

FOR HEALTHCARE AND MEDICAL MEDIA

Diabetes and coronary artery disease

Worldwide, approximately 250 million people have diabetes.¹ These people are at high risk for developing cardiovascular disease and over half are likely to die as a result.^{2,3} Coronary artery disease (CAD) is the most common cardiovascular complication of diabetes and is the number one cause of death among patients with diabetes.⁴ Diabetic patients are 2 to 4 times more likely than people without diabetes to develop CAD and once it develops diabetic patients have a poorer prognosis.⁵

What causes CAD?

CAD is caused by atherosclerosis, which is the gradual build-up of fatty deposits (plaques) in the coronary arteries. Over time, the deposits narrow the coronary arteries causing reduced blood flow to the heart and chest pain (angina). Ultimately, the artery may become completely blocked, leading to heart attack and sudden death.

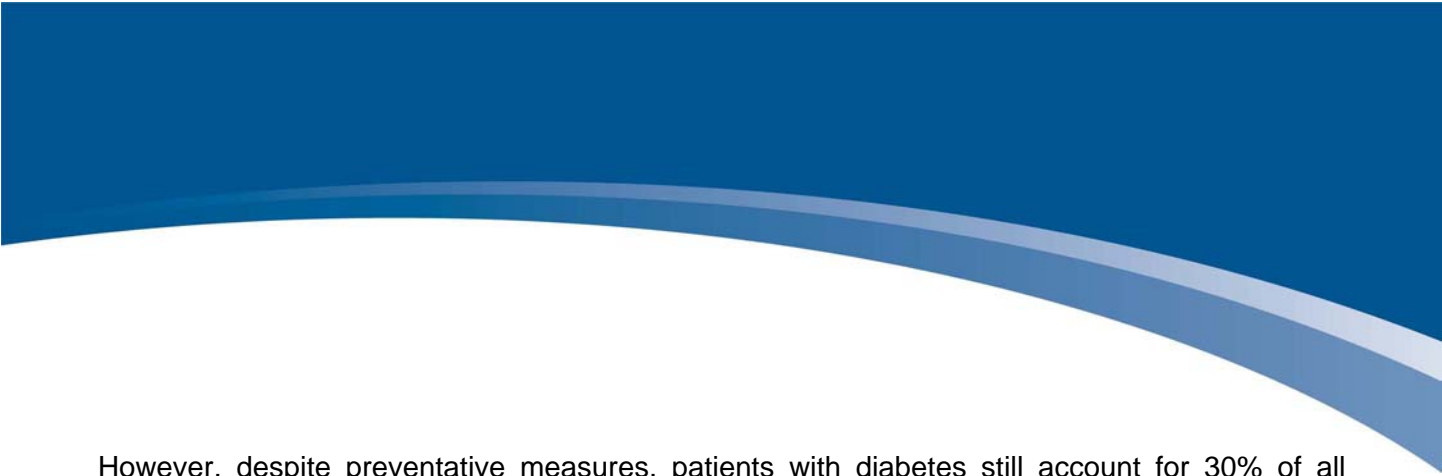
Diabetic patients typically have a range of metabolic disorders that increase their risk of developing CAD.⁵ These include abnormal cholesterol levels, high blood pressure and obesity around the waist. Clinical studies that included thousands of patients found that the number of deaths from CAD doubles in diabetic patients with one extra risk factor, and more than triples in patients with three extra risk factors.⁶

In addition, diabetes itself is a cardiovascular risk factor because it has an adverse effect on the blood vessels, making them more likely to become blocked if a plaque forms. In addition, diabetes causes the blood to clot more easily, further increasing the likelihood of blockage.⁷

These changes encourage CAD to develop and result in a more complex disease with plaques that can be long or located in small, difficult to reach vessels. In addition, the course of the disease is accelerated, increasing the risk of heart attack.

Can CAD be prevented?

Preventative treatment for CAD is very important for patients with diabetes and involves management of cardiovascular risk factors. Studies show that taking medication to lower blood pressure can reduce cardiovascular events by 69% in diabetic patients, and that cholesterol-lowering medication results in a 33% reduction.⁸ In addition, daily treatment with Aspirin®, which helps reverse the effect of diabetes on blood clotting, can lower the risk of cardiovascular death, heart attack and stroke by approximately 19%.⁹



However, despite preventative measures, patients with diabetes still account for 30% of all people who are diagnosed with symptoms of a heart attack (acute coronary syndrome) and over 50% of all cardiovascular deaths.⁵

How is CAD treated?

