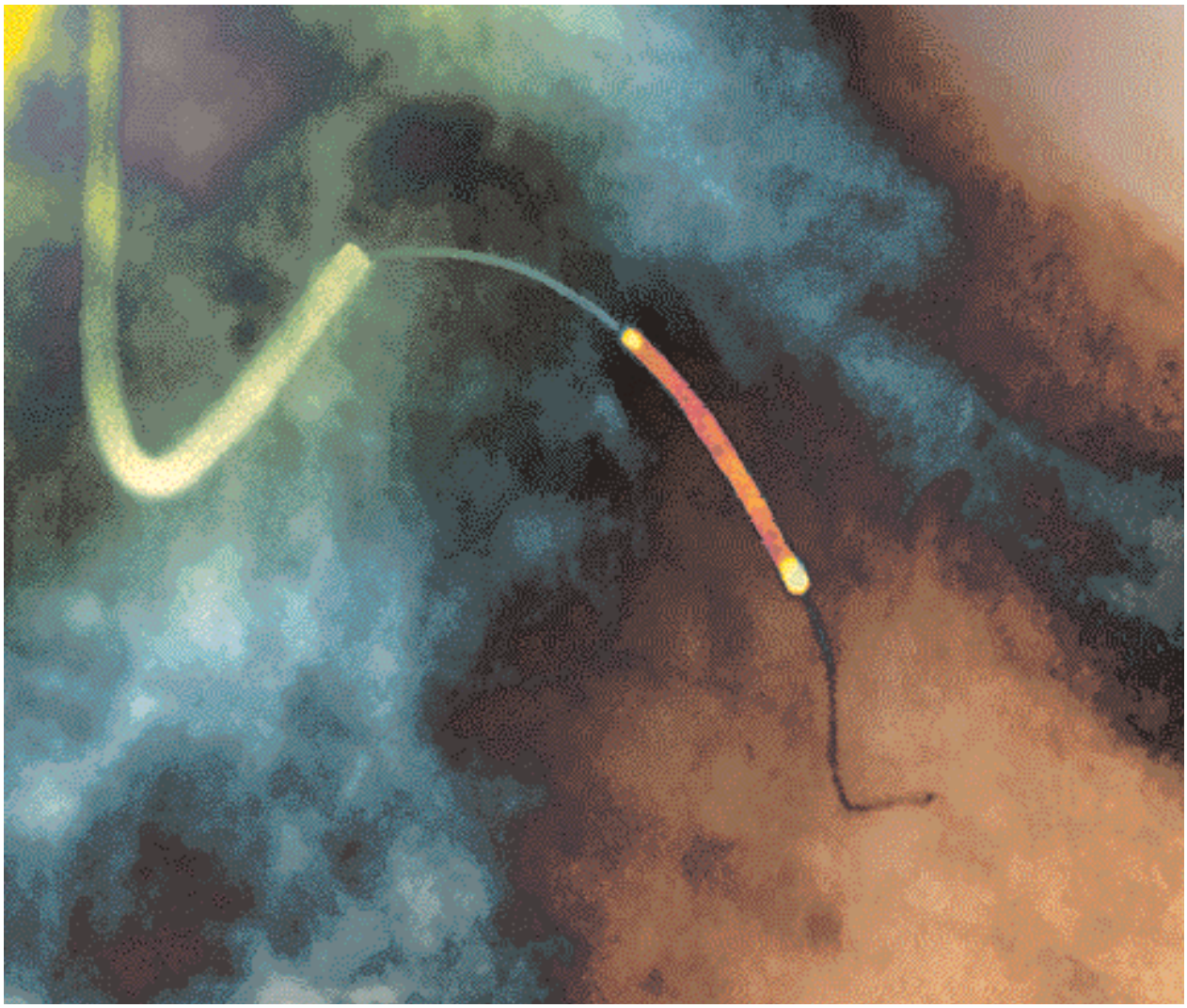
Should your patient have CABG or stents?

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PATIENTS WITH SIGNIFICANT CORONARY ARTERY DISEASE CAN PRESENT WITH A spectrum of symptoms that range from the very subtle to the very obvious.

