2nd M.I.P.H.A Meeting

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5 Facts Before The Lesson

- Coronary artery is the type of artery that supplies oxygenated blood to the heart by carrying the blood from the aorta (largest artery).
- There are six branches of coronary arteries in the body.
- Myocardial Infarction (Heart Attack) can be caused by coronary artery blockage if left untreated.
- Coronary artery blockage can be caused by atherosclerosis (the formation of cholesterol and fatty deposits).
- Improving your lifestyle by getting more exercises and eat a healthy diet can significantly reduce the chance of CADs (Coronary Artery Diseases)

What is CABG (Coronary Artery Bypass Grafting)?

Coronary Artery Bypass Grafting surgery is one of the most common cardiac surgery/procedure in United States. About 500,000 cases of CABG are performed each year. The objective of the surgery is to improve the blood flow from the coronary artery to the heart by “extracting arteries and veins” and use it to “bypass the coronary artery.”

The Predicament of Jonathan

Jonathan is a 45 years old male working at a Burger King in Seattle. Due to his indolence and unhealthy lifestyle. He eats fast food for every dinner, thinking that it is cheap and efficient. However, the consumption of high cholesterol and fat product is causing atherosclerosis (deposition of fatty material in the heart) within his coronary arteries. One day in at work, he tells his colleagues that he is not feeling well. Soon, he collapses on the floor. His colleagues calls the ambulance to send him to the Level 1 Trauma Center. What is going on with Jonathan? Is the collapse related to his unhealthy diet?

The Predicament of Jonathan (Part 2)

Later, Jonathan is sent to a Level 1 trauma center due to his collapsion. After the emergency medicine physician stabilizes Jonathan. He suspects that Jonathan is having multiple coronary blockages. Hence, Jonathan was sent to the radiologist for further examination. The radiologist injects contrast medium inside Jonathan's blood stream while Jonathan lies inside the CT scan for the diagnostic test. The CT scan results show that Jonathan is having multiple coronary artery blockages which causes his heart muscles to slowly deteriorate. He desperately needs a surgery to bypass the blocked arteries otherwise he will die. Thankfully, the medical professionals immediately registered a CABG surgery for him on the next day.

Things to do Before On-Pump CABG

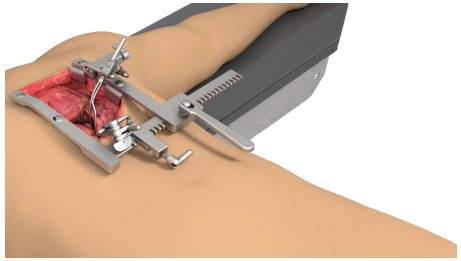
- **Patient would be given IV (intravenous vein)**
- **Patient will be sedated (oral or through IV)**
- **A breathing tube would be placed into the trachea with the ventilators on**
- **Catheter would be placed in the bladder to drain the urine.**
- **Patient's chest will be sterilized with isopropanol to minimize the chance of infection.**
- **Patient will be connected to the EKG (electrocardiogram) for monitoring the heart rhythm, blood pressure, and other statistics.**
- **Surgeon and other staffs working on the surgery would equipped with PPE. Such as face mask and gloves.**

Items You Need to Know

Sternum Saw

Scalpel

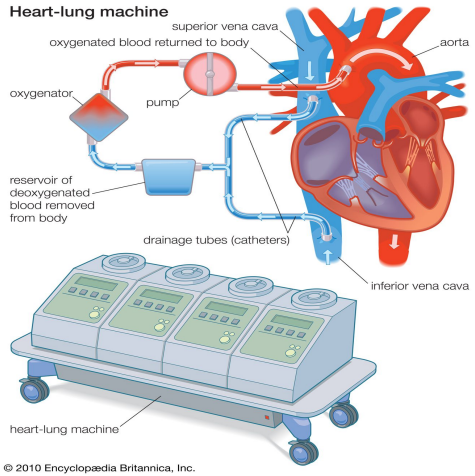
Titanium Wire



Heart Retractor

The Heart-Lung Machine

A heart-lung machine is an essential equipment in cardiac surgeries. It temporarily substitutes the function of the heart and the lungs. A tube connecting to the machine and the aorta pumps the oxygenated blood to the heart. Depending on the situation, one or two tubes will be placed in the superior vena cava or inferior vena cava to divert the deoxygenated blood back to heart-lung machine. When deoxygenated blood reaches the machine, it will be oxygenated and “repump” it the the aorta. The cycle continues until the surgery is over.