Coronary revascularisation is the name given to the procedures used to repair or replace arteries that have become damaged or blocked by CAD. Approximately 30% of all coronary revascularisation procedures are carried out in diabetic patients. There are two main types of revascularisation, coronary artery bypass grafting (CABG) and percutaneous coronary intervention (PCI).⁵

CABG surgery involves taking a vein or artery from another part of the patient's body, usually the chest or leg, to create a detour around the blocked and damaged area of the coronary artery. CABG requires general anaesthesia and may also require that the heart be stopped and a pump used to circulate blood while the procedure is performed. This procedure is used for patients with severe narrowing or blockage or disease in multiple vessels.

Patients typically spend up to a week in hospital after CABG surgery, including several days in intensive care. Recovery from surgery varies, although patients often start to resume their activities within 4 to 6 weeks. Patients may be required to take various medications after surgery, including blood thinners to prevent blood clots from forming and medicine to help keep the heart beat regular.

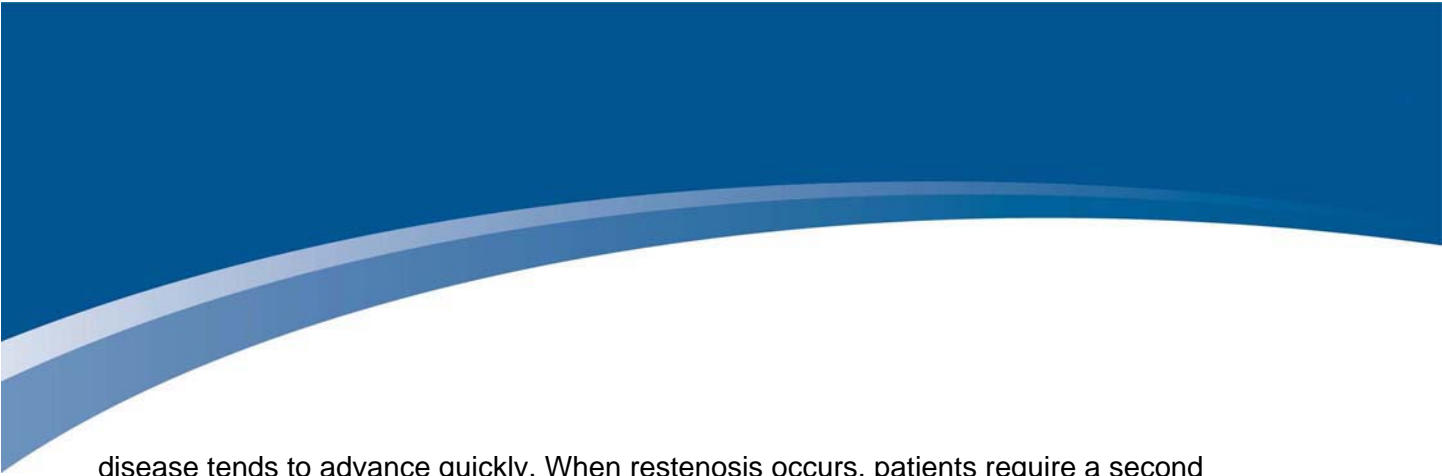
PCI involves repairing the damaged or blocked artery using balloon angioplasty and a stent. The stent is inserted into an artery in the groin under local anaesthetic and then fed through to the narrowed coronary artery. Once in the correct location, the balloon is used to expand the stent and is then removed. The stent remains in place to hold the artery open and blood flow resumes through the reopened vessel.

After patients receive a stent, they must take an anti-clotting or antiplatelet drug, such as clopidogrel or Aspirin® to prevent the blood from clotting within the stent.

Approximately 850,000 PCI procedures are carried out per year in Europe,¹⁰ 30% of which are performed in patients with diabetes.

What is the prognosis after revascularisation?

Diabetic patients who receive coronary revascularisation may have a worse prognosis than people without diabetes, regardless of which procedure is used.⁵ This is because these patients tend to have complex CAD and multiple cardiovascular risk factors. A major problem is reblocking (restenosis) of arteries, which is common in patients with diabetes because their



disease tends to advance quickly. When restenosis occurs, patients require a second revascularisation procedure.

Drug-eluting stents were developed to reduce the high rate of restenosis seen with bare-metal stents, which occurs at a rate of between 20% and 30%. As a result of restenosis, patients with diabetes are more likely to develop acute coronary syndrome and require repeat procedures.¹¹ Drug-eluting stents contain a drug which interrupts the biological processes that cause arteries to reblock.

Diabetic patients treated with the TAXUS paclitaxel-eluting stent system developed significantly less restenosis than patients treated with bare-metal stents.¹² As a result, they were considerably less likely to undergo repeat procedures.

A major new study called SYNTAX compares TAXUS Express²™ stents with CABG surgery in patients with complex CAD, including people with diabetes. The trial includes patients from Europe and the United States, and should help decide which of these treatments is better. Results of the one-year follow-up from SYNTAX study will be presented later in 2008. Another large study (FREEDOM) is currently underway that will compare sirolimus-eluting stents with CABG surgery in patients with diabetes and multivessel disease.

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