In some patients chest discomfort may be clearly pleuritic or musculoskeletal in nature and does not require referral. However, in other patients who describe a history of chest discomfort, particularly of recent onset, related to exercise and radiating to the arms and neck, there should be a high suspicion that this represents coronary artery disease. Patients with these symptoms should always be referred early for further assessment, urgently if the symptoms are of recent onset or rapidly escalating, to delineate the extent and severity of coronary artery disease. This will determine if the disease is prognostically important and whether it can be controlled with medical therapy or requires invasive intervention.

However, it is impossible to determine the prognostic significance of coronary artery disease on history alone. A significant proportion of patients with prognostically important disease will present with either minimal or atypical chest pains, and sometimes with indigestion.

Some patients with significant coronary artery disease may be »

Table 1

Red flags for referral and urgent referral

Red flags:
- Any chest pain or breathlessness without known cause
- Appearance of new chest pain or breathlessness that is exertional in nature
- Gradual increasing angina or breathlessness in a patient with known coronary artery disease

Urgent referral:
- Appearance of angina or breathlessness at rest (consider referral to A&E)
- Acute and marked deterioration in symptoms that were previously stable

totally asymptomatic. These patients present for other reasons, such as sudden cardiac arrest, or during screening before an operation. This situation is more common in patients with diabetes.

Alternatively, some patients may present predominantly with breathlessness rather than chest discomfort.

In patients with chest discomfort other concomitant risk factors, particularly in younger patients (such as those aged 40 to 50 years), reinforce the need for formal assessment. These risk factors include:
- A strong family history of coronary artery disease
- Smoking
- Diabetes
- Hypertension
- Hyperlipidaemia.

Although a considerable proportion of these patients may, after detailed assessment, eventually turn out not to have **significant** coronary artery disease, it is important that the patient and the GP are certain about this.

'The majority of patients with a positive exercise ECG require angiography'

Patients should always be initially referred for assessment to a cardiologist or to a GP with a particular interest in cardiology.

Q How are patients requiring coronary revascularisation assessed?

A A resting ECG may demonstrate abnormalities suggestive of coronary artery disease. However, an exercise ECG is more likely to reveal abnormalities predictive of significant coronary artery disease.

Patients with completely normal exercise ECGs, or with very minor abnormalities, usually require no further investigation.

The majority of patients with a positive exercise ECG require angiography to define the exact extent and severity of coronary artery disease.

For patients who are not capable of undergoing an exercise ECG, the alternative is to perform a perfusion scan. If this is normal it usually eliminates the possibility of significant coronary artery disease.

In patients who have an abnormal exercise test it is important to assess left ventricular function, either at the time of angiography or by echocardiography.

In patients with significantly impaired ventricular function who do not have angina, a cardiac MRI will help distinguish those with hibernating muscle (which has the potential to improve after revascularisation) from patients with infarcted muscle (which will not improve with revascularisation).

Q How is the surgical procedure chosen?

A At present there are no definitive national guidelines on which treatment should be offered to which patients.

This problem is compounded by the fact that the actual decision on which intervention the patient should receive is usually determined by an interventional cardiologist, rather than by a multidisciplinary team. This is in contrast with many areas of medicine, and I have proposed, for debate among all relevant parties in the UK, that a multidisciplinary team, including a non-interventional cardiologist, interventional cardiologist and a cardiac surgeon, should be the minimum standard of care to ensure that patients are offered the best advice.[1,2]

Q What are the benefits of coronary artery bypass grafting and stenting?

A For almost three decades coronary artery bypass grafting (CABG) has been known to offer survival benefits in patients with left main stem stenosis and triple-vessel coronary artery disease, especially if it involves the proximal left anterior descending coronary artery, which has particular adverse prognostic significance.

The benefits of surgery are magnified in patients with:
- Severe symptoms
- A positive exercise ECG
- Impaired ventricular function.[3]

The long-term patency of an internal mammary artery also makes this the best proven treatment for isolated proximal left anterior descending coronary disease, although many patients with single-vessel coronary artery disease may prefer a less invasive approach.[4]

In contrast, percutaneous coronary intervention (PCI) with stents has conventionally been reserved for patients with one- or two-vessel coronary artery disease who have remained symptomatic despite optimal medical therapy.

