information to comment on the comparability of the groups. All report differences at baseline. Jackson and colleagues attempted to deal with the differences by undertaking a logistic regression to establish that the case-mix was independent of major outcomes.[134] Peterson and co-authors re-analysed the data using a narrow group of patients who had not had a previous revascularisation and restricting any outcomes to the target lesion.[152] This did not result in any change in the results. Palmer and co-authors did not deal with the baseline differences, except by establishing identical success and complication rates in the two groups.[137]

Quality of the studies

The quality of the studies is reported in the economic studies checklist (see appendix 14; page 141). Six of the studies reported a sensitivity analysis, with explicit assumptions. All the studies have flaws. Only one study (BENESTENT II) was an RCT with costs and outcomes collected and reported simultaneously.[27] The general pattern of quality for sources of effectiveness data (items 8–10 on checklist; see pages 141 and 142) were good but the pattern for costs considerably poorer (items 16–19; see page 142).

Source of cost data

Nine of the studies based their costings on bottom-up costing exercises[27,134,137–149,152] and five of these used European data.[27,134,137–145,148] Five studies used UK prices[1,18,133,150,153] and in three studies there was insufficient information given to determine the source of the cost data.[70,116,151] Further detail is given in appendix 12 (page 137).

Outcome measures

A range of outcome measures have been reported: event-free survival (EFS), cost per event-free survivor (cost/EFS), cost per outcome avoided, incidence of major adverse coronary events, cost per quality adjusted life-year (QALY). (EFS in the clinical effectiveness review has been taken to be the reverse of total event rate.) Appendix 13 (page 139) shows which studies have reported individual outcome measures.

EFS includes the absence of death, MI and revascularisation procedures. These outcomes were used in the three studies that used this measure to compare PTCA with stenting. Each of these outcomes carries equal weight in the outcome measure, but all of the studies reported the individual event rates separately and found that the major difference was in the revascularisation rates.

With the exception of the West Midlands DEC report,[1] the quality of life data used in all the cost–utility analyses were derived from the paper by Cohen and colleagues (1994).[154] Cohen and colleagues used data from Pliskin's study of patients with angina and made some assumptions about quality of life for three different degrees of severity of angina.

Results of cost-effectiveness analysis

The cost/EFS is largely the cost per revascularisation procedure averted (which is usually a repeat PTCA) although there are small proportions of patients with MI or deaths. There is concern about the meaning of cost/EFS when the main event being prevented is repeat PTCA which has mainly resource rather than health implications.

The cost/EFS for stents ranges from 38% higher than PTCA to 31% lower. Results from the four studies reporting this outcome are shown in *Table 7*. The differences are a function of differences both in costs and in the EFS rates. However, the majority contributor to lower costs/EFS in stent patients in recent studies appears to be a reduction in cost differential.

The earliest report used data from BENESTENT I and there is a large (55%) additional cost of stenting compared with PTCA.[146] This high cost is mainly due to the anticoagulation regimen used for BENESTENT I. The same study also used data from the BENESTENT II pilot (Phase IV) (approximately 2 years later) and compared the stenting results from this with the PTCA results of BENESTENT I. This comparison results in an 18% lower cost/EFS. The main contributor to the low cost/EFS for stenting is the large (22%) difference in EFS rates between the two groups. As the effectiveness data were not collected over the same time period, it is likely that factors other than the type of procedure affected the result. The cost difference between the stenting in the BENESTENT II pilot (Phase IV) and PTCA is much lower than for BENESTENT I and this difference is largely due to the change to an antiplatelet regimen.

Schwicker and Banz reported the largest differences in cost/EFS.[138–145] Their effectiveness estimates were derived from a literature review up to 1996 with some input from experts. Although they used quality criteria for the inclusion of studies, they also included some non-randomised trials, which may account for the larger differences in EFS rates. They also had the longest follow-up period.

TABLE 7 *Features of studies reporting EFS rates and costs*

Study	Follow-up period	EFS rate (%)			Costs		Cost-difference as % of PTCA	Cost/EFS		Difference in cost/EFS as % of PTCA
		Stents	PTCA	Difference	Stents	PTCA		Stents	PTCA	
Van Hout *et al.*[146]										
BENESTENT I	7 months	80	70	10	DFl 23,593	DFl 15,208	+55	DFl 29,000	DFl 21,000	+38
BENESTENT II pilot		92	70	22	DFl 16,663	DFl 15,208	+9.5	DFl 18,000	DFl 22,000	–18
Schwicker & Barz[138–145]										
SVD 1 year follow-up	1 year	89	76	13	DFl 12,812	DFl 12,479	+2.6	DFl 14,430	DFl 19,989	–29
SVD 3 years follow-up	3 years	82	68	14	DFl 15,126	DFl 14,885	+1.6	DFl 18,697	DFl 27,271	–31
BENESTENT II[27]	1 year	89	79	11	DFl 18,812	DFl 16,727	+2.5	DFl 21,309	DFl 21,073	+1.2
Boston Scientific[150]	1 year	84	78	6	£4918	£4662	+5.5	£5840	£6010	–2.9

SVD, single vessel coronary disease

Some figures have been rounded

Both BENESTENT II and a study by Boston Scientific reported similar costs/EFS for PTCA and stenting.[27,150] Both used the effectiveness data from BENESTENT II. Apart from the Boston Scientific study,[150] all these studies used cost data from The Netherlands, which reduces the differences between healthcare systems.

Despite the above explaining variation, the general pattern revealed is a favourable or neutral impact on cost-effectiveness. This is particularly so when account is taken of the fact that the only cost-effectiveness analysis showing markedly greater cost/EFS in the stent group relative to the PTCA group is the oldest study which least reflects current practice.

Results of cost–utility analyses

Table 8 shows the results of the studies reporting cost/QALY. This also presents the ranges of cost/QALY from the sensitivity analyses and the assumptions made in the models. Although the cost/QALY derived in the Wessex DEC study[133] is notably higher than in the other studies, the lower end of the sensitivity analysis is of a similar order as for the other results. Equally, the higher ranges of cost/QALY obtained from the studies by Guidant[148] and by Cohen and colleagues[147,149] are of a similar order to the Wessex DEC[1] result. The results are very sensitive to the assumptions used in the models, and the effectiveness and cost data used. In individual models the cost/QALY was very sensitive to the restenosis rates and the costs of stenting. This was clearly demonstrated in a model developed by Cohen and colleagues (1994).[154] The overall pattern suggests a cost/QALY difference between stents and PTCA of approximately £20,000–£30,000.

When comparing the cost–utility results between studies other assumptions are important. The Wessex DEC assumed an equal mortality rate in the PTCA and stent groups and thus only included the difference in revascularisation rates in their model.[133] The mortality rate after PTCA and stenting is approximately 1% at 1 year and thus it is a reasonable assumption to exclude deaths. When Guidant[148] excluded deaths from their model, the cost/QALY rose substantially. Although the West Midlands DEC also assumed an equal death rate at 1 year, they included a higher mortality rate in the PTCA group at 6 months follow-up.[1] Boston Scientific[150] did not have a significantly different mortality rate at 1 year. The West Midlands DEC[1] used different quality of life data for the different grades of angina reported by BENESTENT II. This is in

TABLE 8 *Analysis of cost–utility studies*

Study	Key assumptions	Difference in revascularisation rates (%)	Additional cost of stent	Cost/ QALY	Range of cost/ QALY from sensitivity analysis
Wessex DEC[133]	Patients with repeat PTCA had symptomatic restenosis with QOL valued at 0.8 Waiting-time for revascularisation 3 months Same procedural success rate in both groups Same survival rate in both groups PTCA if PTCA or stent	10.6	£1431	£250,000	£20,000–£772,000
West Midlands DEC[1]	Different QOL data used for the different grades of angina post PTCA and stent (data based on BENESTENT II results) Average EUROQOL for post-PTCA patient with angina is 0.661, and post-stent is 0.724 Death rates at 1 year are the same, at 6 months for PTCA death rate = 0.5% and for stent = 0.2% One stent used per procedure	5.6	£919	£23,000	£13,000–£53,000
Boston Scientific[150]	Deaths: 0.2% more early deaths in PTCA group Waiting-time for target-lesion revascularisation was 3 months Utility value with restenosis 0.8 QALYs 1.17 stents used per procedure	5.8	£256*	£31,500	Approx. £15,000–£82,000
Cohen *et al.*, 1997 & 1999[147,149]	55-year-old man with single vessel disease Restenosis > 50% would require revascularisation Patients with restenosis would have a max. of 3 percutaneous revascularisation attempts before CABG	16	$800	$33,700	Cost/QALY increases to $200,000 for type A mid-right coronary stenosis, with abrupt closure rate of 3% and restenosis rate of 25–30%

**This is the marginal cost of adjunctive stenting at 1 year, not the average price of a stent*

QOL, quality of life

continued

TABLE 8 contd *Analysis of cost–utility studies*

Study	Key assumptions	Difference in revascularisation rates (%)	Additional cost of stent	Cost/ QALY	Range of cost/ QALY from sensitivity analysis
Guidant[148]	No difference was assumed in death rates from primary procedures, but the submission includes the effects of higher total deaths from secondary and subsequent procedures in the absence of stents, due to higher rates of restonosis Waiting-time for target-lesion revascularisation was 3 months 2-year follow-up	10	£1041	£6812	£6813–£360,000 (if impact of deaths and CABGs and longer waiting times ignored)

contrast to the other studies, which derived their utility values for angina from Cohen and colleagues (1994).[154] Guidant[148] calculated the lowest cost/QALY. This was the lowest end of the range in their sensitivity analysis, and they took a 2-year perspective, unlike the other studies.

Stents compared with CABG in multi-vessel disease

The ARTS study[70] and Schwicker and Banz[138–145] looked at stents in comparison with CABG for multi-vessel disease. They both reported higher rates of EFS in patients following CABG. Schwicker and Banz report lower costs at 3 years follow-up in stent patients, and ARTS has similar findings for patients with two-vessel disease. Despite the lower effectiveness, stenting may be a cost-effective alternative to CABG in patients with multi-vessel disease.

Summary and implications of economic analysis

Variation is a marked feature of all the health economic data reviewed. This variation was particularly apparent between different estimates of cost, cost-effectiveness or cost–utility. There was also a contrast between the general message about efficiency provided by cost-effectiveness analyses, which presented elective stenting as efficient and having relatively minimal resource consequences, and that presented by the cost–utility estimates, which in the range of £20,000–£30,000 would be close to an important threshold distinguishing efficient from inefficient.

Although the interrelationship was only examined crudely, we believe that there are clues to the source of this contradiction.

From the analysis of cost information, hospital costs of stents remain higher than those of PTCA despite the falling costs of stents – differential of approximately £1500 to £1800. The cost differential between stents and PTCA falls when the wider costs (of follow-up and repeat revascularisation procedures) are taken into account. Taking this into account would reduce the cost differential to about £900.

This differential in costs is similar to those used in cost–utility calculations. However the cost differential used in the cost-effectiveness analyses is much narrower. In contrast to estimates of effectiveness used in all the health economic analyses, there is a marked difference in the costs used. The question arises as to which set of analyses uses the most accurate costs. This is particularly important because costing methods were rarely given in the studies reporting cost data. Thus, there was little indication of whether key factors likely to influence relative cost, such as the degree of use of bailout stenting or multiple use of stents, were taken into account. Uniquely, McKenna and colleagues[131] provided a bottom-up costing, but despite good methods, it is clear that current practice in these key respects could not be anticipated in 1997.

