



How Does Bypass Surgery Work?

What they'll do to Clinton's heart.

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Former President Bill Clinton, who was admitted to New York Presbyterian Hospital today after complaining of chest pains, will soon undergo a heart bypass operation. How does this life-saving surgical procedure work?

A coronary bypass provides a detour for blood on its way to the heart. The creation of such an indirect route is necessary when one of the heart's arteries becomes clogged with fat and cholesterol, a condition that can cause symptoms ranging from mild chest pains to massive fatal heart attacks. The operation is one of the most common major medical procedures in the United States, with over 500,000 of the surgeries performed every year.

In the most widely performed procedure, an anesthetized patient's chest is cut is open, and the breastbone is sawed apart. The heart is stopped with medication for the duration of the operation; a heart-lung machine keeps oxygenated blood flowing. The vein or artery that will eventually serve as the detour around the clogged section of the heart is then taken from somewhere else in the patient's body. Surgeons typically choose the saphenous vein from the leg since its removal does not cause any future ambulatory problems. (There may be some swelling in the days following the operation, but this can be alleviated by keeping the leg aloft.) Other popular choices are the internal mammary artery from the chest and the radial artery from the arm.

The blood vessel is then grafted onto the top and bottom of the clogged section of the coronary artery, so the blood can route around the blockage. It is common for surgeons to do several such grafts, to tackle multiple blockages; there are reports that President Clinton will have four grafts, which means his operation will be a quadruple bypass.

There are some alternative approaches to performing a coronary bypass, most notably a less invasive option that now accounts for between 10 percent and 20 percent of all such operations. This procedure requires an incision that's just 3 inches long, compared to the 8-inch incision used for the traditional method. Also, the breastbone doesn't have to be sawed open. But it's primarily used for single or double bypasses, so it's probably not a viable option in President Clinton's case. There are also some surgeons who operate on a still-beating heart, albeit one that's been slowed down with drugs. This requires a great deal of skill but is preferable if it can be done correctly; some patients can react badly to blood pumped via a heart-lung machine.

The odds for the president's complete recovery are quite good. The success rate for coronary bypass surgery is between 95 percent and 98 percent, and President Clinton isn't considered a high-risk patient because he's under 70 years old, he's male, he hasn't had prior heart surgery, and he doesn't have any other serious medical conditions. The post-surgical side effects he'll encounter are mostly mild: a poor appetite, constipation, insomnia, depression, and short-term memory problems.

QUESTIONS

1. A coronary bypass is performed when:
 - a. the coronary arteries become clogged
 - b. the valves of the heart fail to shut properly
 - c. the electrical signals to the heart become unstable
 - d. the heart is beating too fast
2. What medical equipment keeps blood oxygenated during the procedure?
 - a. pacemaker
 - b. bone saw
 - c. heart-lung machine
 - d. electrocardiogram
3. What is actually used to bypass the coronary artery?
 - a. a synthetic tube
 - b. a vein from within the body
 - c. a skin graft
 - d. the inferior vena cava
4. The chance of recovery and survival from this type of operation is:
 - a. poor
 - b. good
5. Surgeons who operate on a still-beating heart must:
 - a. have a donor available
 - b. perform a quadruple bypass
 - c. use a heart-lung machine
 - d. be very skilled