

CORONARY HEART DISEASE

This information sheet is for your information and is not a substitute for medical advice. You should contact your physician or other healthcare provider with any questions about your health, treatment or care.

What is coronary heart disease?

Coronary heart disease causes the arteries that supply blood and oxygen to the heart muscle to narrow. The consequences of coronary heart disease include stable angina (predictable but intermittent chest pain), unstable angina (chest pain that is new in onset, occurs at rest, or has a worsening pattern), heart attack (myocardial infarction), or death.

The aim of treatment for patients with coronary heart disease is to reduce the effects of the condition on the patient's quality of life and to alleviate symptoms of chest pain. In some people, these interventions may frequently delay or stop the progression of the condition and thereby prolong life. The treatment options available to patients with stable angina are classified as medical treatment or interventional treatment. The choice among these treatment options depend on many individual factors.

A significant percentage with coronary heart disease patients are controlled by the careful and correct use of adequate dosages of specific medication. There are, however, patients that require intervention by cardiologists.

Interventional treatments

The interventional treatments for coronary heart disease include percutaneous coronary angioplasty (PTCA) with or without stent placement and CABG surgery. These treatments effectively relieve symptoms of coronary heart disease, such as angina, but they do not necessarily significantly increase the life expectancy of the patient.

Candidates for interventional treatment

Interventional treatment may be recommended over medical therapy for those patients with stable angina:

- who have persistent and intolerable symptoms despite adequate medical treatment; and/or
- who have specific patterns of arterial narrowing and a high risk of heart attack and death.

Medical versus interventional treatment

Several factors may help determine whether medical or interventional treatment is a better treatment option:

Age

Interventional treatments are associated with more risks in older patients. The risk of dying from bypass surgery is about three times greater for patients older than 79, compared to patients who are 50 years old. However, older patients often stand to gain the most from bypass surgery. In older patients (aged 75 or older), bypass surgery has a greater life-prolonging benefit relative to medical treatment. Therefore, advancing age does not necessarily rule out interventions such as angioplasty or bypass surgery as treatment options.

Severity of angina

Angina patients are usually managed with medical treatment initially, unless stress or chemical testing indicates that the person may have a severe condition. If medical treatment does not significantly improve symptoms of angina or if the person cannot tolerate medical treatment, arteriography followed by PTCA or CABG surgery may be recommended. PTCA has not been shown to prolong life compared with medical therapy; but is used principally to improve symptoms when medication fails.

Advanced heart disease

Heart disease may lead to poor pumping function of the left ventricle (the heart chamber that pumps blood around the body), and it may even lead to a serious condition called congestive heart failure. People with these advanced types of heart disease may benefit more from interventional treatments, primarily bypass surgery, than from medical treatment. In fact, interventional treatment may even reverse abnormal function of the left ventricle in some cases. Still, interventional procedures are also associated with greater risks in people with advanced heart disease.

Test results

Certain tests can provide an accurate measure of the degree of coronary heart disease. These tests may establish if medical or interventional treatment is more appropriate and can help decide which interventional option (angioplasty or bypass surgery) is best. Examples of these tests are:

- *Exercise electrocardiogram (ECG) testing:* This test can often determine if a person has a low or high risk of a heart attack and cardiac death. The test involves running on a treadmill or bicycling while an ECG is continuously monitored. Exercise testing provides information about the effects of coronary heart disease on the heart's ability to function at different levels of exertion. Advantages of this test are that it is not invasive and it is particularly useful for identifying a small percentage of people with stable angina who are at higher levels of potential risk of heart attack and death from their coronary heart disease.
- *Angiography:* Also known as cardiac catheterisation, this involves using x-ray guidance to pass a small catheter into the coronary arteries where dye is injected to show the outline of any blockages. Angiography is usually recommended for people who are considered to have a high-risk condition based on the results of other tests, such as the exercise tests described above. The results of angiography can then help determine if angioplasty or bypass surgery is a better option.

Narrowing of coronary arteries

Interventional treatment is usually more beneficial than medical treatment in the following circumstances:

- the coronary arteries are severely narrowed;
- many coronary arteries are narrowed; and
- the left main coronary artery (that supplies blood to the left side of the heart) is narrowed to the extent that it becomes risky.

These early patterns of arterial narrowing often predict how severe heart damage would be if a heart attack occurs. Patients with two or three narrowed coronary arteries are usually advised to undergo interventional treatment. Patients with only one narrowed coronary artery are often advised to undergo medical treatment, unless this treatment fails to control angina. If angina persists with medical treatment, an angioplasty, with or without a stent, or coronary bypass graft surgery may be recommended.

Peripheral arterial disease

Peripheral arterial disease refers to narrowing of arteries in parts of the body other than the heart. For example, arteries that supply blood to the arms and legs or to the brain may be narrowed. Studies suggest that peripheral vascular disease patients have greater risks from angioplasty and bypass surgery, and medical treatment may therefore be a better choice.