Recently, however, there has been an increasing trend to use PCI in patients with more severe coronary artery disease. This rationale is based on the results of randomised trials that claim to show a similar survival benefit with CABG and stents.

However, the results of these trials are not really applicable to patients with true triple-vessel coronary artery disease. The trials only randomised fewer than 5% of all potentially »

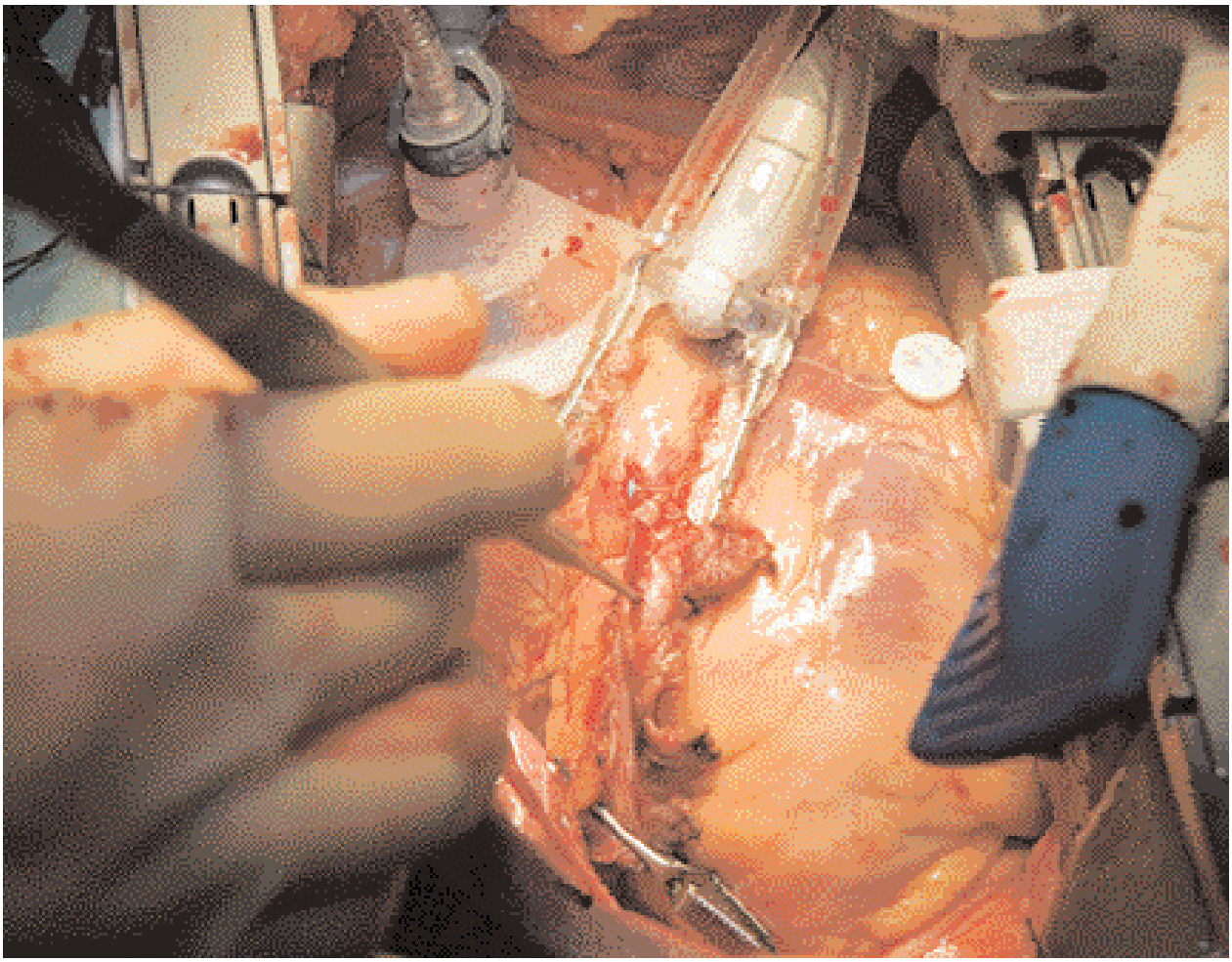


FIGURE 1
Coronary artery bypass grafting
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eligible patients, and mainly included patients with one- or two-vessel coronary artery disease and normal left ventricular function, in whom it was already established that surgery had no prognostic benefit. Thus the trials were, in effect, inherently biased against the prognostic benefit of CABG.[1]