We believe, therefore, that the observation that the cost-effectiveness analyses tended to be based on bottom-up costings, and cost–utility estimates tended to be based on ill-defined costs or prices, suggests that greater caution should be applied to the interpretation the cost/QALY figures. This is particularly so as the utility values used to assess impact are underpinned by a limited amount

of research. Further, in the interpretation of cost/QALY figures, although the health value of the main event avoided – need for repeat PTCA – is probably correctly attributed a relatively low health value, this does not take into account the potential value of avoiding repeat PTCA to the wider healthcare system. This may be particularly pertinent in the NHS where there is evidence of significant under-provision of revascularisation procedures for severe IHD. In a situation in which there is an imperative to increase revascularisation rates, and where it may take time to develop capacity (i.e. increased numbers of centres with trained staff with the appropriate technical skills), the value of avoiding repeat PTCAs may not be truly reflected by its impact on individual health alone.

Although we tentatively favour the picture of efficiency suggested by the cost-effectiveness analyses, some caution also needs to be exercised in interpreting these. We had concern about the meaning of cost/EFS, where the main event being prevented is repeat PTCA, which arguably has greater resource consequences than personal health consequences.

On the basis of the above we conclude that there is evidence that initial costs to achieve a reduced rate of repeat PTCA may be largely off-set by the savings this brings about. However, the confidence with which this can be asserted would be greatly improved if the resource neutrality of coronary artery stents could be confirmed, using more rigorously derived cost data.

Finally, two points should be noted: firstly, that, despite some information on costs and a health economic analysis, conclusions concerning the efficiency of stenting relative to CABG are hampered by a lack of fully published effectiveness data; secondly that, although effectiveness data exist showing the relative benefit of stenting relative to PTCA in AMI, no relevant cost or health economic analyses were identified, again prohibiting conclusions.

Chapter 4

Discussion and conclusions

Results summary

Stents versus PTCA for subacute IHD (i.e. mainly angina and unstable angina)

General

It is important to remember that whatever the results of the evidence examined, we have implicitly accepted that there is a role for stenting in treating acute closure occurring during a PTCA (bailout or rescue stenting). The evidence for this is mainly observational, but convincing. The main alternative in this situation, an emergency CABG, appears to have worse outcomes, and has major resource implications.

BCIS audit data suggest that increasing stent use has been associated with a reduction in emergency CABG. However other technological advances could also contribute to this change over time. Although not part of the effectiveness review, two small trials provided little support for prolonged balloon perfusion balloon inflation as an alternative to bailout stenting.

Finally the availability of bailout stenting does not obviate the need for recourse to emergency CABG.

Effects and effectiveness

The key points are shown in *Box 6*.

Costs

The key points are presented in *Box 7*.

Cost-effectiveness and cost–utility

The key points are presented in *Box 8*.

Stents versus CABG for subacute IHD (i.e. mainly angina and unstable angina)

General

Understanding whether elective stenting is effective and cost-effective in the management of complex patterns of coronary artery occlusion, for which currently CABG is the preferred method of management, is critical to planning an appropriate balance of provision between the two main modes of coronary artery revascularisation – PTCA and CABG. The importance of this is compounded by the fact that the two sets of procedures are undertaken by different professional groups whose skills are not obviously transferable.

Effects and effectiveness

Seven randomised trials were identified (three with sufficient information to make some entry in our study characteristics table; four without such information, detailed in the table of excluded studies). Unfortunately, none of the trials have reported their results fully, although a number have completed recruitment. Currently, there is thus no rigorous evidence on the effectiveness of stents relative to CABG. However it seems likely that such evidence may become available over the next 2 years.

Costs

Cost data are available on both PTCA and CABG. All the provisos concerning the available cost data mentioned above apply.

Cost-effectiveness and cost–utility

One health economic analysis was identified. This is based on an ongoing trial, but clearly until confirmed and fully published effectiveness data are available, this analysis must be regarded as speculative.

Stents versus PTCA for acute MI

General

In order to interpret research comparing elective stenting and PTCA for acute MI, we have assumed that PCI is at least as effective and cost-effective as medical acute management of MI. Although we did not specifically review this evidence, this seems reasonably well established.

Effects and effectiveness

There are a good number of randomised trials, with more in progress. Unfortunately the results of those that have been completed are devalued by incomplete or poor reporting. Although we have not examined these studies in as much detail, most of the issues highlighted in the analysis of trials on elective stenting versus PTCA in subacute IHD seem to apply.

- The PTCA arms of most of the trials actually allow bailout or rescue stenting.
- What constitutes bailout stenting in the PTCA alone trial arms varies, and does not only include stenting for acute closure, but also for suboptimal PTCA results.

BOX 6 Stents versus PTCA for subacute IHD: key points on effects and effectiveness

- There is a good volume of randomised trials, with many more in progress. Unfortunately the results of those that have been completed are in many cases devalued by incomplete or poor reporting.
- Interpretation of the available published trials is complicated by considerable clinical heterogeneity manifested by important differences in:
  - IHD sub-types investigated
  - stenting strategies used
  - anticoagulation strategies used.
- The PTCA arms of most of the trials actually allow use of stents when acute closure occurs during the angioplasty procedure (bailout stenting). Thus it is inaccurate to interpret the results of the trials as the impact of stents versus no stents.
- Further, the definition of what constitutes bailout stenting varies. In some trials, stenting occurring in the control arm appears to have been undertaken not just for acute closure but also for sub-optimal PTCA results.
- Thus, effectively trials compare treatment packages comprising:
  - the PCI
  - rules for and patient preference for crossover
  - antithrombotic therapy.
- There is a consistent difference between treatment and control groups other than use of stents, especially in the use of more intensive antithrombotic therapy. This could account for some of the difference in observed outcome, currently wholly attributed to stent use alone.
- Aside from the quality of reporting, the quality of trial conduct also needs to be taken into account. Randomisation processes were often inadequately reported or sub-optimal. Further, steps to increase the objectivity of outcome assessment, although difficult, were rarely attempted. This is important to maintain validity, as in the absence of blinding there is clear risk of decisions to re-intervene being heavily influenced by whether a patient was allocated to elective stenting or PTCA alone.
- Although the above points introduce important sources of uncertainty, the following effects appear to have been established:
  - stents decrease total event rates (generally consisting of death, MI and need for re-intervention [either repeat PTCA or CABG]); the summary OR from the meta-analysis is 0.68 (95% CI, 0.59 to 0.78)
  - the main component of this decrease is reduced numbers of repeat PTCAs; the summary OR is 0.57 (95% CI, 0.48 to 0.69)
  - because of the relative rarity of events, it is impossible to be categorical about whether there is any impact on deaths, MIs and CABGs
  - it is impossible to be categorical about the effect on being angina-free because relatively few trials have measured this outcome.
- This pattern exists whether outcomes are examined in the medium term (4–11 months) or the long-term (1–5 years).
- The general consistency of the results, with the possible exception of the effect on angina status, suggests that the marked clinical heterogeneity noted may not be as important in assessing the effectiveness of elective stenting as it might at first appear.
- Although not conclusive, there is no obvious evidence of publication bias.
- There is insufficient evidence to draw conclusions on whether provisional stenting (observing initial PTCA result, and only inserting a stent if deterioration in the initial result occurs) is an effective or cost-effective strategy relative to routine insertion of stents.
- There is insufficient evidence to draw conclusions on use of stents in small coronary arteries (where the lumen of the coronary artery is < 3 mm).

BOX 7 Stents versus PTCA for subacute IHD: key points on costs

- There is a considerable amount of recent, routine and published cost data.
- Whether considering the procedure costs, the hospital costs or the wider costs of stents relative to PTCA, there is uncertainty, manifest by wide variation.
- Some of this variation is likely to be due to costing method, although it is difficult to substantiate this owing to poor reporting of the method by which costs or prices were derived. We have placed greatest reliance on explicit methods, which in practice meant weighting more highly bottom-up or micro-costing exercises.
- It is unclear to what extent the following potentially very influential factors on cost have been taken into account:

  – established use of stents in routine PTCA practice, particularly for bailout stenting

  – trends towards using multiple stents.
- Failure to take account of the first of the above would have a tendency to overestimate the cost differential; failure to take account of the second would have a tendency to underestimate the cost differential.
- With these provisos, there is a cost differential, stents costing more than PTCA. The cost differential is smaller when wider costs are taken into account.

BOX 8 Stents versus PTCA for subacute IHD: key points on cost-effectiveness and cost–utility

- There is a considerable volume of recent published health economic analyses, relating effectiveness and costs in:

  – cost-effectiveness analyses, particularly expressing cost/EFS

  – cost–utility analyses, expressed as cost/QALY.
- On appraisal, all analyses examined had important weaknesses.
- The overall pattern from cost-effectiveness analyses is that cost/EFS is less for elective stenting than PTCA, particularly in more recent analyses. In these the increased initial costs of stents are almost completely offset by savings resulting from reduced need for revascularisation.
- Although there was some concern about the interpretation of the measure cost/EFS, where the main event being prevented is repeat PTCA, the implication is that use of stents, at least in the context of the trials on which the cost-effectiveness analyses were based, could be cost-neutral.
- The overall pattern from cost–utility analyses is less easy to discern, there being much wider variation, but marginal cost/QALY in the region of £20,000–30,000 are typical.
- Thus the cost–utility analyses appear less encouraging, partly reflecting the apparently low perceived personal health value of requiring a repeat PTCA after the initial procedure. However, there is very little evidence in the literature on the impact of stents on quality of life.
- The view of the general efficiency of elective stenting thus seems to be dependent on the type of analysis used. Based on a limited exploration of the data we believe that this difference could arise from general differences in cost differential between stents and PTCA. The cost-effectiveness analyses tend to use bottom-up costing; the cost–utility analyses tend simply to use prices. We believe the latter method of costing is less likely to take into account important factors influencing cost.
- A further important issue relevant to the interpretation of cost/QALY figures, is that although the health value of the main event avoided – need for repeat PTCA – is correctly attributed a relatively low health value, this does not take into account the potential value of avoiding repeat PTCA to the wider healthcare system. This may be particularly pertinent in the NHS where there is evidence of significant under-provision of revascularisation procedures for severe IHD. In a situation where there is an imperative to increase revascularisation rates, and where it may take time to develop capacity (i.e. increased numbers of staff with the appropriate staff with the appropriate technical skills), the value of avoiding repeat PTCAs may not be truly reflected by its impact on individual health alone.

- Randomisation processes were often inadequately reported or sub-optimal, and steps to reduce the bias introduced by the difficulty of blinding to treatment allocation was rarely attempted.

Similarly, although the above points introduce uncertainty, the following effects appear to have been established.

- Elective stenting decreases total event rates (generally consisting of death, MI and need for re-intervention [either repeat PTCA or CABG]). The summary OR from the meta-analysis is 0.39 (95% CI, 0.28 to 0.54).
- The main component of this decrease is reduced numbers of repeat PTCAs. The summary OR is 0.44 (95% CI, 0.26 to 0.74).
- Because of the relative rarity of events, it is impossible to be categorical about whether there is any impact on deaths, MIs and CABGs.
- It is impossible to be categorical about the effect on being angina-free because relatively few trials have measured this outcome, although one large trial found a significant difference in favour of stents.[126]

Costs

No cost data specific to the use of stents or PTCAs in the context of acute MI were identified.

Cost-effectiveness and cost–utility

Similarly, no health economic evaluations of the use of PTCA in comparison with stents in the context of acute MI were identified. The absence of such information is critical because of the major structural and resource implications of widespread use of either PTCA or stenting immediately after MI.

Potential methodological strengths and weaknesses of the technology assessment

Strengths

We identify the following methodological features as being particularly robust:

- a series of clearly defined questions
- a comprehensive search strategy incorporating both published and partially published material
- duplicate application of inclusion and exclusion criteria
- detailed assessment of included study quality
- duplicate data abstraction
- use of meta-analysis to amplify the assessment of patterns of results across several trials assessing the same intervention.

