

## Editorial

# Coronary angioplasty—what can we reasonably expect?

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Coronary angioplasty has proved to be an effective alternative to coronary surgery for the treatment of angina in selected patients. Many of the first patients to receive this treatment in the United Kingdom six years ago remain symptom free. Coronary angioplasty was established as a new and valuable method of treatment by the pioneering work of Dr Andreas Gruentzig. His death in a flying accident has robbed angioplasty of its acknowledged leader.

As with many new methods of treatment, coronary angioplasty was initially greeted with scepticism and was then embraced with great enthusiasm. The indications were expanded from single vessel to multiple vessel disease; from one proximal lesion to more than one lesion per vessel; from patients with recent onset of stable symptoms to those with unstable angina and those with longer histories; and from concentric stenoses to eccentric lesions, calcified lesions, and occlusions. These advances have been the result of increased operator skill and experience and of technical improvements in the equipment. Some workers have felt capable of tackling up to eight stenoses with apparently successful results.<sup>1</sup>

Amid all this excitement two recent papers have drawn attention to the complications of this procedure. Shiu *et al* reported an occlusion rate of 8% in 240 procedures from three centres.<sup>2</sup> A high proportion of these patients were women. Attempts to redilate were often successful (six out of ten attempts) and redilatation was a safe procedure if the steerable wire had been left in place across the lesion. Because this process does not take too long, it can be tried in an emergency while preparations for cardiac surgery are under way. On page 223 Norell *et al* report their early experience at the London

Chest Hospital in 69 patients.<sup>3</sup> These workers must be congratulated on the speed and efficiency with which emergency surgery was started after failure of angioplasty. All but one of their complicated cases survived with symptomatic improvement and only one third of those patients with occlusions subsequently had an infarct. An overall failure rate of 27% with an occlusion rate of 19%, however, must have been disappointing and Norell and coworkers speculate on the reasons for this.

Coronary angioplasty is a technically demanding procedure in which there is a thin line between success and failure. The figures in the National Heart, Lung and Blood Institute register clearly show that at all centres there is a learning curve during which procedure-related complications and failure to dilate the lesion decrease.<sup>4</sup> The London Chest group included "three individuals who were becoming experienced" and the total number of procedures (69) was not great, so in this series none of the operators was likely to have a large experience of angioplasty. It is not clear whether these procedures were undertaken before or after recent improvements in equipment. The use of smaller soft tip guiding catheters (with and without side holes), finer steerable guide wires which permit better visualisation of the artery, and low profile balloons might have reduced the complications—particularly that of trauma to the left main stem coronary artery.

What then can reasonably be expected from a centre during the first few years of coronary angioplasty? In Sheffield 240 dilatations have been performed in 209 patients. Most of these were done by one operator who now has personal experience of over 300 cases. Technical success was achieved in 205 (85%), in 14 (6%) urgent surgery was required, and two patients died (one after discharge). There were nine (4%) Q wave infarcts (four after surgery).

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Recent occlusions, occurring between initial angiography and angioplasty, were successfully dilated in 10 out of 17 attempts. Unstable angina accounted for 20% of the cases and two-vessel dilatations were performed in only 12 patients. These results are similar to those from other centres and have improved gradually. They reflect increasing experience, and the use of more appropriate equipment and patient selection. We have found that less than 10% of patients considered for revascularisation are suitable for angioplasty, and that it is unusual to find multivessel disease in which all important lesions are amenable to dilatation.

Technical success is not always followed by prolonged symptomatic relief. Late recurrence of symptoms (that is, after six months) is usually due to progression of disease, but early recurrence is due to restenosis of the angioplasty site. Angiographic restenosis may occur in up to 30% of patients. Symptomatic restenosis occurs in 10–15% of patients but in this group repeat angioplasty is safer, easier, and more successful than the initial procedure. Not much is known about the factors governing restenosis—it occurs later than one day and earlier than three months. Restenosis is not clearly related to any technical factors at the time of angioplasty, nor to any particular patient features. It will be interesting to see the results of attempts to improve the radiographic appearance of the dilatation and to reduce platelet aggregation at the angioplasty site with epoprostenol (prostacyclin).

The role of angioplasty continues to expand. It has a definite place in the treatment of unstable angina.<sup>5</sup> It will almost certainly be valuable in acute myocardial infarction after the use of selective thrombolytic agents. The value of angioplasty in complex multivessel disease is unclear because so far there has been no long term follow up. No compara-

tive trial of angioplasty versus surgery and medical treatment has so far been performed because of the difficulties inherent in such a study. A trial is planned in the United States and this will include patients with multivessel disease.

Coronary angioplasty and bypass graft surgery are complementary procedures. One clear message from the paper by Norell *et al* is that we are still a long way from being able to dispense with surgical back up to prevent or reduce the extent of infarction after complicated angioplasty. Coronary graft stenoses, on the other hand, may also be amenable to dilatation. Angioplasty also preserves the saphenous veins for future operation if the disease progresses. It is unlikely that coronary angioplasty will reduce the demand for bypass surgery. Referrals for angiography, especially in younger patients with short histories, will increase. Only some of them will be suitable for dilatation and the rest will join the ever increasing queue for bypass grafting.

#### References

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