Several large databases have recently confirmed the prognostic benefit of surgery over PCI in patients with triple-vessel coronary artery disease. For example, this was demonstrated in the New York registry of almost 60,000 patients who underwent PCI or CABG. At three years of follow-up, after risk matching for cardiac and non-cardiac comorbidity, there was an absolute survival advantage of 5% and a seven-fold reduction in the need for further intervention in patients undergoing CABG compared with PCI.[5] Similar results have been reported in several other large databases[6,7] and have been seen in patients with diabetes, who often have more severe coronary artery disease.[8,9]

'PCI is not a cost effective treatment compared with medical therapy or CABG'

The recent COURAGE trial also showed no advantage for the use of stents over optimal medical therapy.[10] Although some investigators feel that this may mean that there is no advantage for stents in comparison with CABG, this is not the case; around 70% of the patients in the COURAGE trial had single- or double-vessel coronary artery disease with normal left ventricular function and would not normally be offered CABG. »

'Several large databases have recently confirmed the prognostic benefit of surgery over PCI in patients with triple-vessel coronary artery disease'

More recently, health economists have stated that, because of the frequent need for repeat interventions after stenting, PCI is not a cost effective treatment in the NHS compared with medical therapy or CABG.[11,12]

'Grafts not only treat the culprit lesions, but also offer protection against the development of further disease'

Q Why does coronary artery bypass grafting offer a survival advantage compared with stents?

A There are two reasons. First, CABG grafts are placed to the mid-coronary vessels, beyond all diseased segments. Therefore the grafts not only treat the initial culprit lesions, but also offer protection against the development of further disease in the diffusely unstable endothelium of these patients. In contrast, PCI only deals with the localised culprit lesion (if it is suitable for stenting) and offers no protection against the development of further disease.

Second, whereas CABG offers complete revascularisation in most patients, PCI stenting often leads to incomplete revascularisation. This degree of incomplete revascularisation correlates with subsequent mortality. For example, in a study of 22,000 patients undergoing PCI almost 70% had incomplete revascularisation and this led to an increase in subsequent mortality.[13]

Q Do drug-eluting stents produce better outcomes?

A The initial hype that drug-eluting stents would solve all the problems with previous generations of stents, such as restenosis, has now been moderated by several large meta-analyses. These have shown that drug-eluting stents **do not** improve survival or reduce myocardial infarction in comparison with other stents.

The analyses have also shown that drug-eluting stents introduce the problem of late stent thrombosis. The incidence of this is uncertain,

but has been estimated as 1-5% of patients per annum, depending on the frequency of drug-eluting stent use in 'off-label' situations or without dual antiplatelet medication. This complication carries a 40% risk of infarction or death.[14] The major reason for this problem is that drug-eluting stents prevent complete re-endothelialisation of the vessel, thereby leaving a prothrombotic substrate.

In the United States the use of drug-eluting stents has fallen from more than 80% of patients who receive PCI to less than 50%, and is expected to fall even further.

CONCLUSION

There should be a low threshold for referring patients with chest discomfort for rapid assessment, especially when it is of recent onset and/or the patient has other risk factors.

In patients with significant coronary artery disease a multidisciplinary team should devise a treatment strategy. In general, patients with left main stem disease and three-vessel coronary artery disease (especially involving the proximal left anterior descending coronary artery) who are eligible for surgery should always be given a surgical opinion.

Patients with one- or two-vessel coronary disease may be managed with medical therapy or be considered for stents if they remain symptomatic. For patients with proximal left anterior descending disease the best proven therapy is still an internal mammary artery graft. ●

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