Potential weaknesses

In systematic reviews, publication bias is always a potential problem, and although the comprehensive search strategy is a defence against this and the funnel plot showed no obvious evidence of publication bias, the possibility of it can never be completely excluded. Related to this is the major constraint of the lack of complete information on finished trials. The response to requests for further information from lead authors was poor but understandable given the relatively short time-scales involved. Collecting missing outcome data could be important for two reasons:

- it might allow more definitive conclusions on rarer outcomes like deaths, MI and repeat CABG
- it might provide reassurance that there is no selective reporting (i.e. reporting only outcomes that show the intervention in its most favourable light).

Ideally it would have been useful to explore completely the influence of different variables on the pattern of effectiveness results using meta-regression. However, although available time was a limiting factor, so too was availability of complete data, which as indicated above was outside our control.

In the review of economic evaluations, quality of available cost data was a major limitation. Without clear methods it is impossible to assess the degree to which important costs have or have not been included. Not undertaking our own de novo modelling of costs and effects might also be construed as a limitation, but our own view was that in the time available we could not overcome a major short-coming of the cost–utility estimates (in particular, poor assessment of costs using micro-costing techniques). Finally, as for the effectiveness data, additional efforts to explore the differences between the various economic evaluations identified could have increased the certainty of some of our conclusions on the general efficiency of elective stenting.

Important issues not addressed by this health technology assessment

Key issues that this assessment did not encompass include the following.

- The evidence base for use of stents for bailout stenting.

- The relative effectiveness of different stent types.
- The effectiveness of PTCA + stents in those patients for whom the risk from PTCA and/or CABG is currently perceived to be too great. These patients can currently only be offered medical therapy, which in the specific situation is unlikely to be offering complete relief of symptoms attributable to IHD.
- The evidence base for newer technologies (e.g. laser and minimally invasive CABG). However, although possible in theory, we are not convinced that it is possible to predict how stenting will relate to developing technologies, particularly whether it will be superseded, and if so when.
- The impact on PCI of different anti-thrombotic regimens, particularly glycoprotein IIb/IIIa inhibitors. The assessment also did not address the issue of whether the newer anti-thrombotic regimens added to PTCA alone without use of stents may achieve some of the benefit currently attributed wholly to stent use.

Conclusions

- In subacute IHD, especially stable angina and unstable angina, there is evidence for the effectiveness of a strategy of using stents rather than PTCA plus recourse to bailout stenting when acute closure occurs.
- The main impact is on reduced need for repeat PTCA.
- Although based on RCTs, the available research is open to bias and hence there is not complete certainty.
- Our tentative view is that used in these conditions and this way, stents are likely to represent an efficient use of resources.
- However, the confidence with which the last conclusion can be made would be greatly improved if the resource neutrality of stents could be confirmed, using more rigorously derived cost data.
- The evidence on the relative effectiveness and efficiency of stents used provisionally is inconclusive.
- Outside the use of stents in subacute IHD, the effectiveness and/or efficiency of stents use is not known.

Implications of assessment findings

NHS

- The main conclusions relate to an area of practice – elective stenting for stable and unstable angina – which is already well established. In this sense the findings of this report serve to confirm that the trend for increasing use of stents is reasonable, with the important proviso that its cost neutrality is confirmed. If this is the case, complete diffusion of the technology should have minimal consequences.
- Unfortunately, research on effectiveness, cost-effectiveness and cost–utility is not available to address whether further expansion of stenting beyond these indications should be encouraged or discouraged.
- For many important stenting applications, research appears to be ongoing (see pages 5 and 15), suggesting a further reassessment of available research evidence and health economic evaluations would be valuable in 1 to 2 years' time. This is particularly true for the following areas:
  - use of stents provisionally
  - assessment of the relative impact of different types of stents
  - use of PTCA + stents relative to medical therapy in patients thought to be unsuitable for PTCA and/or CABG
  - use of stents relative to CABG in subacute IHD with complex patterns of occlusion
  - use of stents in acute manifestations of IHD, especially acute MI.
- In our opinion, further expansion of stent use in these areas should await the reassessments.
- In addition, there are a few areas where little if any research appears to be on-going, and these are described in detail in implications for future research.

Patients and carers

- Making individual decisions on the most appropriate treatment for severe IHD is difficult, both because of the highly technical nature of the subject and because of the perceived severity of the circumstances in which patients are required to make that decision.
- Because individuals are being required to make such decisions, an important task is to convey information about the relative benefits and drawbacks of PTCA + stents or CABG, clearly indicating the circumstances in which the balance of these might favour one or other option. A concern is that stents might be misperceived as a panacea.

Implications for future research

A general message from this assessment is to give a clear indication to researchers and industry that complete reporting of any trial data is essential.

Even if a peer-reviewed publication is not feasible, a properly prepared manuscript should be readily available which gives details about method and results, including information on all outcomes measured in all patients who were initially randomised. Conference abstracts and press releases are insufficient, and effectively lead to the exclusion of potentially valuable information in this sort of exercise.

Specifically, we believe the following areas in relation to the use of stents need to be addressed:

- better cost data, using explicit micro-costing
- impact of stents on severity of angina and quality of life
- effectiveness of newer technologies.

Finally, such is the importance of clearly establishing the effectiveness and efficiency of stents compared with CABG that careful consideration should also be given to whether further targeted research would be valuable in this area too, despite the fact that there is considerable ongoing research on this topic.

Acknowledgements

Subject experts were extensively consulted in the course of the production of an earlier report on coronary artery stents[1] (names available on request).

Professor James Raftery advised on health economics, in particular feedback on earlier economic analyses.

Mr Adrian Boulton and Ms Deborah Hartland provided administrative support.

The views expressed in this report are those of the authors, who are also responsible for any errors.

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Appendix 1

Manufacturers' submissions

All of the submissions were used in the review to look for new data that met the inclusion/exclusion criteria of the review for both effectiveness studies and economic evaluations.

The table below details those submissions with original data (not available elsewhere) that were used in the review.

TABLE 9 *Submissions with original data (not available elsewhere) used in the review*

Company	Effectiveness	Data extracted cost	Economic evaluation
Biocompatibles Ltd	–	✔	✔
Biotronik UK Ltd	✔ (SVS)	✔	–
Boston Scientific	–	✔	✔
Cook (UK) Ltd	–	–	–
Cordis	✔ (OPUS)	–	✔
Guidant Ltd	–	–	✔
Jomed UK Ltd	–	✔	–
Medtronic AVE	–	–	–
Sorin Biomedica UK Ltd	–	✔	–

Appendix 2

Effectiveness search strategy

TABLE 10 *Electronic databases searched*

Database	Years/date searched	Search strategy	Results	
			Total no. references	No. of RCTs found†
MEDLINE	1989–Nov 1999	See *Table 12*	199	19
BIDS ISI	1989–Nov 1999	Coronary + stent$ + trial$	302	4
EMBASE	1980–Sept 1999	See *Table 13*	209	0
HealthSTAR non-MEDLINE	1992–Sept 1999	Stents and coronary and trial	12	0
Cochrane Library	1999 Issue 4	Stents	266	0
York HTA	Sept 1999	Stent$	25	0
York DARE	Sept 1999	Stent$	14	0
American College of Cardiology conference abstracts	48th Scientific Session, 1999	Stents	224	6
Google web browser	Oct 1999	Stents	2128 (first 100 investigated)	2
Cardiosource (http://www.cardiosource.com)	Oct 1999	Stents	32	3
National Research Register	Nov 1999	Stent*	203	3

† *In addition to those found in MEDLINE*

TABLE 11 *Handsearch of conference abstracts/reviews*

Conference/review	Year	No. of RCTs found
Circulation **98**(17)	1998	9
Circulation **96**	1997	4
Circulation **94**(8)	1996	0
European Heart Journal **20**	1999	5
European Heart Journal **19**	1998	0
European Heart Journal **18**	1997	0
Coronary stenting current perspectives[75]	1998	2
Perleth M, Kochs G. Systematic review[51]	1999	4

TABLE 12 *MEDLINE effectiveness search strategy*

	Search history	Results
1	Randomized controlled trial.pt.	119,196
2	Randomized controlled trials.sh.	13,626
3	Random allocation.sh.	39,176
4	Double blind method.sh.	56,793
5	Single blind method.sh.	4,547
6	1 or 2 or 3 or 4 or 5	169,645
7	Animal.sh.	2,922,596
8	Human.sh.	6,575,986
9	7 not (7 and 8)	2,323,349
10	6 not 9	160,831
11	Exp stents/	8,056
12	Exp angioplasty, transluminal, percutaneous coronary/ or exp atherectomy, coronary/ or exp coronary aneurysm/ or exp coronary angiography/ or exp coronary arteriosclerosis/ or exp coronary artery bypass/ or exp coronary care units/ or exp coronary circulation/ or exp coronary disease/ or exp coronary thrombosis/ or exp coronary vasospasm/ or exp coronary vessel abnormalities/ or exp coronary vessels/ or exp internal mammary-coronary artery anastomosis/	155,820
13	10 and 11 and 12	164
14	STENT$.mp	11,636
15	10 or 14	11,636
16	10 and 12 and 15	199

TABLE 13 *EMBASE search strategy*

	Search history	Results
1	Exp randomized controlled trial/	39,332
2	Exp controlled study/	888,862
3	Randomised controlled trial$.tw.	1,439
4	Exp randomisation/	2,454
5	Exp double blind procedure/	32,633
6	Exp single blind procedure	2,400
7	1 or 2 or 3 or 4 or 5 or 6	900,571
8	Exp stent/ or 'stents'.mp.	7,891
9	Exp coronary artery/ or exp coronary artery aneurysm/ or exp coronary artery anomaly/ or exp coronary artery atherosclerosis/ or exp coronary artery blood flow/ or exp coronary artery bypass graft/ or exp coronary artery bypass surgery/ or exp coronary artery circumflex branch/ or exp coronary artery collateral circulation/ or exp coronary artery constriction/ or exp coronary artery dilatation/ or exp coronary artery disease/ or exp coronary artery fistula/ or exp coronary artery ligation/ or exp coronary artery obstruction/ or exp coronary artery pressure/ or exp coronary artery recanalisation/ or exp coronary artery spasm/ or exp coronary artery surgery/ or exp coronary artery thrombosis/ or exp coronary blood vessel/ or exp coronary care unit/ or exp coronary haemodynamics/ or exp coronary reperfusion/ or exp coronary risk/ or exp coronary sinus blood flow/ or exp coronary vascular resistance/ or exp coronary vasodilating agent/ or exp coronary vessel malformation/ or exp left anterior descending coronary artery/ or exp left coronary artery/ or exp right coronary artery/ or exp transluminal coronary angioplasty.	147,626
10	7 and 8 and 9	410
11	Limit 10 to yr=1997-2000	235
12	Limit 11 to human	209

Appendix 3

Cost search strategy

TABLE 14 *Electronic databases searched*

Database	Years/date searched	Search strategy	Results	
			Total no. references	No. cost studies found*
MEDLINE	1960–Nov 1999	See *Table 16*	35	0
NHSEED	Nov 1999	Stent$	41	1
MEDLINE effectiveness search	See effectiveness search strategy (appendix 2)	See effectiveness search strategy (appendix 2)	See effectiveness search strategy (appendix 2)	2
HM Government, NHS Executive – reference costs[130]	1999	N/A	N/A	1

**In addition to MEDLINE cost search (*Table 16*)*

N/A, not applicable

TABLE 15 *Handsearch of conference abstracts/reviews*

Conference/review	Year	No. of cost studies found*
West Midlands DEC coronary artery stents[1]	1998	1
Wessex DEC coronary artery stents[133]	1998	1
Wessex DEC LMW heparins[132]	1999	1
European Heart Journal **20**	1999	2

