciting new advances have been in the field of cardiovascular surgery.

As in most industries, as technology advances, and techniques perfected, gadgetry and devices become smaller and lower profile.

The miniaturization of technology in cardiovascular surgery, known as *minimally invasive heart surgery*, is of particular importance because smaller equipment and less invasive techniques translates into smaller incisions, smaller scars, and in some cases, less pain and shorter hospitalization time.

Minimally Invasive Heart Surgery Defined:

Minimally invasive heart surgery is performed through a small incision, often using specialized surgical instruments. Incisions are typically 2 to 4 inches as opposed to the 6- to 8-inch incision used for traditional surgery known as a median sternotomy. Additional minimally invasive approaches include Keyhole or port-access techniques which are used in specific types of cardiac surgery.

Some of the Minimally Invasive Cardiac Surgical approaches include:

- 1. Heart Valve surgeries**, including valve repairs and valve replacements, are the most common minimally invasive heart surgery procedures. A small, 3- to 4-inch incision is made down the center of the sternum (breastbone). With traditional valve surgery an incision about 6 to 8 inches long and complete separation of the sternum is required.
- 2. Minimally invasive direct coronary artery bypass graft MID CABG** is an option for patients requiring a left internal mammary artery bypass graft to the left anterior descending artery. Here, a small, 2-3 inch incision is made in the chest wall between the ribs, unlike the incision made during traditional CABG surgery which is about 6 to 8 inches long and made down the center and coursing the entire length of the sternum (breastbone).
- 3. Keyhole or Port Access Cardiac Surgery** In some cases small incisions (5-10 mm) are made known as a "keyholes" or "ports" which allow passage of thin cylindrical video instruments known as a thoroscopes as well as low profile

surgical instruments. The thoracoscope allows the surgeon to perform video-assisted surgery through tiny holes placed between ribs.

Examples of minimally invasive cardiac procedures using *keyhole* or *port access* technique include:

- Select patients requiring re-operation for coronary bypass
- Select patients requiring re-operation for valve surgery
- Epicardial lead (electrical wire) for special pacemaker/ICD placement

4. Off-pump bypass surgery –Also known as beating heart surgery, allows surgeons to perform surgery on the heart while it is still beating. A medication may be given to slow the heart during surgery, but the heart keeps beating during the procedure. This type of surgery may be an option for patients with single-vessel disease (such as disease of the left anterior descending artery or right coronary artery).

Traditionally, CABG surgery is performed with the assistance of the heart-lung machine where the heart is stopped, so the surgeon can operate on a motionless heart. With the heart standing still, the heart-lung takes over as the pump and removes carbon dioxide from the blood and replacing it with oxygen.

Off pump or beating heart surgery does not require the heart lung machine. Instead, the surgeon uses equipment to stabilize (hold) portions of the beating heart while mending blocked arteries. Meanwhile, the rest of the heart keeps pumping and circulating blood to the body.

Benefits of minimally invasive heart surgery include:

- A smaller incision
- A smaller scar

Additional possible benefits of minimally invasive heart surgery include:

- Reduced risk of infection
- Less bleeding with minimally invasive heart surgery
- Less pain and trauma
- Decreased length of stay in hospital after the procedure: the average stay is 3 to 5 days after minimally invasive surgery, while the average stay after traditional heart surgery is 5 days

- Decreased recovery time: the average recovery time after minimally invasive heart surgery is 2 to 4 weeks, while the average recovery time after traditional heart surgery is 6 to 8 weeks

When is minimally invasive heart surgery appropriate and who is a candidate?

Whether or not you are a candidate for minimally invasive cardiac surgery depends on your specific cardiac anatomy, co-morbid conditions, and most importantly, whether the risks and benefits of a minimally invasive approach are superior to that of a traditional cardiac surgical approach.