

aprotinin is excreted renally lower doses are recommended in renal failure. No studies have yet been published examining the potentially increased risks of postoperative thromboembolic disease and loss of graft patency that may occur with any agent modifying perioperative haemostasis. Until full risk benefit analyses have been performed aprotinin should be used with caution. If, however, these studies indicate little risk, then current studies of aprotinin's use in paediatric and "low risk" cardiac surgery, liver transplantation, and vascular surgery suggest that aprotinin may have wide applications in reducing perioperative bleeding. Its efficacy suggests that the importance of fibrinolytic activation in the pathogenesis of perioperative bleeding has previously been underestimated.

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Coronary bypasses 10 years on

About two in five will occlude

The return of angina comes as a bitter disappointment to patients who have had coronary artery bypass surgery. Ten years ago they believed that they were cured. Their doctors may have had reservations, but they did not know how long the grafts would last. Now we know better, thanks to some prospective studies.

Fitzgibbon and his colleagues from the National Defence Medical Centre in Ottawa have a "compliant" population of military staff, 222 of whom have undergone repeated elective coronary angiography.¹ Rates of occlusion of vein grafts at 1 month and 1, 5, 7.5, and 10 years were 8%, 13%, 20%, 40%, and 41% respectively. The jump at 7.5 years is due to the unplanned inclusion of a group of patients studied again for clinical rather than routine reasons - that is, their angina had returned. Similar results have been obtained in Montreal by Bourassa and colleagues, who reported rates of 3.4% at 2-3 weeks, 10% at 6-18 months, 19% at 5-7 years, and 37% at 10-12 years.² Graft occlusion occurred 2.5 times more commonly after six years than before. Similarly, Lytle *et al* from the Cleveland Clinic found that 36% of grafts were occluded 7.3 years after surgery.³ These authors also report the development of graft stenoses: early studies suggest an incidence of 5-10%, often at the distal anastomosis, but some narrowings are seen in 38% of grafts at five years and 75% at 10 years.¹ Few vein grafts escape disease, but the pathological findings vary with the age of the graft.⁴ Early occlusion is usually due to thrombus, probably resulting from technical problems with the vein, particularly at the distal anastomosis. Fibrointimal hyperplasia occurs next, and conventional atheroma is superimposed some years later.

The main manifestations of these developments are recurrent angina, myocardial infarction, and death. It should be emphasised that surgery improves the 10 year survival of patients at high risk - that is, those with extensive coronary disease and poor left ventricular function.^{5,7} Mortality in the

surgical groups tends, however, to accelerate after 5-7 years, so that if patients with less severe disease are included no overall benefit is demonstrable. If perioperative myocardial infarction is excluded the rate of subsequent heart attack is lower in the surgical group until five years. Thereafter the incidence rises to 2.4% a year, compared with 1.4% in a comparable group treated medically.⁸ The infarcts, however, are smaller⁹ and less commonly fatal⁸—no doubt because the grafts and long standing coronary disease have encouraged the development of a mature collateral circulation. Subsequent reinfarction, however, is more likely. Patients presenting with recurrent angina commonly do so with an episode of rest pain some seven years after their operation, a familiar experience that might be termed the seven year glitch.

So what should we do about all this? Firstly, we should remember that surgery for degenerative disease never cures. Bypass surgery should be postponed in those with mild to moderate coronary disease and good left ventricular function. If the coronary arteriogram does not show significant left main stem or three vessel disease medical management can safely be encouraged: extra effort spent on exercise and diet, together with prophylactic nitrates and maintenance β blockade, can be surprisingly successful. We should think twice about surgery for certain patients. Women fare less well, probably because of their smaller stature and vessels¹⁰; younger men, although an apparently deserving group, will have clinically important atherosclerosis of the graft five years later.¹¹ Buying time with angioplasty may therefore be preferable. As for the operation itself, using the left internal mammary artery for the anterior descending graft is clearly desirable because its long term patency is superior (92.5% at 10 years).³ Aspirin also reduces the rate of graft occlusion, halving it at one year in a recent study.¹² Ideally aspirin should be started within hours of surgery, although not before because of the increased risk of bleeding. Despite the many studies of the benefits of aspirin

the optimal dose is unknown. Aspirin alone is effective in doses ranging from 100 mg¹³ to 975 mg¹⁴ daily; as more than 325 mg daily confers no additional benefit¹⁵ a dose of 150-300 mg is probably reasonable. There is general agreement that dipyridamole is superfluous.¹²

Although aspirin reduces the risk of thrombotic occlusion of grafts, not much can be done to prevent fibrointimal hyperplasia. As late atherosclerosis is related to recognised risk factors such as smoking¹⁶ and hyperlipidaemia¹⁷ these should be corrected. Vigorous attempts to reduce serum lipid concentrations will retard the progression of both graft disease and native coronary diseases.¹⁸

When angina recurs there is an understandable reluctance to make the diagnosis. Chest wall pain is usual, indeed universal, in those in whom the left internal mammary artery has been used. The angina sometimes has a different character, being felt less in the precordium. But gradually realisation dawns, and the diagnosis may be confirmed by exercise testing. Drug treatment should be restarted. There is little point in undertaking repeat angiography until the angina is truly limiting. Only occasionally is there a stenosis that invites

angioplasty, and then the results are not encouraging.¹⁹ A second operation is certainly possible: other veins (the other saphenous vein and arm veins) and arteries (such as the gastroepiploic) may be used. The results are less satisfactory with a higher mortality (for example 6-9% compared with 2% in one series²⁰) and greater morbidity. But despite the higher threshold for recommending repeat operations, these now comprise a sizable component of the work of most cardiac surgical units.

Coronary artery bypass surgery should be reserved for those who need it: those with limiting angina and severe coronary disease. Current surgical practice may produce better results than that of 10 years ago,²¹ but even so patients should be warned that their angina will recur some time in the future. Often, however, this is a better prospect than the alternative.

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Showing the green card

New surveillance scheme to monitor the effects of pesticides on health

Many patients believe that their health has been damaged by pesticides or other toxic chemicals. How can their doctors decide whether they are right?

When the BMA's Board of Science and Education prepared its report *Pesticides, Chemicals and Health*, it found that little was known about the effects on the general population of exposure to pesticides.¹ Others have also drawn attention to the need for more information. The World Health Organisation has recommended that "every effort should be made to perform epidemiological studies and to improve understanding of the effects of pesticides on the public health."² The House of Commons agriculture committee and the medical and toxicology panel of the advisory committee on pesticides want better coordination of existing systems for monitoring poisonings due to pesticides and full investigation of serious poisonings and major incidents.^{3,4} The British Agrochemicals Association and the Green Alliance have jointly called for the establishment of a scheme to monitor incidents involving

pesticides to replace the four existing schemes for reporting such incidents.⁵

To obtain data on exposure to pesticides and suspected adverse effects on health the BMA working party on pesticides recommended setting up a "green card" reporting system. This was intended as an early warning system, analogous to the yellow card system for reporting adverse drug reactions, which would enable better monitoring of exposure to pesticides. The working party believed that doctors, particularly general practitioners, were ideally placed to alert other agencies to cases of suspected pesticide poisoning.

The Health and Safety Executive, with the encouragement of the Department of Health and the BMA, has funded the West Midlands Poisons Unit to conduct a pilot scheme in the West Midlands and Trent regions. This three year scheme will investigate the frequency and severity of acute pesticide poisoning in these regions; it will run parallel to rather than