**In addition to MEDLINE cost search (*Table 16*)*

LMW heparins, low molecular weight heparins

TABLE 16 *MEDLINE cost search strategy*

	Search history	Results
1	Exp 'costs and cost analysis'/ or exp direct service costs/ or exp health care costs / or exp hospital costs/	15,858
2	Exp stents/ or 'stent'.mp	4,987
3	Exp angioplasty, transluminal, percutaneous coronary/ or exp atherectomy, coronary/ or exp coronary aneurysm/ or exp coronary angiography/ or exp coronary arteriosclerosis/ or exp coronary artery bypass/ or exp coronary care units/ or exp coronary circulation/ or exp coronary disease/ or exp coronary thrombosis/ or exp coronary vasospasm/ or exp coronary vessel abnormalities/ or exp coronary vessels/ or exp internal mammary-coronary artery anastomosis/	24,555
4	1 and 2 and 3	43
5	Limit 4 to English language	35

Appendix 4

Economic evaluation search strategy

TABLE 17 *Electronic databases searched*

Database	Years/date searched	Search strategy	Results	
			Total no. references	No. cost–utility/ cost-effectiveness studies found*
MEDLINE	1960–Nov 1999	See *Table 19*	59	5
NHSEED	Nov 1999	Stent$	41	1
MEDLINE effectiveness search	See effectiveness search strategy (appendix 2)	See effectiveness search strategy (appendix 2)	See effectiveness search strategy (appendix 2)	1

**In addition to MEDLINE cost-effectiveness search (*Table 19*)*

TABLE 18 *Handsearch of systematic reviews*

Review	Year	No. cost–utility/cost-effectiveness studies found*
West Midlands DEC, coronary artery stents[1]	1998	4
Perleth M, Kochs G. Systematic review[51]	1999	1
Industry submissions	1999	4

**In addition to MEDLINE cost-effectiveness search (*Table 19*)*

TABLE 19 *MEDLINE cost-effectiveness search strategy*

	Search history	Results
1	Exp stents/ or 'stent'.mp	10,178
2	Exp angioplasty, transluminal, percutaneous coronary/ or exp atherectomy, coronary/ or exp coronary aneurysm/ or exp coronary angiography/ or exp coronary arteriosclerosis/ or exp coronary artery bypass/ or exp coronary care units/ or exp coronary circulation/ or exp coronary disease/ or exp coronary thrombosis/ or exp coronary vasospasm/ or exp coronary vessel abnormalities/ or exp coronary vessels/ or exp internal mammary-coronary artery anastomosis/	156,431
3	1 and 2	2,477
4	exp cost allocation/ or exp cost control/ or exp cost of illness/ or exp cost savings/ or exp cost sharing/ or exp cost-benefit analysis/ or exp 'costs and cost analysis'/ or exp technology, high-cost/	60,221
5	exp cost-benefit analysis/ or exp health care costs or exp quality of life/ or exp quality-adjusted life years/	44,540
6	4 or 5	78,748
7	3 and 6	59

Appendix 5

Tables of results of review of effectiveness

TABLE 20 *Excluded RCTs: IHD, stent versus PTCA*

Study acronym or author	Patient group	Intervention	Comparator(s)	Reason for exclusion
ADVANCE[56]	IHD	Stent	PTCA	No patient follow-up information
BESMART[57]	IHD in small arteries	Stent (Bestent)	PTCA	Allocation of patients not complete
BOSS[58]	IHD	Stent (Palmaz-Schatz)	PTCA (Optimal)	Allocation of patients not complete
COAST[59]	Details not available	Stent (coated Jostent)	(a) PTCA (b) Non-coated stent	Allocation of patients not complete
DESTIN[160,155,156]	IHD	Elective stent	PTCA with provisional stent	Results for only some of the trial participants
FROST[61]	IHD	Stent	Optimal PTCA	Results at 6 months for only half trial participants
GIPSI[62]	IHD	Stent	PTCA (gradual inflation at optimum pressure)	Allocation of patients not complete
MAJIC[63]	IHD with CO	Stent (Wiktor)	PTCA	Allocation of patients not complete
RAP[64]	IHD in small arteries	Stent (Bestent)	PTCA	Allocation of patients not complete
Sato[158]	IHD with CO	Stent	PTCA	No patient numbers in either arm
SISA[65]	IHD in small arteries	Stent (Bestent)	PTCA	Allocation of patients not complete
SOAR[66]	IHD	Stent	PTCA	Allocation of patients not complete
STENT-BY[67]	IHD	Stent (Palmaz-Schatz)	PTCA	No patient numbers in each arm
SVS[68]	IHD in small arteries	Stent	PTCA	Allocation of patients not complete
TASC[169,159]	IHD	Stent (Palmaz-Schatz)	PTCA	No patient numbers in each arm

CO, chronic coronary occlusion

TABLE 21 *Excluded RCTs: IHD, stent versus CABG*

Study acronym or author	Patient group	Intervention	Comparator(s)	Reason for exclusion
ARTS[70]	IHD (SA/UA)	Stent (Palmaz-Schatz Crown + Crossflex, multiple)	CABG	No details of number of patients in each group (N.B. industry submission data)
AWESOME[71]	IHD (unstable myocardial ischaemia)	Stents, rotablator or laser	CABG	Allocation of patients not complete
MIDCAB[72]	IHD	Stent	Minimally invasive CABG	Allocation of patients not complete
SOS[73]	IHD	Stent	CABG or minimally invasive CABG	Allocation of patients not complete

SA, stable angina; UA, unstable angina

TABLE 22 *Excluded RCTs: AMI, stent versus PTCA*

Study acronym or author	Patient group	Intervention	Comparator(s)	Reason for exclusion
BESSAMI[74]	AMI	Stent (heparinised Wiktor)	PTCA	Allocation of patients not complete
CADILLAC[75]	AMI	Stent ± abciximab	PTCA ± abciximab	Allocation of patients not complete
PRISAM[76]	AMI	Stent (Wiktor)	PTCA	Allocation of patients not complete

TABLE 23 *Excluded RCTs: IHD, other comparisons*

Study acronym or author	Patient group	Intervention	Comparator(s)	Reason for exclusion
Rodriguez *et al.*[77]	IHD	Stent (Giantunco-Roubin)	Medical treatment	Trial of stent versus medical
GRACE[75]	IHD with failed PTCA	Stent (Gianturco-Roubin)	PTCA (prolonged perfusion balloon)	Allocation of patients not complete
TASC II[78]	IHD with failed PTCA	Stent (Palmaz-Schatz)	PTCA (prolonged perfusion balloon)	Trial of bailout stenting (not elective stenting)

TABLE 24 *Included RCTs: IHD, stents versus PTCA – patient characteristics and intervention*

Study acronym or author	Patient group	Inclusion criteria	Exclusion criteria	Intervention	Antithrombotics (intervention group)	Comparator(s)	Antithrombotics (comparator group)
BENESTENT[80–84]	IHD SA	Single and multiple, new lesion, native coronary artery < 15 mm long, > 3 mm diameter	Ostial, bifurcation, severe vessel tortuosity, presence of thrombus, contraindication to anticoagulation/ antiplatelet treatment	Stent (Palmaz-Schatz)	Aspirin, dipyridamole, dextran, heparin, warfarin, calcium antagonists	PTCA	Aspirin, dipyridamole, heparin, calcium antagonists
STRESS[85–89]	IHD	New lesions, native coronary artery, > 70% stenosis, < 15 mm long, > 3 mm diameter	MI within 7 days, contraindications to anticoagulation. LVEF < 40%. Thrombus, multiple focal lesions, diffuse disease, serious disease in L main artery, ostial, severe vessel tortuosity	Stent (Palmaz-Schatz)	Aspirin, dipyridamole, calcium antagonists, dextran 40, heparin, warfarin	PTCA	Aspirin
STRESS II[79]	IHD	New lesions, native coronary artery, > 70% stenosis, < 15 mm long, > 3 mm diameter	MI within 7 days, contraindications to anticoagulation. LVEF < 40%. Thrombus, multiple focal lesions, diffuse disease, serious disease in L main artery, ostial, severe vessel tortuosity	Stent (Palmaz-Schatz)	Aspirin, dipyridamole, calcium antagonists, dextran 40, heparin, warfarin	PTCA	Aspirin
Eeckhout *et al.*[90]	IHD Angina	Symptomatic and documented angina, new onset stenosis of R coronary artery only	Contraindication to anticoagulation, evolving MI, previous extensive inferior myocardial necrosis, at risk of loss to follow-up, poor candidates for CABG, vessel < 3 mm diameter, > 20 mm long, ostial, thrombus, vessel tortuosity	Stent (Wiktor)	Aspirin, nifedipine, heparin, acenocoumarol, dipyridamole	PTCA	Aspirin, nifedipine, heparin, calcium channel blocker
Versaci *et al.*[91]	IHD	Angina, ± documented myocardial ischaemia, new lesion in proximal LAD artery < 15 mm long, > 3 mm diameter, LVEF > 40%	MI within 1 month, contraindication to anticoagulation, ostial, major branch within target lesion, total occlusion, severe vessel tortuosity	Stent (Palmaz-Schatz)	Aspirin, diltiazem, heparin, warfarin	PTCA	Aspirin, diltiazem, heparin

LVEF = left ventricular ejection fraction (measure of heart performance); L, left; R, right

continued

TABLE 24 contd *Included RCTs: IHD, stents versus PTCA – patient characteristics and intervention*

Study acronym or author	Patient group	Inclusion criteria	Exclusion criteria	Intervention	Antithrombotics (intervention group)	Comparator(s)	Antithrombotics (comparator group)
START[92–94]	IHD	Angina or objective evidence of ischaemia. New lesion, stenosis > 70%, < 15 mm long, > 3 mm diameter, > 1 lesion per patient allowed to be randomised	Ostium, side branch > 2.5 mm, total occlusion, heavy calcification, vessel tortuosity, stenosis of L main, > 25% cardiogenic shock, life-threatening condition, MI within 1 week, contraindication to anticoagulation	Stent (Palmaz-Schatz)	Aspirin, heparin, dipyridamole, calcium channel antagonist, dextran 40, warfarin	PTCA	Not clearly reported
Knight *et al.*[108]	IHD	Suboptimal result of PTCA	NR	Stent (Palmaz-Schatz)	NR	PTCA	NR
BENESTENT II[27]	IHD	Stable or unstable angina, new lesions (≥ 1) suitable for CABG < 18 mm long > 3 mm diameter	Contraindication to antiplatelet treatment, L main lesion, bifurcation, graft vessel lesion, LVEF < 30%, evolving MI within 1 week	Heparin-coated stent (Palmaz-Schatz)	Heparin, ticlopidine, aspirin	PTCA	Heparin, aspirin
RSSG[95]	IHD	Single lesion re-narrowed following previous successful PTCA > 50% < 10 mm long. Angina or abnormal stress test	None	Stent (Palmaz-Schatz)	Aspirin, heparin, phenprocoumon	PTCA	Aspirin, heparin
WIN[51,109]	IHD	New or restenotic lesions, > 3 mm diameter, < 22 mm long	Ostial, bifurcation lesions, LVEF < 35%	Stent (Wall stent)	NR	PTCA	NR
AS Trial[110]	IHD	Single new lesions, native arteries	None	Stent (Palmaz-Schatz)	Ticlopidine, ASA (probably aspirin)	PTCA	Ticlopidine, ASA (probably aspirin)

LVEF = left ventricular ejection fraction (measure of heart performance); L, left; R, right; NR, not reported

continued

TABLE 24 contd *Included RCTs: IHD, stents versus PTCA – patient characteristics and intervention*

