

*Current controversies***Surgery is the best intervention for severe coronary artery disease**

David P Taggart

A multidisciplinary approach is essential, but best evidence favours surgery over percutaneous intervention

For the past two decades coronary artery bypass grafting has been the standard treatment for patients with severe multivessel ischaemic heart disease.¹ In the past few years, however, it has been increasingly challenged by percutaneous coronary intervention. Indeed, in many parts of the developed world percutaneous coronary intervention is done twice as often as coronary artery bypass grafting. Why has this change in practice occurred? I believe that it is not evidence based, does not represent best value for money, and that patients are not appropriately informed of its limitations.

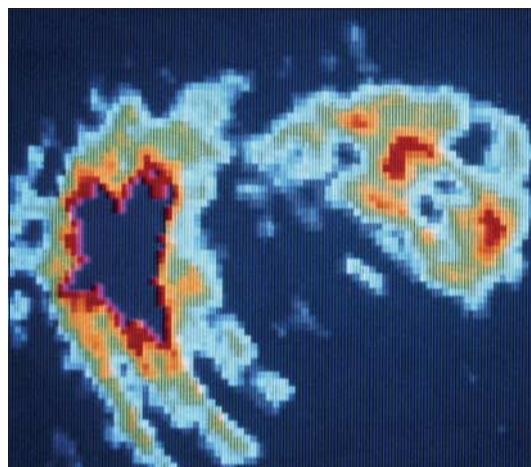
Research evidence

Coronary artery bypass grafting is probably the most intensively studied surgical procedure, with follow up data extending over 20 years.² It is highly effective in relieving the symptoms of ischaemic heart disease and improving life expectancy in patients with certain anatomical patterns of disease; these benefits are magnified in patients with more severe disease and with impaired left ventricular function.¹ Furthermore, coronary artery bypass grafting is remarkably safe. Improvements in medical, anaesthetic, and surgical management have ensured that hospital mortality has remained around 2% over the past decade despite the treatment being used in older and sicker patients.³

On the other hand, until recently percutaneous coronary intervention has been used to treat patients with coronary disease in only one or two vessels. Its current use in patients with more widespread disease has largely mirrored its development from simple balloon angioplasty to a procedure that uses (multiple) stents. The conventional Achilles' heel of simple angioplasty is restenosis, affecting up to 40% of procedures, and this is halved by stents. Most recently, drug eluting stents have been claimed to effectively eliminate restenosis.

Applicability of research

So is percutaneous coronary intervention really as effective as coronary artery bypass grafting? Ten randomised trials have compared percutaneous coronary intervention and coronary artery bypass grafting in patients with multivessel ischaemic heart disease. Overall, the trials broadly agreed that survival was similar with both interventions but that surgery greatly reduced the need for further intervention (from 20% with percutaneous coronary intervention to 5% with coronary artery bypass grafting). However, 80% of the participants had single or double vessel disease and normal ventricular function,⁴ a population already known not to benefit prognostically from coronary artery bypass grafting.¹ By largely excluding patients with severe three vessel coronary



Positron emission tomogram of blocked coronary artery

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artery disease, who predominantly constitute the population having surgery in the real world, the trials were, in effect, inherently biased against the prognostic benefit of surgery.

Subsequent reporting of these trials in the medical literature was misleading. Because the papers were styled and titled as trials of multivessel ischaemic heart disease, the highly unrepresentative nature of their patient populations was apparent only to expert readers who were prepared to pursue the small print. Accompanying editorials, invariably written by cardiologists, either ignored or fleetingly mentioned this fundamental limitation.