10 Steps to On-Pump CABG (during the procedure)

1. The cardiothoracic surgeon will extract the left mammary artery and the great saphenous vein for the bypass.
2. The cardiothoracic surgeon will make an incision on the chest with a scalpel as the surgical assistant would be keeping the surgical site visible by suctioning.
3. The cardiothoracic surgeon will use the sternum saw to cut the sternum vertically in half.
4. A heart retractor would be used to keep the sternum separated.
5. The perfusionist would connect the patient to the heart-lung machine

10 Steps to On-pump CABG (Part 2)

6. The surgical anesthesiologist will use an iodine or a potassium solution to stop the heart temporarily.

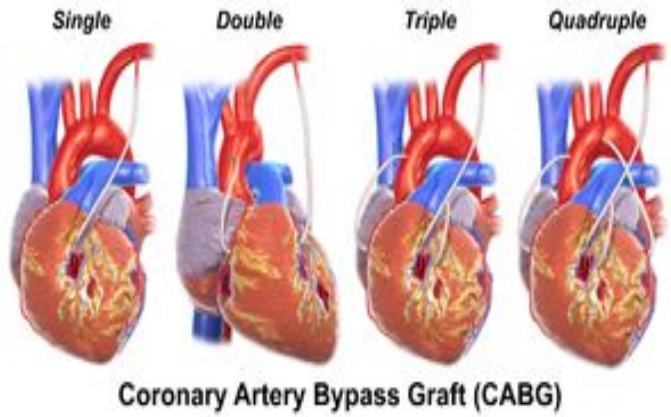
7. Once the heart is stopped, the cardiothoracic surgeon will connect the left mammary artery to the aorta and the right side of the coronary artery. The great saphenous vein would be connected to the between the aorta and the left side of the coronary artery.

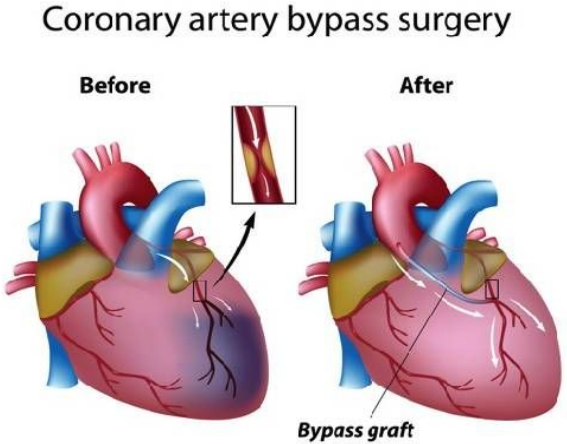
8. After the bypass is complete, the surgeon will restart the heart. Then disconnect the patient with the heart lung machine.

10 Steps to On-Pump CABG (Part 3)

9. Surgeon will remove the heart retractor and suture the sternum with titanium wire.

10. Surgeon will suture the muscle and skin back together.





A Video In Case You Don't Understand

CABG

Some FAQs

Q: How long does a CABG surgery take?

A: About 3-5 hours, depending on the patient's health condition and the numbers of coronary arteries that needs to be bypassed.

Q: How long do patients recover from CABG surgery?

A: About 12 weeks.

Q: What are the risks during CABG?

A: Blood clots, pneumonia, infection at the incision site, arrhythmia, tachycardia

CABG FAQs

Q: How long do patients have to stay at the hospital after CABG?

A: About a week

Q: What is the mortality rate of CABG in USA?

A: 2-3%

Q: How much is CABG?

A: The entire procedure will cost around $40,000 without health insurance. They cost may differ depending on the insurance you purchase.

The Predicament of Jonathan (End)

The surgery was a success, Jonathan becomes more vivacious day after day. However, he is struggling to pay his $40,000 medical bills due to the lack of income he received from working at Burger King. To pay the debt, Jonathan was forced to sell his house and most of his belongings. Hence, he became a homeless wandering around Seattle.

The End.

Source

https://cardiacsurgery.ucsf.edu/conditions--procedures/coronary-artery-bypass-grafting-(cabg).aspx#:~:text=Coronary%20artery%20bypass%20grafting%20(CABG)%20is%20a%20type%20of%20surgery,up%20inside%20the%20coronary%20arteries.

https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/coronary-artery-bypass-graft-surgery

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https://medlineplus.gov/coronaryarterybypasssurgery.html

https://www.nhs.uk/conditions/coronary-artery-bypass-graft-cabg/#:~:text=A%20coronary%20artery%20bypass%20graft,oxygen%20supply%20to%20the%20heart.

What is better?
Open heart or minimally invasive heart surgery?

Arguments for Open Heart Surgery:

1. **It is easier for the surgeon to perform, making it less risky for the procedure to go wrong.**
2. **Open-heart surgery is one of the most traditional type of cardiac surgery. Hence, many surgeons would have a lot of experience in performing the surgery, which may cause the fatality rate to decrease.**

According to the National Institute for Health and Clinical Excellence (NICE), survival rates 1 year after either form of open-heart surgery are similar at about **96–97 percent**.

Arguments for Minimally Invasive:

1. **Patient recovery is faster.**
2. **Patients are more relaxed about the thought of surgery, hence more willing to cooperate with the surgery.**
3. **Less complication due to the less invasive technique.**

Minimally invasive heart valve surgeries take less time to complete, and patients generally have fewer complications and recover faster – in as few as **10 days compared with six to eight weeks** after traditional surgery.

Meeting concluded!

Next meeting: Physician Assisted Suicide