Study acronym or author	Patient group	Inclusion criteria	Exclusion criteria	Intervention	Antithrombotics (intervention group)	Comparator(s)	Antithrombotics (comparator group)
WIDEST[111]	IHD	New lesion, native artery	NR	Stent (Wiktor)	Decided by physician	PTCA	Decided by physician
SAVED[96]	IHD in vein graft	Angina or objective evidence of myocardial ischaemia. Stenosis > 60%, diameter 3.0–5.0 mm	MI within 7 days. Contraindications to anticoagulation, LVEF > 25%, diffuse disease needing > 2 stents, thrombus, outflow obstruction of graft	Stent (Palmaz-Schatz)	Aspirin, dipyridamole, dextran 40, heparin, warfarin	PTCA	Aspirin (if bailout, had warfarin and dipyridamole)
EPISTENT[41,97]	IHD	Stenosis > 60% target vessel	Unprotected L main stem artery, bleeding diathesis, intracranial neoplasm, CVA within 2 years, uncontrolled hypertension, recent surgery, PTCA within 3 months, taking warfarin	Stent + abciximab (Palmaz-Schatz and others not specified)	Aspirin, ticlopidine, heparin	PTCA + abciximab	Aspirin, ticlopidine, heparin
SICCO[98–100]	IHD with occluded artery	Aged > 18 years, PTCA of occluded artery (total + functional; i.e. TIMI 0 or 1), native artery, previously undilated lesion, reference diameter > 2.5 mm	Occlusions < 2 weeks old, unable to take anticoagulation, in another RCT, unlikely to return for follow-up, reference diameter < 2.5 mm, indication for bailout stenting (major dissection), previously dilated segments, complex anatomy, poor distal runoff, thrombus	Stent (Palmaz-Schatz) Randomised after PTCA completed	Aspirin, heparin, dextran, dipyridamole, warfarin, calcium channel antagonists	No stent	Aspirin, heparin, calcium channel antagonists
GISSOC[101]	IHD with occluded artery	Absolute or functional occlusion (TIMI 0 or 1), all suitable for CABG (Occlusion duration from angiographic and/or clinical follow-up)	AMI within 30 days, acute angina at rest 7 days, contraindication to anticoagulation, total occlusions at site of previous PTCA, complex dissection, occlusions for < 30 days, significant L main disease, < 3 mm diameter, > 13 mm long, tortuous, side branch	Stent (Palmaz-Schatz) Randomised after PTCA completed	Aspirin, calcium channel blocker, heparin, warfarin, ± dextran, dipyridomole	No stent	Aspirin, calcium channel blocker, heparin

LVEF, left ventricular ejection fraction (measure of heart performance); L, left; R, right; NR, not reported; CVA, cerebro-vascular accident (stroke); TIMI, Thrombolysis In Myocardial Infarction flow grade: 0 (poor) – 4 (good)

continued

TABLE 24 contd *Included RCTs: IHD, stents versus PTCA – patient characteristics and intervention*

Study acronym or author	Patient group	Inclusion criteria	Exclusion criteria	Intervention	Antithrombotics (intervention group)	Comparator(s)	Antithrombotics (comparator group)
Hancock *et al.*[102]	IHD with CO	Complete obstruction, TIMI 0 or 1, > 3 days old, successful initial PTCA result with TIMI grade 3 flow distal to occlusion	Bailout, stent occlusions, poor distal flow after PTCA, stent thrombosis, graft (CABG), AMI, thrombus, < 3 mm diameter, contraindication to anticoagulation	Stent (Palmaz-Schatz) Randomised after PTCA completed	Heparin, aspirin, warfarin	No stent	Heparin, aspirin
TOSCA[103,104]	IHD with total CO	TIMI 0 or 1. > 3 mm diameter, native artery, suitable for stenting, can cross lesion with guidewire	< 72 hours from onset of ST elevation, thrombus, previously revascularised occlusion, uncontrolled heart failure or shock, unsuitable for 6 month angioplasty, child-bearing potential	Heparin-coated stent (Palmaz-Schatz)	Aspirin, ticlopidine (in 93% of patients), abciximab (in 3% of patients)	PTCA	Aspirin, ticlopidine (in 57% of patients), abciximab (in 3% of patients)
SPACTO[105]	IHD with CO	TIMI = 0 only, event > 28 days, occlusion diagnosed by angio-graphy, myocardial scentigraphy, reference diameter < 2.7 mm	Contraindication to anticoagulation, renal failure, recent CVA	Stent (Wiktor-GX) Randomised after PTCA completed	Aspirin, heparin, phenprocoumon (in 40% patients), ticlopidine (in 60% patients)	No stent	Aspirin, heparin, ticlopidine. phenprocoumon. (Fewer patients than in stent group, $p < 0.01$)
SARECCO[106]	IHD with CO	TIMI grade 0, for > 1 wk estimated from clinical history or angiography, vessel > 2.5 mm diameter, (long lesions, diffuse, thrombus included)	Contraindication to anticoagulation, AMI, CABG, severe vessel tortuosity, infarction lesions, residual stenosis > 50% after PTCA	Stent (mixed types) Randomised after PTCA completed	Aspirin, heparin, ticlopidine	No stent	Aspirin, heparin
STOP[112]	IHD with CO	CO > 10 days	NR	Stent (AVE Micro stent) Randomised after PTCA completed	NR	No stent	NR

continued

TABLE 24 contd *Included RCTs: IHD, stents versus PTCA – patient characteristics and intervention*

Study acronym or author	Patient group	Inclusion criteria	Exclusion criteria	Intervention	Antithrombotics (intervention group)	Comparator(s)	Antithrombotics (comparator group)
CORSICA[113]	IHD with CO	> 15 days lesion, stable + satisfactory results of PTCA	Not clearly reported	Stent (Palmaz-Schatz) Randomised after PTCA completed	Aspirin, ticlopidine	No stent	Aspirin, tidopidine
OCBAS[107]	IHD (symp-tomatic)	Successful PTCA with good immediate angiographic result, (i.e. residual diameter stenosis < 30%, no dissection)	Lesions > 20 mm long, reference diameter < 2.5 mm, diffuse or severe L main disease, severe vessel tortuosity, acute complications from PTCA, suboptimal PTCA result, initial stent treatment, contra-indications to anticoagulant/anti-platelet treatment, non-cardiac illness, < 1 year life expectancy, in another RCT	Stent (mixed types) Randomised after stable PTCA result obtained	Aspirin, heparin, ticlopidine, calcium channel antagonists	Repeat PTCA and stent if deterioration (provisional stenting)	Aspirin, heparin, ticlopidine, calcium channel antagonists
DEBATE II[114,115,117]	IHD	Eligible for angioplasty or stent, M + F, aged 18–150 years	NR	Stent (not specified)	NR	'Guided PTCA'	NR
OPUS[116 *]	IHD	Single vessel, < 20 mm long, > 3 mm diameter, > 70% stenosis, potentially treatable by PTCA or stent, age 21–81 years	MI within < 24 hours	Stent (Palmaz-Schatz) Randomised after stable PTCA results obtained	Not clearly reported	Repeat PTCA and stent if deterioration (provisional stenting)	Not clearly reported

TABLE 25 *Included RCTs: stents vs PTCA for IHD – numbers randomised and baseline characteristics*

Study acronym or author	No. of patients eligible	Total no. randomised	No. randomised to:		Mean age (years)/sex	Baseline characteristics	Relevant differences between trial arms at baseline	Dropouts (*n*/*n* randomised [%]) Crossovers (*n*/*n* results reported for [%])	
			Stents	PTCA				Stents	PTCA
BENESTENT[80–84]	NR	520	262 (259)*	258 (257)	57.5 19% F	SA, 100% UA, 0% PMI, 19.4% AMI, – CO, –	No significant differences	3/262 (1.1%) 24/259 (9.3%)	1/258 (0.4%) 16/257 (6.2%)
STRESS[85–89]	NR	410	207 (205)	203 (202)	60 22% F	SA, 52.6% UA, 47.4% PMI, 73/407 AMI, – CO, –	More men in stent group ($p < 0.05$)	2/207 (1.0%) 8/205 (3.9%)	1/203 (0.5%) 21/202 (10.4%)
STRESS I + II[79]	NR	189	100	89	NR	SA. – UA, – PMI, – AMI, – CO, –	NR	NR	NR
Eeckhout *et al.*[90]	204	84	42	42	58 19% F	SA, 85.7% UA, 14.3% PMI, 36.8% AMI, – CO, –	No significant differences	0 2/42 (4.8%)	0 3/42 (7.1%)
Versaci *et al.*[91]	204	120	60	60	56.5 12.5% F	SA, 82.5% UA, 17.5% PMI, 26.5% AMI, 0% CO, 0%	No significant differences	2/60 (3.3%) 3/60 (5.2%)	2/60 (3.3%) 4/60 (6.9%)

*In brackets, number on which results were reported (i.e. different from number randomised)

PMI, previous myocardial infarction

continued

TABLE 25 contd *Included RCTs: stents vs PTCA for IHD – numbers randomised and baseline characteristics*

Study acronym or author	No. of patients eligible	Total no. randomised	No. randomised to:		Mean age (years)/sex	Baseline characteristics	Relevant differences between trial arms at baseline	Dropouts (*n*/*n* randomised [%]) Crossovers (*n*/*n* results reported for [%])	
			Stents	PTCA				Stents	PTCA
START[92–94]	NR	452	229	223	58.5 14% F	SA, – UA, 72% PMI, 32% AMI, 0% CO, 0%	No particular differences between groups	NR	NR
Knight *et al.*[108]	143	77	37	38	59 22% F	SA, – UA, – PMI, – AMI, – CO, –	NR	NR	NR
BENESTENT II[27]	NR	827 (823)*	414 (413)	413 (410)	54.5 21.5% F	SA, 50.3% UA, 42.2% PMI, 14.1% AMI, – CO, – Other: Silent ischaemia, 6.2%	More women in stent group, older in PTCA group	1/414 (0.2%) 14/413 (3.4%)	3/413 (0.7%) 57/410 (13.9%)
RSSG[95]	NR	383	178	176	59.5 19.2% F	SA, – UA, 19.2% PMI, 39.0% AMI, – CO, –	No obvious significant differences	13/191 (6.8%) 12/178 (6.7%)	16/192 (8.3%) 2/176 (1.1%)
WIN[51,109]	NR	586	299	287	NR	SA, – UA, 83% PMI, – AMI, – CO, –	NR	NR	NR 94/287 (32.7%)

*In brackets, number on which results were reported (i.e. different from number randomised)

continued

TABLE 25 contd *Included RCTs: stents vs PTCA for IHD – numbers randomised and baseline characteristics*

Study acronym or author	No. of patients eligible	Total no. randomised	No. randomised to:		Mean age (years)/sex	Baseline characteristics	Relevant differences between trial arms at baseline	Dropouts (*n*/*n* randomised [%]) Crossovers (*n*/*n* results reported for [%])	
			Stents	PTCA				Stents	PTCA
AS Trial[110]	NR	388	192	196	NR	SA, – UA, – PMI, – AMI, – CO, –	Well matched in clinical and angiographic parameters	NR	NR
WIDEST[111]	400 to be randomised	300	154	146	NR	SA, – UA, – PMI, – AMI, – CO, –	No significant differences	0 8/154 (5.2%)	0 46/146 (31.5%)
SAVED[96]	NR	220	110	110	66 19.5% F	SA, ?20.5% UA, 79.5% PMI, 69% AMI, – CO, –	Higher rate diabetics in PTCA group ($p = 0.05$)	2/110 (1.8%) 3/108 (2.8%)	3/110 (2.7%) 4/107 (3.7%)
EPISTENT[41,97]	NR	2399	794	796	59.5 24.8% F	SA, 43.9% UA, 55.5% PMI, 32.5% AMI, 16.5% (within 7 days) CO, – Other: 0.6% without angina	No significant differences	10/794 (1.3%) 21/794 (2.7%)	11/796 (1.4%) 154/796 (19.3%)
SICCO[98–100]	590 (from 3080 patients with PTCA)	Not stated	58	59	57.8 18% F	SA, 100% UA, – PMI, 62.4% AMI, – CO, 100%	No obvious differences	Combined 2 (1.7%) 1.7%	0%

continued

TABLE 25 contd *Included RCTs: stents vs PTCA for IHD – numbers randomised and baseline characteristics*

