



What are coronary artery stents and how are they used?

You probably know people who have had a stent inserted into a coronary artery. Between twenty and thirty thousand of these relatively simple procedures are performed each year in Australia. They make a big difference to the quality of life and life expectancy of the recipients.

The muscle cells of the heart need a blood supply, just like the cells in the rest of the body. This blood supply is delivered through the coronary arteries. The major coronary arteries run down on the surface of the heart and give off ever smaller branches into the heart muscle. Thus the muscle cells are supplied with oxygen and other substances. The used and waste materials from the muscle cells (carbon dioxide and other substances) are removed by the coronary veins.

Problems arise if the coronary arteries become narrowed or blocked. Deposits of cholesterol within the wall of an artery reduce its diameter, resulting in a 'narrowing' of the artery - coronary artery disease. If blood clots form on one or more of the cholesterol containing plaques, the artery may block completely, resulting in coronary artery occlusion or heart attack.

The development of plaques is prevented, or slowed, by lowering the levels of cholesterol, blood pressure, weight and blood sugar, by not smoking and remaining physically active.

In many people the narrowing in the coronary arteries may lead to an inadequate blood supply to

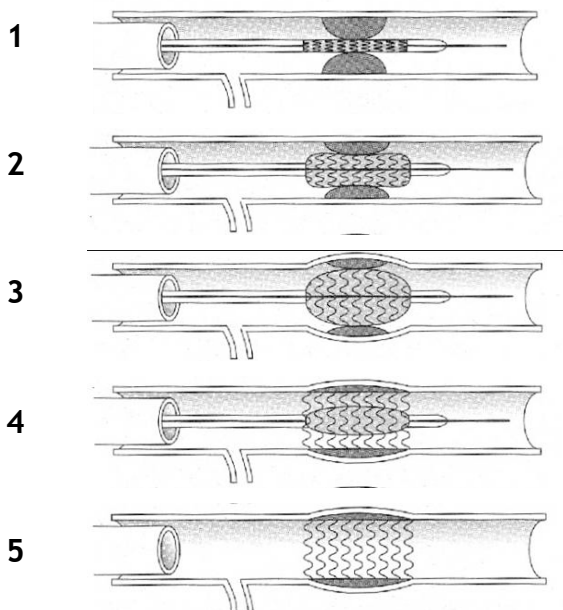
part of the heart muscle. This reduced supply of blood may then lead to chest pain (angina pectoris) on exertion or under other stresses. This problem has been addressed by coronary artery bypass graft surgery over the past 40 years (discussed in a separate information sheet). More recently, it has been addressed by coronary artery angioplasty, where the narrowing in the coronary artery is opened by inflating a long, narrow balloon inside the affected segment. The problem with this approach in the past was that sometimes the opened artery could narrow again. If that happened, it might have been necessary to repeat the procedure or to perform urgent bypass surgery. Here is where the stent comes in. A stent is an open, metal mesh (like chicken wire) which is expandable (by balloon) to open up and thereby hold open the previously narrowed segment. Development of stents was such an advance that it is now unusual to have angioplasty alone. In the vast majority of procedures of this type, the angioplasty is now coupled with a supportive stent.

Similarly it was found that in the event of a blood clot blocking a coronary artery, leading to a heart attack, the clot and the underlying plaque could be effectively opened and stabilised by angioplasty and the insertion of a stent.

Thus, in most major hospitals, this urgent procedure is generally offered to patients who are having an acute heart attack. The procedure has been clearly demonstrated to be highly effective. It still remains possible that the diameter of the stent may later start to narrow or block with plaque and blood clots. Chest pain may return. To prevent that from happening, additional medication is prescribed for the patient. The second approach is to coat the stent itself with chemicals which prevent the tendency for clots to form on the stent. Thus many stents inserted are now not bare metal stents but are chemically

coated. The steps whereby a stent is inserted are shown in the diagram.

For those with established coronary artery disease, this is of critical importance. For all of us, maintaining healthy lifestyles and taking preventive medication remain of greater importance to avoid progressive disease.



1. The stent (like a metal cage) on a balloon catheter is positioned at the problem site.
2. The balloon catheter is then inflated.
3. The stent is fully expanded and
4. left in place after the balloon has been deflated.
5. The stent remains expanded inside the artery.

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