PTCA and stenting

PTCA involves passing a tiny, deflated balloon through the arterial system (usually through an artery in the groin) to the narrowed coronary artery. The balloon is then inflated, causing the walls of the balloon to dilate (expand) the narrowed artery, which restores blood flow to the heart muscle. This procedure is called angioplasty.

A stent (an expandable tube usually made of wire mesh) is often placed into the narrowed artery after the vessel has been expanded with the balloon. This is done to prevent the narrowing from recurring.

The efficacy of PTCA depends on the severity of arterial narrowing. PTCA is often recommended when arterial narrowing is mild or moderate or when only one or two coronary arteries are severely narrowed. It is more effective in non-diabetic patients, as diabetics appear to have greater benefit from bypass surgery, especially if there are two or three vessels involved.

Benefits of intervention

PTCA can effectively relieve angina and improve the patient's ability to exercise. However, a percutaneous coronary intervention (PCI) does not reduce the risk of heart attack or death in most people over time.

Complications of intervention

Since PTCA does not require surgery, complications are relatively infrequent and hospital stay and recovery are usually brief. The most frequent complications are related to the insertion of catheters in the leg and include pain and bleeding at the puncture site.

Occasionally, the catheter used in PTCA creates a small tear (dissection) in the coronary artery. However, the tear is usually small and heals by itself or can be corrected with a stent. If the tear is large, the artery may become blocked quickly; this occurs in about 4% of patients. This is treated by repeat angioplasty and the insertion of a stent. Rarely, the patient will need urgent bypass surgery. Approximately 1% of patients may have a heart attack as the result of angioplasty.

In most cases, patients are able to walk on the day after the PCI and can resume their normal activities, including returning to work, within a week. **However, this should first be discussed with your treating doctor.**

Limitations of intervention

Although PTCA restores blood flow and relieves symptoms in over 90% of patients, there is a risk of recurrent symptoms due to recurrent narrowing (restenosis) of the artery. Restenosis that is severe enough to cause bothersome or life-threatening symptoms occurs in less than 10% of patients, particularly when drug-coated stents are used. Recurrent symptoms may also develop because it is impossible to dilate all narrowed vessels. Some vessels that are very small have a chronic total occlusion, or may have a very calcified, hard lesion that cannot be adequately dilated.

CABG surgery

CABG surgery involves sewing one end of an artery or vein above a blocked coronary artery and the other end below the blockage, thereby allowing blood an alternate pathway to the heart. The arteries or veins used for the bypass are called grafts and are usually obtained from the leg or the chest wall. Bypass surgery may not be possible if the coronary artery is heavily calcified or if the heart disease is very widespread.

Admission and intensive care unit treatment is usually necessary for this procedure. **Please discuss these aspects with your treating doctor.**

Factors favouring bypass surgery

The main indications for bypass surgery over angioplasty are disease and narrowing of the left main coronary artery by more than 50%, when PTCA does not relieve angina, or when many arteries are narrowed and the heart's pumping function is substantially impaired. In addition, bypass surgery is often preferred over PTCA in diabetics where two or three vessels are involved.

Benefits of bypass surgery

Bypass surgery can very effectively relieve angina and can even prolong life in people with severe coronary heart disease. However, the effects of bypass surgery on symptoms and survival depend on several factors, including the pattern and extent of arterial narrowing, the general progression of coronary heart disease over time, and the blood vessels used for bypass. In general, bypass surgery is more likely than angioplasty to provide complete revascularisation. The patient's willingness to co-operate with the doctor's post-surgery orders will also influence eventual outcomes.

About 95% of patients with narrowing arteries have improvement or complete relief of their angina immediately after surgery. About 85% to 90% of patients remain angina-free for up to three years after surgery and about 75% of patients remain free of angina or major coronary events for five years after surgery. Later, about one-half of vein grafts may become narrowed or occluded, and need re-operation.

Complications of bypass surgery

Bypass surgery usually requires an incision in the middle of the chest (sternum) and the use of a cardiopulmonary bypass machine to maintain blood supply to the tissues of the body while the surgeon is operating and the heart's pumping function is stopped. For this reason there are possible complications. **Please consult your doctor for more information.**

Recovery from bypass surgery

It usually takes several weeks to a few months to recover from bypass surgery, even if there are no complications. However, about 70% to 80% of patients who have bypass surgery are eventually able to return to work. This is about the same percentage of patients who are treated medically and are able to return to work.

Minimally invasive bypass surgery

Several new surgical approaches are being developed, which could potentially reduce the discomfort and complications associated with traditional bypass surgery. These procedures are collectively referred to as being 'minimally invasive'.

In general, minimally invasive approaches focus on performing bypass surgery through a very small chest incision and performing bypass surgery while the heart is still beating (i.e. without the need for a heart/lung bypass machine).

These procedures are best suited for patients who have blockages limited to certain parts of the heart, particularly the left coronary artery. Thus, they are not suitable for everyone. However, these procedures are more suitable for patients who have narrowing in only one or two arteries and who are at high-risk for conventional surgery. Information about the long-term outcome after minimally invasive surgery is limited.

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