Study acronym or author	No. of patients eligible	Total no. randomised	No. randomised to:		Mean age (years)/sex	Baseline characteristics	Relevant differences between trial arms at baseline	Dropouts (*n*/*n* randomised [%]) Crossovers (*n*/*n* results reported for [%])	
			Stents	PTCA				Stents	PTCA
GISSOC[101]	111	Not stated	56	54	57.6 15.5% F	SA, 86.4% UA, 9.1% PMI, 68.2% AMI, – CO, 100% Other: no angina, 4.5%	Higher baseline previous MI, single vessel disease and left circumflex coronary artery occlusion in PTCA group, higher hypercholesterolaemia and RCA in stent group (NS)	0 0	1.8% 1.9%
Hancock *et al.*[102]	187	60	30	30	60.5 36.7% F	SA, – UA, – PMI, – AMI, – CO, 100%	NR	0 0	0 0
TOSCA[103,104]	738	Not stated	202	208	57.6 18.0% F	SA, 82.7% UA, – PMI, 67.1% AMI within 6 weeks, 30.2% CO, 100%	No significant differences	0 8/202 (4.0%)	0 20/208 (9.6%)
SPACTO[105]	223	85	42	43	62.2 28.9% F	SA, 90.6% UA, 9.4% PMI, 42.3% AMI, – CO, 100%	Significantly more women in stent group ($p = 0.02$)	0 1/42 (2.4%)	0 7/43 (16.3%)

NS, not statistically significant

continued

TABLE 25 contd *Included RCTs: stents vs PTCA for IHD – numbers randomised and baseline characteristics*

Study acronym or author	No. of patients eligible	Total no. randomised	No. randomised to:		Mean age (years)/sex	Baseline characteristics	Relevant differences between trial arms at baseline	Dropouts (*n*/*n* randomised [%]) Crossovers (*n*/*n* results reported for [%])	
			Stents	PTCA				Stents	PTCA
SARECCO[106]	NR	111	55	55	60.5 28.2% F	SA, NR UA, NR PMI, 49.1% AMI, – CO, 100%	None	0 1 (1.8%)	0 0
STOP[112]	NR	96	48	48	59.3 16.7% F	SA, – UA, – PMI, – AMI, – CO, –	NR	NR	NR
CORSICA[113]	NR	142	72	70	NR	SA, – UA, – PMI, – AMI, – CO, –	Baseline clinical + angiographic data including TIMI 0 and occlusion duration – no significant differences	NR	NR
OCBAS[107]	206	Not stated	57	59	57.2 16.4% F	SA, 10.3% UA, 80.2% PMI, 21.6% AMI, 9.5% CO < 1 month, 12.9%	No significant differences	0% 0%	0% 8/59 (13.5%)
DEBATE II[114,115,117]	626	620	97	523	NR	SA, – UA, – PMI, – AMI, – CO, –	NR	Combined 16/523 (3.1%) NR	

continued

TABLE 25 contd *Included RCTs: stents vs PTCA for IHD – numbers randomised and baseline characteristics*

Study acronym or author	No. of patients eligible	Total no. randomised	No. randomised to: Stents	No. randomised to: PTCA	Mean age (years)/sex	Baseline characteristics	Relevant differences between trial arms at baseline	Dropouts (*n*/*n* randomised [%]) Crossovers (*n*/*n* results reported for [%]) Stents	Dropouts (*n*/*n* randomised [%]) Crossovers (*n*/*n* results reported for [%]) PTCA
DEBATE II[114,115,117]	626	383	189	194	NR	SA, – UA, – PMI, – AMI, – CO, –	NR	Combined 16/523 (3.1%) NR	
OPUS[116]*	NR	479	230	249	NR	SA, – UA, – PMI, – AMI, – CO, –	2 groups 'comparable' re demographics and cardiovascular risk factors	0 0	0 37%

*Some information from press release in Cordis industry submission

TABLE 26 *Included RCTs: stents vs PTCA for IHD – design, quality and execution*

Study acronym or author	Multicentre?	Method of randomisation	Description of withdrawals and dropouts?	Jadad score	'Adjuncts' in intervention group, not received by control group	Departures from intervention indicated	Departures from control indicated
BENESTENT[80–84]	Yes	Block by telephone	Yes	3	1000 ml dextran infusion peroperatively; warfarin to achieve INR of 2.5 to 3.5 for 3 months postoperatively	5% received PTCA; 3% eCABG; 1% treated medically	5% received stent (most bailout); 1% eCABG
STRESS[85–89]	Yes	Block, sealed envelope	Yes	3	Dipyridamole 25 mg tds and calcium channel antagonist commenced preoperatively; dextran and possibly heparin peroperatively; dipyridamole and warfarin to achieve INR of 2.0 to 3.5 for 1 month postoperatively	3% received PTCA	6% received bailout stent
STRESS II[79]	Yes	Block, sealed envelope	No	1	As for STRESS	–	–
Eeckhout *et al.*[90]	No	Not stated	Yes	2	Higher dose aspirin (> 250 mg vs 100 mg), dipyridamole 25 mg tds and acenccoumarol to maintain INR > 2.5. All postoperatively for 6 months	2% received PTCA; 2% eCABG	7% received bailout stent
Versaci *et al.*[91]	No	Not stated	Yes	2	Warfarin to maintain INR at 2.5 to 3.5 for 3 months postoperatively	5% received eCABG	3% received bailout stent; 3% eCABG
START[92–94]	Yes	Sealed envelope	No	3	Procedures used in control group not precisely defined. Unable to assess whether the rigorous anticoagulation regimen used in stent group was also used in control group	1% received bailout stent (unclear what is meant by this); 1% eCABG	15% received bailout stent

eCABG, emergency CABG; INR, International Normalised Ratio

continued

TABLE 26 contd *Included RCTs: stents vs PTCA for IHD – design, quality and execution*

Study acronym or author	Multicentre?	Method of randomisation	Description of withdrawals and dropouts?	Jadad score	'Adjuncts' in intervention group, not received by control group	Departures from intervention indicated	Departures from control indicated
Knight *et al.*[108]	No	Not stated	No	1	No detail on procedures in intervention or control group	No information on crossovers	
BENESTENT II[27]	Yes	Block by telephone	Yes	3	Ticlopidine 25 mg od for 1 month postoperatively	1% received non-heparin coated stent; 2% PTCA; 1% eCABG	13% received bailout stent; 1% eCABG
RSSG[95]	Yes	Not stated	Yes	2	Phenprocoumon to maintain INR at 2.0 to 3.5 for 3 months postoperatively	1% received eCABG	6% received bailout stent; 1% eCABG
WIN[51,109]	Yes	Not stated	No	1	–	–	32.7% received stent
AS Trial[110]	Yes	Not stated	No	1	No apparent differences, but minimal detail on procedures in intervention or control group	No information on crossovers	
WIDEST[111]	Yes	Not stated	No	1	No detail on procedures in intervention or control group	2% 'crossovers' (presumed PTCA); 3% 'failures' (presumed eCABG)	30% received bailout stent, of whom 3% were 'failures' (presumed eCABG)
SAVED[96]	Yes	Not stated	Yes	2	Aspirin 325 mg and dipyridamole 75 mg per day preoperatively; dextran and heparin infusions peroperatively; warfarin and dipyridamole for 1 month post-operatively. (Bailout stents received the additional warfarin and dipyridamole postoperatively)	2% received PTCA; 1% eCABG	7% received bailout stent; 2% eCABG; 2% medical treatment
EPISTENT[41,97]	Yes	Telephone hotline	Yes	3	Ticlopidine 250 mg bd (at investigator's discretion)	3% not stented – no information on alternative treatments offered	19% received bailout stent

continued

TABLE 26 contd *Included RCTs: stents vs PTCA for IHD – design, quality and execution*

Study acronym or author	Multicentre?	Method of randomisation	Description of withdrawals and dropouts?	Jadad score	'Adjuncts' in intervention group, not received by control group	Departures from intervention indicated	Departures from control indicated
SICCO[98–100]	Yes	Block, sealed envelope	Yes	3	Dextran peroperatively; dipyridamole 75 mg tds and warfarin to maintain INR at 3.5 to 4.0 for 3 months postoperatively	2% not stented – no information on alternative treatments offered	No deviations from allocated control treatment
GISSOC[101]	Yes	Sealed envelope	Yes	3	Warfarin to maintain INR at 2.5 to 3.5 for 1 month postoperatively. Dextran peroperatively, and dipyridamole postoperatively at investigator's discretion	No deviations from allocated intervention treatment	2% received bailout stent
Hancock *et al.*[102]	No	Not stated	Yes	2	Warfarin to maintain INR at > 2.0 postoperatively	No deviations from allocated intervention treatment	No deviations from allocated control treatment
TOSCA[103,104]	Yes	Not stated	Yes	2	Ticlopidine postoperatively (93% received this in intervention group; 57% in control)	4% 'crossover' (presumed PTCA)	10% 'crossover' (presumed bailout stent)
SPACTO[105]	Yes	Not stated	Yes	2	Ticlopidine postoperatively (57% received this in intervention group; 19% in control); phenprocoumon postoperatively (43% received this in intervention group; 16% in control)	2% not stented – no information on alternative treatments offered	16% received bailout stenting
SARECCO[106]	Yes	Not stated (separately for each centre)	Yes	2	No apparent differences, particularly in anticoagulation regimens	2% not stented – no information on alternative treatments offered	No deviations from allocated control treatment
STOP[112]	Yes	Not stated	No	1	No detail on procedures in intervention or control group	No information on crossovers	

continued

TABLE 26 contd *Included RCTs: stents vs PTCA for IHD – design, quality and execution*

Study acronym or author	Multicentre?	Method of randomisation	Description of withdrawals and dropouts?	Jadad score	'Adjuncts' in intervention group, not received by control group	Departures from intervention indicated	Departures from control indicated
CORSICA[113]	Yes	Not stated	No	1	No apparent differences, but minimal detail on procedures in intervention or control group	No deviations from allocated intervention treatment	4% received bailout stenting
OCBAS[107]	Yes	Sealed envelope	Yes	3	Ticlopidine 250 mg bd postoperatively for 1 month to patients receiving stents	No deviations from allocated intervention treatment	No deviations from allocated control treatment
DEBATE II[114,115,117]	Yes	Double randomisation process	Yes	1	No detail on procedures in intervention or control group	No apparent deviations from allocated intervention treatment, but minimal information	24% received bailout stent
DEBATE II[114,115,117]	Yes	Double randomisation process	Yes	1	No detail on procedures in intervention or control group	No information on crossovers	
OPUS[116 *]	Yes	Not stated	No	1	No detail on procedures in intervention or control group	1% not stented – no information on alternative treatments offered	No deviations from allocated control treatment

