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OPINION ARTICLE

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Coronary Artery Bypass Surgery and its Efficacy in Surgical Sciences

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About the Study

Coronary artery bypass surgery, also known as Coronary Artery Bypass Graft (CABG, pronounced "cabbage") surgery. A surgical treatment to restore normal blood flow to an occluded coronary artery is known as bypass surgery. A typical coronary artery delivers blood directly to the heart muscle, bypassing the rest of the circulatory system.

There are two primary strategies. In one, the Left Internal Thoracic Artery (LITA) (also known as the Left Internal Mammary Artery, LIMA) is diverted to the left coronary arteries left anterior descending branch. The artery is "pedicled" in this approach, which means it is not severed from its origin. In the other, a great saphenous vein is extracted from a leg, and one end is linked to the aorta or one of its major branches, while the other end is immediately attached to the clogged artery to restore blood flow.

CABG is used to treat angina that hasn't responded well to anti-ischemic medication, to prevent or treat left ventricular dysfunction, and/or to lower the risk of mortality. Myocardial infarction is not prevented with CABG (heart attack). The heart is frequently stopped during this procedure, necessitating the use of cardiopulmonary bypass. However, two alternative approaches exist, allowing CABG to be done on a beating heart either without the use of cardiopulmonary bypass, a process known as "off-pump" surgery, or with partial support from the cardiopulmonary bypass, a procedure known as "on-pump beating" surgery. The latter method combines the benefits of both the on-pump halted and off-pump procedures while limiting their negative effects. CABG is usually recommended when the coronary arteries are 50 to 99 percent obstructed. The blockage can be bypassed due to arteriosclerosis, atherosclerosis, or both.

Efficacy

According to the 2004 ACC/AHA CABG guidelines, CABG is the preferred treatment for: Left Major Coronary Artery disease (LMCA). All three coronary arteries are diseased (LAD, LCX and RCA). Diffuse disease that is not amenable to Percutaneous Coronary Intervention (PCI). According to the 2005 ACC/AHA guidelines, CABG is the optimal treatment for other high-risk patients with significant ventricular dysfunction (low ejection fraction) or diabetes mellitus.

When partial obstructions prevent stents from enhancing blood flow, bypass surgery can provide relief from angina. Instable angina patients, bypass surgery has no advantage over medication therapy in terms of survival. However, there is obvious benefit of CABG surgery when compared to medical therapy, as it prolongs survival not only in patients with 3-vessel disease but also with left main disease and 1 or 2 vessel disease with proximal LAD disease.

Bypass surgery does not prevent future myocardial infarctions. The outcome of CABG is dependent on a number of factors, although effective grafts typically last 8–15 years. In general, CABG improves the chances of survival for high-risk patients (usually triple or greater bypass), while the difference in survival rates between those who have surgery and those who are treated with medication therapy reduces after around five years. The patient's age at the time of CABG is crucial to the prognosis; younger individuals with no complicating conditions fare better, whereas older patients are more likely to experience subsequent coronary artery blockage.

Veins that are used either have their valves removed or are turned around so that the valves in them do not occlude blood flow in the graft. External support may be placed on the vein prior to grafting into the coronary circulation of the patient. Because the artery is more robust than a vein and because the LITA is already attached to the arterial tree, it only needs to be grafted at one end, LITA grafts last longer than vein grafts. Because of its greater long-term patency compared to saphenous vein grafts, the LITA is generally grafted to the Left Anterior Descending coronary artery (LAD).

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