

Off-Pump Coronary Artery Bypass Grafting

Revascularización coronaria sin circulación extracorpórea

This new website developed by the Argentine Society of Cardiology offers reliable information in Spanish for the entire community.

CORONARY ARTERY BYPASS GRAFTING

There are two coronary arteries: one on the left and one on the right side of the heart. The left main coronary artery arises as a single trunk that branches off into two main vessels, one into the anterior wall and the other into the lateral and inferior wall of the heart.

Once coronary artery bypass grafting has been decided, the surgical technique is chosen on the basis of what is best for each patient and on the surgeon's experience. Two techniques are used: on-pump or off-pump coronary artery bypass grafting.

ON-PUMP CORONARY ARTERY BYPASS GRAFTING

On-pump coronary artery bypass grafting is the external blood flow diversion through a machine that replaces the lung and heart function. The patient is connected via cannulas inserted into the ascending aorta and the right atrium. Blood is withdrawn from the right atrium and pumped through a membrane where it is oxygenated and returned to the body circulation through an arterial cannula in the ascending aorta.

This allows the heart to be stopped and infused with cardioplegic solutions which maintain the heart motionless and supplied with nutrients, enabling the surgeon to work in a quiet, bloodless field. It also allows heart luxation for revascularization of lateral and posterior segments. To use this technique, the ascending aorta is clamped to disconnect the heart from the general circulation.

This method has revolutionized cardiac surgery and has expanded the use of the coronary artery bypass technique. As any other method, it may present complications or undesirable effects. One of them is the systemic inflammation caused by blood contact with non-biological surfaces, such as the elements of the extracorporeal circulation system. It should be pointed out that materials are constantly improved and those effects are minimized. Cerebral calcium microemboli causing neurological disorders may also result from aortic clamping.

OFF-PUMP CORONARY ARTERY BYPASS GRAFTING

This technique has been developed to improve the previous method.

Its application requires accurate indications, and also depends on the experience of the surgical team. It has been shown to be beneficial in patients with severely calcified aorta, impaired ventricular function, renal failure, and severe anemia. Stroke, postoperative renal failure, and blood transfusion rates decrease with this surgical technique without aortic manipulation.

The heart is displaced to expose its walls and the coronary arteries to be treated. The anterior wall is usually the most accessible. Displacing the cardiac apex to the zenith is necessary to reach the lateral and inferior dorsal wall. Suction devices on the cardiac surface holding a region of the heart are used for this purpose, allowing the surgeon to work with greater stability (Figure 1).

When this technique is followed, the patient experiences early recovery, not manifest in hospital length of stay -which is similar to that of patients undergoing on-pump coronary artery bypass grafting- but evident during the first 15 days. In general, transfusion and systemic inflammation rates are lower.

The experience of the surgical team with this method is important, since one of the criticisms to this technique is the reduced number of coronary bridges and their lower patency, given the difficulty of its performance. If there are doubts in applying this technique, using extracorporeal circulation and stopping the heart should be the method of choice.

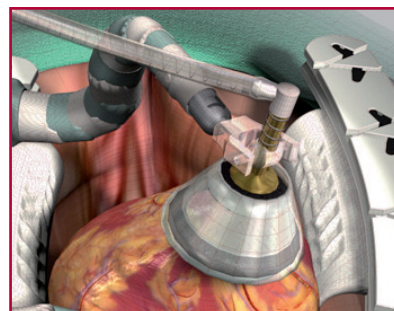


Fig. 1. Suction stabilizer in the cardiac apex.



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