*Some information from press release in the Cordis industry submission

TABLE 27 *Included RCTs: stents vs PTCA for IHD – short-term clinical results*

Study acronym or author	Procedure	Follow-up	No. followed up	Death		MI		Q wave MI		Non-Q wave MI		Major bleed	
				n	%	*n*	%	*n*	%	*n*	%	*n*	%
BENESTENT[80–84]	Stent	In hospital	259	0	0	9	–	5	1.9	4	1.5	35*	13.5
	PTCA		257	0	0	8	–	2	0.8	6	2.3	8*	3.1
STRESS[85–89]	Stent	14 days	205	0	0	11	5.4	6	2.9	NR		NR	
	PTCA		202	3	1.5	10	5.0	6	3.0	NR		NR	
STRESS II[79]	Stent	In hospital	100	STRESS II patients cannot be distinguished from STRESS patients, so no data reported here									
	PTCA		89										
Eeckhout *et al.*[90]	Stent	In hospital	42	0	0	0	0	NR		NR		6–9	–
	PTCA		42	0	0	0	0					1	2.3
Versaci *et al.*[91]	Stent	In hospital	60	0	0	1	–	1	1.7	0	0	4	6.7
	PTCA		60	0	0	1	–	0	0	1	1.7	0	0
START[92–94]	Stent	NR	NR	NR		NR		NR		NR		NR	
	PTCA												
Knight *et al.*[108]	Stent	NR	NR	NR		NR		NR		NR		NR	
	PTCA												
BENESTENT II[27]	Stent	30 days	413	0	0	11	–	5	1.2	6	1.5	5	1.2
	PTCA		410	1	0.2	13	–	4	1.0	9	2.2	4	1.0
RSSG[95]	Stent	In hospital	178	2	1.1	7	–	5	2.8	2	1.1	11*	6.2
	PTCA		176	1	0.6	2	–	1	0.6	1	0.6	1*	0.6
WIN[51,109]	Stent	30 days	299	1	0.4	16	7.0	NR		NR		NR	
	PTCA		287	1	0.4	13	5.5						
AS Trial[110]	Stent	NR	NR	NR		NR		NR		NR		NR	
	PTCA												
WIDEST[111]	Stent	In hospital	154	0	0	NR		NR		NR		NR	
	PTCA		146	1	0.7								

*$p < 0.05$, stent compared with PTCA

continued

TABLE 27 contd *Included RCTs: stents vs PTCA for IHD – short-term clinical results*

Study acronym or author	Procedure	Follow-up	No. followed up	Death		MI		Q wave MI		Non-Q wave MI		Major bleed	
				n	%	*n*	%	*n*	%	*n*	%	*n*	%
SAVED[96]	Stent	30 days	108	2	1.9	4	–	2	1.9	2	1.9	17*	15.7
	PTCA		107	2	1.9	8	–	1	0.9	7	6.5	5*	4.7
EPISTENT[41,97]	Stent	30 days	794	2	0.3	36	4.5	7	0.9	28	3.5	6	0.8
	PTCA		796	6	0.8	42	5.3	12	1.5	29	3.7	5	0.6
SICCO[98–100]	Stent	14 days	58	0	0	1	1.7	NR		NR		11*	19.0
	PTCA		59	0	0	0	0					1*	1.7
GISSOC[101]	Stent	In hospital	56	–	–	–	–	NR		NR		4	7.1
	PTCA		54	–	–	–	–					0	0
Hancock *et al.*[102]	Stent	In hospital	30	0	0	0	0	NR		NR		1	3.3
	PTCA		30	0	0	1	3.3					0	0
TOSCA[103,104]	Stent	In hospital	202	0	0	2	1.0	NR		16	7.9	NR	
	PTCA		208	0	0	1	0.5			4	2.4		
SPACTO[105]	Stent	In hospital	42	NR		NR		NR		NR		5	11.6
	PTCA		43									2	4.8
SARECCO[106]	Stent	14 days	55	0	0	1	1.8	0	0	1	1.8	0	0
	PTCA		55	0	0	1	1.8	1	1.8	0	0	0	0
STOP[112]	Stent	In hospital	48	NR		NR		NR		NR		NR	
	PTCA		48										
CORSICA[113]	Stent	30 days	72	NR		NR		NR		NR		NR	
	PTCA		70										
OCBAS[107]	Stent	In hospital	57	0	0	1	–	0	0	1	1.8	NR	
	PTCA		59	0	0	0	–	0	0	0	0		
DEBATE II[114,115,117]	Stent	NR	NR	NR		NR		NR		NR		NR	
	PTCA												
OPUS[116†]	Stent	NR	NR	NR		NR		NR		NR		NR	
	PTCA												

*$p < 0.05$, stent compared with PTCA

†Some information from press release in the Cordis industry submission

TABLE 28 *Included RCTs: stents vs PTCA for IHD – short-term event rates and re-intervention*

Study acronym or author	Procedure	Event rate		TVR		CABG		PTCA	
		n	%	*n*	%	*n*	%	*n*	%
BENESTENT[80–84]	Stent	18	6.9	NR		8	3.1	1	0.4
	PTCA	16	6.2			4	1.6	3	1.2
STRESS[85–89]	Stent	12	5.9	NR		5	2.4	9	4.4
	PTCA	16	7.9			8	4.0	4	2.0
STRESS II[79]	Stent	STRESS II patients cannot be distinguished from STRESS patients, so no data reported here							
	PTCA								
Eeckhout *et al.*[90]	Stent	3	7.1	NR		1	2.3	NR	
	PTCA	3	7.1			0	0		
Versaci *et al.*[91]	Stent	NR		NR		3	5.0	NR	
	PTCA					2	3.3		
START[92–94]	Stent	NR		NR		NR		NR	
	PTCA								
Knight *et al.*[108]	Stent	NR		NR		NR		NR	
	PTCA								
BENESTENT II[27]	Stent	16	3.9	NR		3	0.7	2	0.5
	PTCA	21	5.1			2	0.5	5	1.2
RSSG[95]	Stent	NR		5	2.8	4	2.2	NR	
	PTCA			1	0.6	1	0.6		
WIN[51,109]	Stent	22	9.6	NR		2	0.9	6	2.6
	PTCA	13	5.5			4	1.7	2	0.9
AS Trial[110]	Stent	NR		NR		NR		NR	
	PTCA								
WIDEST[111]	Stent	6	3.9	NR		NR		NR	
	PTCA	5	3.4						
SAVED[96]	Stent	6	5.6	NR		2	1.9	1	0.9
	PTCA	11	10.3			4	3.7	1	0.9
EPISTENT[41,97]	Stent	51	6.4	NR		6	–	NR	
	PTCA	73	9.2			5	–		
SICCO[98–100]	Stent	3	5.2	2	3.4	1	0.8	5	0.6
	PTCA	2	3.4	2	3.4	0	0.6	10	1.3
GISSOC[101]	Stent	NR		NR		–	1.7	1	1.7
	PTCA					–	0	2	3.4
Hancock *et al.*[102]	Stent	NR		NR		0	–	NR	
	PTCA					0	–		
TOSCA[103,104]	Stent	NR		1	0.5	1	0	0	0
	PTCA			5	2.4	0	0	1	3.3
SPACTO[105]	Stent	NR		NR		–	0.5	1	1.0
	PTCA					–	0	5	2.4
SARECCO[106]	Stent	NR		NR		0	–	NR	
	PTCA					0	–		

continued

TABLE 28 contd *Included RCTs: stents vs PTCA for IHD – short-term event rates and re-intervention*

Study acronym or author	Procedure	Event rate		TVR		CABG		PTCA	
		n	%	*n*	%	*n*	%	*n*	%
STOP[112]	Stent	NR		NR		–	0	0	0
	PTCA					–	0	4	7.2
CORSICA[113]	Stent	0*	0	NR		NR		NR	
	PTCA	12*	17.1						
OCBAS[107]	Stent	NR		NR		0	–	NR	
	PTCA					–	–		
DEBATE II[114,115,117]	Stent	NR		NR		NR		NR	
	PTCA								
OPUS[116†]	Stent	NR		NR		–	0	NR	
	PTCA					–	–		

*$p < 0.05$, stent compared with PTCA
†Some information from press release in the Cordis industry submission

TABLE 29 *Included RCTs: stents vs PTCA for IHD – angiographic follow-up*

Study acronym or author	Period of follow-up (for MLD/ for restenosis)	Loss to follow-up (*n*/*n* on which results reported [%])		Stent MLD (mm) and % stenosis		PTCA MLD (mm) and % stenosis		Stent restenosis at follow-up		PTCA restenosis at follow-up	
		Stent	PTCA	Mean	SD/range	Mean	SD/range	*n*	%	*n*	%
BENESTENT[80–84]	In hospital/6 months	22/259 (8.5%)	17/257 (6.6%)	2.48* 22%	0.39 8%	2.05* 33%	0.33 8%	22*	8.5%	32*	12.5%
STRESS[85–89]	14 days/6 months	29/205 (14.1%)	44/202 (21.8%)	2.49* 19%*	0.43 11%	1.99* 35%*	0.47 14%	–	31.6%	–	42.1%
Eeckhout *et al.*[90]	In hospital/6 months	2/42 (4.8%)	2/42 (4.8%)	2.87* 25%*	2.66–2.96 23–28%	2.37* 32%*	2.33–2.61 29–35%	19	47.5%	14	35.0%
Versaci *et al.*[91]	In hospital/1 year	11/60 (18.3%)	16/60 (26.7%)	2.8* 17%*	0.6 14%	2.1* 34%*	0.5 13%	–	19%*	–	40%*
START[92–94]	In hospital/6 months	NR	NR	2.84 12%	0.5 10%	2.27 26%	0.5 13%	–	22%	–	37%
Knight *et al.*[108]	N/A/6 months	NR	NR	NR		NR		–	22%*	–	45%*
BENESTENT II[27]	30 days/12 months	Combined 66/823 (8.0%)		2.69* 16%*	0.37 7%	2.13* 29%*	0.39 8%	–	16%	–	31%
RSSG[95]	In hospital/6 months	22/178 (12.4%)	18/176 (10.2%)	3.02 6%	0.43 14%	2.23 30%	0.57 17%	–	18%*	–	32%*
WIN[51,109]	In hospital/6 months	NR	NR	2.56 65%	– –	2.34 66%	– –	–	39%	–	39%
AS Trial[110]	N/A/6 months	NR	NR	NR		NR		–	18.82%*	–	24.74%*
WIDEST[111]	N/A/1 year	Combined 37/300 (12.3%)		NR		NR		–	21.6%	–	17.3%
SAVED[96]	In hospital 30 days/6 months	22/108 (20.4%)	27/107 (25.2%)	2.81* 12%*	0.49 13%	2.16* 32%*	0.57 17%	32	37%	37	46%

*$p < 0.05$, stent compared with PTCA

SD, standard deviation

continued

TABLE 29 contd *Included RCTs: stents vs PTCA for IHD – angiographic follow-up*

Study acronym or author	Period of follow-up (for MLD/ for restenosis)	Loss to follow-up (*n*/*n* on which results reported [%])		Stent MLD (mm) and % stenosis		PTCA MLD (mm) and % stenosis		Stent restenosis at follow-up		PTCA restenosis at follow-up	
		Stent	PTCA	Mean	SD/range	Mean	SD/range	*n*	%	*n*	%
EPISTENT[41,97]	NR	NR	NR	NR		NR		NR		NR	
SICCO[98–100]	14 days/6 months	21.7%	21.7%	2.78* 19%*	0.49 10%	2.13* 34%*	0.58 11%	17*	28%	43*	72%
GISSOC[101]	In hospital/9 months	11%	13%	2.46* 18.2%*	0.5 11.2%	1.91* 34.5%*	0.49 10.3%	–	32.0%	–	68.1%
Hancock *et al.*[102]	In hospital/6 months	1/30 (3.3%)	2/30 (6.7%)	3.3* –1.4%*	–	2.8* 20.3%*	–	8*	28%	16*	57%
TOSCA[103,104]	In hospital/6 months	0	0	2.45* 27%*	0.59 17%	1.97* 38%*	0.46 15%	–	55%*	–	70%*
SPACTO[105]	In hospital/6 months	Combined 21%		2.51* 14.6%*	0.41 10.3%	1.89* 29.4%*	0.53 10.9%	–	32.4%*	–	63.6%
SARECCO[106]	In hospital/4 months	?0	?0	2.54* 3%*	0.53 14%	1.85* 21%*	0.44 13%	13*	26%	32*	62%
STOP[112]	NR/6 months	Combined 27/96 (28.1%)		3.13*	–	2.42*	–	–	42.1%	–	71%
CORSICA[113]	NR	NR	NR	NR		NR		NR		NR	
OCBAS[107]	NR/6 months	1/57 (1.8%)	3/59 (5.1%)	2.7 12.8%	0.59 9%	2.2 22.1%	0.49 11%	11	19.6%	9	16.1%
DEBATE II[114,115,117]	NR	NR	NR	NR		NR		NR		NR	
OPUS[116 †]	NR	NR	NR	NR		NR		NR		NR	