Safety of non-surgical treatment

Despite this, these trials are now used to justify percutaneous coronary intervention in patients with true multivessel disease. The danger of this approach was highlighted in a recent study from the Cleveland clinic, in which propensity matched patients with severe coronary artery disease had a 2.5-fold increase in five year mortality when treated by percutaneous coronary intervention rather than coronary artery bypass grafting.⁵ This reinforced the findings of a large prospective study on around 3000 diabetic patients with triple vessel coronary artery disease showing that those treated with percutaneous intervention rather than coronary artery bypass grafting had a twofold increase in five year mortality.⁶ This increase in mortality with percutaneous intervention rather than surgery belies the oversimplified cardiological justification that the patient "Did not want an operation." Patients generally want what is in their best interest. To most, a week in hospital

Summary points

Most studies of percutaneous coronary intervention have been done on patients with single or double vessel disease and have limited follow up

Nevertheless percutaneous coronary intervention is being increasingly used to treat multivessel ischaemic heart disease

By contrast, studies of coronary artery bypass grafting have established its safety and long term effectiveness

Patients must be given all the evidence to enable an informed choice about treatment

and six weeks recuperation is a good trade-off for a procedure offering an excellent prospect of long term relief of symptoms and a gain in life expectancy.

What of the safety and economics of drug eluting stents? Most studies of these stents have follow ups of less than a year. The early promise that they eliminate restenosis seems increasingly improbable as registry rates of restenosis, reflecting outcome in real practice, are reported at 10-20% in more complex lesions^{7,8} and as high as 28% in bifurcating lesions.⁹ And as these stents inhibit endothelialisation, the patient is at subsequent risk of myocardial infarction even up to a year later if antiplatelet drugs are stopped.¹⁰ These limitations reinforce the National Institute for Clinical Excellence's caution in 2003 that a long overdue expansion of coronary artery bypass grafting with its proved benefits is jeopardised by the widespread use of these expensive stents.¹¹

Informing patients

So how best should we advise patients with severe multivessel ischaemic heart disease? Percutaneous coronary intervention should become the default treatment only when evidence from relevant trials shows that it is really as safe and effective as coronary

artery bypass grafting. The current tendency of some cardiologists to exclusively investigate and treat patients with severe multivessel disease without a surgical opinion not only belittles the traditional multi-disciplinary approach but ensures that the best and most balanced advice is unlikely to be consistently offered. Most importantly, by effectively denying patients the opportunity of making a fully informed choice, it falls far short of best practice.

Contributors and sources: DPT has studied, practised, and published widely on several aspects of coronary artery bypass grafting and in particular its benefits in comparison to percutaneous coronary intervention.

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A nice little interest

As I struggle to combine bringing up a family of three young children with flexible training in anaesthesia, the date of my completion of specialist training seems almost as distant as that of my final repayment on my 25 year mortgage. With my eldest child now attending morning nursery, my days on maternity leave are punctuated by the school run. One of the other mothers chatting at the school gate asked me if I did anything before I became a mother. Keen to discuss my other, more sophisticated role in life, I humbly but proudly told her that I was, and still am, an anaesthetist. "Oh," she replied, "That's a nice little interest."

Somewhat deflated, I felt I might as well have told her that I was a trainee flower arranger at the local Women's Institute.

A week later, I was sitting in front of a RITA (record of in-training assessment) panel, having mounted the equivalent of a military exercise in child care arrangements just to be there. As my breasts were giving me indications that my 4 week old baby sitting outside must by now be starving, I was feeling some maternal guilt, wondering what other mother would put such a young child through the ordeal of the annual RITA.

As the RITA panel efficiently dismantled my portfolio, looking for numbers of craniotomies and coronary artery bypass grafts, audit presentations, and evidence of "enhancing my prominence in the department," I wondered what they thought of my "nice little interest." Perhaps it was time we anaesthetists did more to promote public awareness of the depth of our specialty.

On further reflection, however, I thought that perhaps the other mother had the right perspective. Parenthood, after all, is any mother's intended primary career. For most of us, the number of hours committed to it surpasses anything we will do at work: there is usually only one or maybe two names on the rota, and no European working time directive to protect the participants from fatigue and exhaustion. By comparison, all other careers (not only anaesthetics) could be described as a secondary occupation, if not just "a nice little interest."

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