



da Vinci[®] Coronary Revascularization Questions and Answers

Q: What is coronary artery bypass grafting (also known as “CABG,” coronary revascularization and cardiac revascularization)?

A: The coronary arteries are the blood vessels that branch from the base of the aorta and supply the heart with oxygen and nutrients. The heart relies on these fuels as it works constantly to pump blood through the body. The heart never rests like the other muscles in the body, and it demands a constant supply of fuel day and night.

Any disease that blocks the coronary arteries can cause serious, often fatal, complications. The term “ischemic heart disease” refers to when the heart does not get enough oxygen it needs because of blockages or obstructions in the coronary arteries. When the heart is sufficiently ischemic (when the shortage of oxygen is critical enough), the muscle begins to die. This is a “heart attack” or myocardial infarction.

Coronary artery bypass grafting or “CABG” (often pronounced “cabbage”) is the most commonly performed “open heart” operation in the United States. Cardiothoracic surgeons perform the procedure to bypass blockages or obstructions of the coronary arteries.

Q: What are the indications for surgery?

A: The indications for CABG were first defined by the results of the Coronary Artery Surgery Study or CASS. Cardiothoracic surgeons and cardiologists performed the study in the early days of bypass surgery. It showed a survival advantage for patients undergoing surgery who had disease of the left main coronary artery and those with disease of all three major coronary arteries as well as abnormal function of the main pumping chamber of the heart, the left ventricle. CABG may also be indicated in other specific circumstances, or when an individual patient is experiencing severe angina pectoris that cannot be controlled with medicines alone. The most important thing to keep in mind is that coronary artery disease is complex and every patient’s specific situation is different.

Q: How is the operation typically performed?

A: Coronary Artery Bypass Grafting is a procedure performed exclusively by cardiothoracic surgeons. The traditional technique involves an incision down the front of the chest through the breastbone or sternum. This incision is called a median sternotomy. Through this incision the surgeon can see the heart and aorta. The procedure as traditionally performed requires that the patient be connected to the heart lung machine while the bypasses are being performed. The heart can then be stopped using a special mixture of chemicals called cardioplegia. After the bypasses have been performed, the patient is taken off the machine, and his/her own heart takes over once again.

All bypasses were originally performed using saphenous vein from the leg to carry blood around the obstruction. The vein was attached at one end to the aorta and at the other end to the coronary artery beyond the blockage. The surgeon connects the vein to the aorta and to the coronary artery. In the 1970s and 1980s,

cardiothoracic surgeons discovered that an artery from the inside of the chest wall, the internal thoracic artery (also known as the internal mammary artery), could be used instead of the vein for the bypass grafts and that it stayed open longer than saphenous vein grafts. Today, most CABG operations are performed using a combination of bypass grafts, including this artery and some saphenous vein.

Q: How is CABG performed minimally invasively?

A: Newer techniques are being explored to improve the results and to minimize the discomfort patients feel during recovery from CABG. One technique aimed at improving outcomes for the patient is performing the bypass operation without using the heart lung machine at all. During the procedure the heart continues to do the work of pumping blood throughout the body while surgeons perform the bypass operations on the beating heart. Other techniques in development involve the use of smaller incisions to perform CABG. All of these techniques are commonly referred to as “minimally invasive heart surgery.” In all cases, the hope is that patients will have less pain, faster recovery and less neurocognitive morbidity.

Q: How is the *da Vinci*[®] Surgical System used for a CABG?

A: The miniaturized instruments of the *da Vinci* Surgical System allow the surgeon to access the heart and its vessels through tiny incisions in the chest, rather than creating an incision through the breastbone or sternum (called a median sternotomy). The smaller incisions result in less blood loss and pain and usually a shorter hospital stay.

Q: Why does the *da Vinci* Surgical System work well for a CABG?

A: The patented *InSite*[®] Vision System gives the surgeon a 3-D, 10 times magnified view of the operating field, which provides an excellent view of delicate tissue and organs.

The *da Vinci* Surgical System is ‘intuitive.’ When the surgeon moves the control to the right, the robot’s instruments move to the right, giving the surgeon natural hand-eye coordination.

Also, the *da Vinci* Surgical System has ‘wristed’ instruments that mimic the movements of the surgeon’s hands and wrists, giving him excellent flexibility and control when operating on delicate tissue.

“I believe that once surgical teams from around the world progress down the learning curve, all centers using *da Vinci* Surgical System will be able to perform beating heart TECABs (Totally Endoscopic CABG) in as short as two hours. To date, out center has performed over 125 cardiac cases using the *da Vinci* Surgical System.”

-Professor Friederich Mohr, Chief of Surgery, Leipzig Heart Center, Leipzig, Germany

*While clinical studies support the use of the *da Vinci*[®] System as an effective tool for minimally invasive surgery, individual results may vary. Always ask your doctor about the risks and benefits of all available treatment options.*

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