*$p < 0.05$, stent compared with PTCA

† *Some information from press release in the Cordis industry submission*

TABLE 30 *Included RCTs: 'event rate' definitions*

Study acronym/author	Event rate definition
AS Trial[110]	Death, CVA, Q wave MI, TLR
BENESTENT[80–84]	All deaths, CVA, MI (Q and non-Q), CABG, PTCA of previously treated lesion
BENESTENT II[27]	Death, CVA, MI, CABG, PTCA, treatment crossover
CORSICA[113]	MACCE – not defined
DEBATE II[114,115,117]	MACE – not defined
Eeckhout *et al.*[90]	Death, CVA, MI, CABG, PTCA, treatment crossover
EPISTENT[41,97]	Any death, MI, severe ischaemia requiring CABG or PTCA
GISSOC[101]	Not defined
Hancock *et al.*[102]	Death, MI, CABG, PTCA
Knight *et al.*[108]	Not defined
OCBAS[107]	Death, MI, angina, TVR
OPUS[116*]	Death, MI, CABG, TVR
Restenosis SSG[95]	Death, MI, CABG, PTCA of target vessel
SARECCO[106]	Death, MI, CABG, PTCA, diameter stenosis > 50%
SAVED[96]	Death, MI, CABG, TVR
SICCO[98–100]	MACE – cardiac death, lesion related MI, lesion related CABG or PTCA, angiographic evidence of occlusion
SPACTO[105]	Death, MI, CABG, PTCA, recurrence of angina
START[92–94]	Sum of death, MI, TLR
STOP[112]	Not defined
STRESS[85–89]	All deaths, CVA, MI, CABG, PTCA
STRESS II[79]	As for STRESS
TOSCA[103,104]	Death, MI, any revascularisation
WIDEST[111]	Death, MI, vessel occlusion, CABG, PTCA
WIN[51,109]	MACE – not defined
Versaci *et al.*[91]	Death, MI, recurrence of angina
ERACI II[120]	MACE – death, MI, TLR by CABG or PTCA
SIMA[121]	Major cardiac events – not defined
Spyrantis *et al.*[122]	Not defined
ESCOBAR[124]	Death, MI, TVR by CABG or PTCA
FRESCO[123]	Death, MI, TVR from ischaemia
GRAMI[119]	Death, MI, repeat revascularisation
PAMI-Stent[126]	Death, CVA, MI, ischaemia driven TVR
PASTA[125]	Cardiac death, MI, TLR
PSAAMI[127]	Death, CVA, MI, ischaemic TVR
STENTIM II[128]	Death, MI, TLR by CABG or PTCA

[*]Some information from press release in the Cordis industry submission

MACCE, major adverse coronary and cerebrovascular events; MACE, major adverse coronary events

TABLE 31 *Included RCTs: stents vs PTCA for IHD – medium-term clinical results*

Study acronym or author	Procedure	Follow-up time	No. followed up	Death		MI		Q wave MI		Non-Q wave MI		Angina	
				n	%	*n*	%	*n*	%	*n*	%	*n*	%
BENESTENT[80–84]	Stent	6 months	259	2	0.8	11	–	7	2.7	4	1.5	88	34.0
	PTCA		257	1	0.4	10	–	4	1.6	6	2.3	68	26.5
STRESS[85–89]	Stent	8 months	205	3	1.5	13	6.3	7	3.4	NR		–	21.1
	PTCA		202	3	1.5	14	6.9	7	3.5			–	28.9
STRESS II[79]	Stent	10 months	100	STRESS II patients cannot be distinguished from STRESS patients, so no data reported here									
	PTCA		89										
Eeckhout *et al.*[90]	Stent	6 months	42	0	0	0	0	NR		NR		6	14.3
	PTCA		42	0	0	0	0					7	16.7
Versaci *et al.*[91]	Stent	NR	NR	NR		NR		NR		NR		NR	
	PTCA												
START[92–94]	Stent	NR	NR	NR		NR		NR		NR		NR	
	PTCA												
Knight *et al.*[108]	Stent	NR	NR	NR		NR		NR		NR		NR	
	PTCA												
BENESTENT II[27]	Stent	6 months	413	1	0.2	13	–	7	1.7	6	1.5	97	23.5
	PTCA		410	2	0.5	15	–	5	1.2	10	2.4	125	30.5
RSSG[95]	Stent	6 months	178	2	1.1	8	–	5	2.8	3	1.7	NR	
	PTCA		176	2	1.1	2	–	1	0.6	1	0.6		
WIN[51,109]	Stent	6 months	299	9	3.0	26	8.7	NR		NR		NR	
	PTCA		287	10	3.5	18	6.3						
AS Trial[110]	Stent	NR	NR	NR		NR		NR		NR		NR	
	PTCA												
WIDEST[111]	Stent	NR	NR	NR		NR		NR		NR		NR	
	PTCA												

continued

TABLE 31 contd *Included RCTs: stents vs PTCA for IHD – medium-term clinical results*

Study acronym or author	Procedure	Follow-up time	No. followed up	Death		MI		Q wave MI		Non-Q wave MI		Angina	
				n	%	*n*	%	*n*	%	*n*	%	*n*	%
SAVED[96]	Stent	8 months	108	–	7	NR		–	5	–	6	NR	
	PTCA	(4–8)†	107	–	9			–	4	–	11		
EPISTENT[41,97]	Stent	6 months	794	3	0.4	NR		NR		NR		NR	
	PTCA		796	14	1.8								
SICCO[98–100]	Stent	6 months	58	0	0	1	1.7	NR		NR		25*	56.9
	PTCA		59	0	0	0	0					45*	76.3
GISSOC[101]	Stent	9 months	56	0	0	–	–	0	0	NR		NR	
	PTCA		54	1	1.9	–	–	0	0				
Hancock *et al.*[102]	Stent	6 months	30	0	0	0	0	NR		NR		NR	
	PTCA		30	1	3.3	1	3.3						
TOSCA[103,104]	Stent	6 months	202	1	0.5	5	2.5	NR		NR		NR	
	PTCA		208	1	0.5	2	1.0						
SPACTO[105]	Stent	6 months	40/42	1	2.5	0	0	NR		NR		4	7.5
	PTCA		40/43	0	0	0	0					9	22.5
SARECCO[106]	Stent	4 months	55	0	0	1	1.8	0	0	1	1.8	NR	
	PTCA		55	0	0	1	1.8	1	1.8	0	0		
STOP[112]	Stent	6 months	?48	NR		NR		NR		NR		NR	
	PTCA		?48										
CORSICA[113]	Stent	6 months	72	NR		NR		NR		NR		NR	
	PTCA		70										
OCBAS[107]	Stent	NR	NR	NR		NR		NR		NR		NR	
	PTCA												
DEBATE II[114,115,117]	Stent	6 months	97	NR		NR		NR		NR		NR	
	PTCA		523										
DEBATE II[114,115,117]	Stent	6 months	189	NR		NR		NR		NR		NR	
	PTCA		194										
OPUS[116] ‡	Stent	6 months	230	NR		NR		NR		NR		NR	
	PTCA		249										

*$p < 0.05$, stent compared with PTCA

†From life-table; minimum and maximum length of follow-up

‡Some information from press release in the Cordis industry submission

TABLE 32 *Included RCTs: stents vs PTCA for IHD – medium-term event rates and re-intervention*

Study acronym or author	Procedure	Event rate		TVR		CABG		PTCA	
		n	%	*n*	%	*n*	%	*n*	%
BENESTENT[80–84]	Stent	52*	20.1	NR		13	5.0	26*	10.0
	PTCA	76*	29.6			10	3.9	53*	20.6
STRESS[85–89]	Stent	40	19.5	NR		10	4.9	23	11.2
	PTCA	48	23.8			17	8.4	25	12.4
STRESS II[79]	Stent	STRESS II patients cannot be distinguished from STRESS patients, so no data reported here							
	PTCA								
Eeckhout *et al.*[90]	Stent	10	23.8	NR		3	7.1	5	11.9
	PTCA	12	28.6			1	2.3	7	16.7
Versaci *et al.*[91]	Stent	NR		NR		NR		NR	
	PTCA								
START[92–94]	Stent	NR		NR		NR		NR	
	PTCA								
Knight *et al.*[108]	Stent	NR		NR		NR		NR	
	PTCA								
BENESTENT II[27]	Stent	53*	12.8	NR		6	1.5	33	8.0
	PTCA	79*	19.3			6	1.5	56	13.7
RSSG[95]	Stent	–	16.0*	16/156*	10.3	6/178	3.4	NR	
	PTCA	–	27.8*	42/158*	26.6	2/176	1.1		
WIN[51,109]	Stent	84	28.1	63	21.1	8	2.7	57	19.1
	PTCA	77	26.8	58	20.2	5	1.7	54	18.8
AS Trial[110]	Stent	–	13.23	NR		NR		NR	
	PTCA	–	21.16						
WIDEST[111]	Stent	NR		NR		NR		NR	
	PTCA								
SAVED[96]	Stent	–	26*	–	17	–	7	–	13
	PTCA	–	39*	–	26	–	12	–	16
EPISTENT[41,97]	Stent	103	13.0	69	8.7	NR		NR	
	PTCA	163	20.5	123	15.4				
SICCO[98–100]	Stent	12	20.7	12	–	3	5.2	10	17.2
	PTCA	27	45.8	23	39.0	1	1.7	24	40.7
GISSOC[101]	Stent	NR		3*	5.4	2	3.6	3	5.4
	PTCA			12*	22.2	4	7.4	10	18.5
Hancock *et al.*[102]	Stent	4	13.3	NR		1	3.3	3	10.0
	PTCA	9	30.0			2	6.7	5	16.7
TOSCA[103,104]	Stent	47	23.3	17*	8.4	3	1.5	25	12.4
	PTCA	49	23.6	32*	15.4	4	1.9	41	19.7
SPACTO[105]	Stent	12*	30.0	NR		1	2.5	10	25.0
	PTCA	22*	55.0			2	5.0	16	40.0
SARECCO[106]	Stent	NR		13*	23.6	0	0	13*	26.6
	PTCA			30*	54.5	0	0	30*	54.5

*$p < 0.05$, stent compared with PTCA

continued

TABLE 32 contd *Included RCTs: stents vs PTCA for IHD – medium-term event rates and re-intervention*

Study acronym or author	Procedure	Event rate		TVR		CABG		PTCA	
		n	%	*n*	%	*n*	%	*n*	%
STOP[112]	Stent	NR		–	18.9	NR		NR	
	PTCA			–	38.7				
CORSICA[113]	Stent	16	22.2	16	22.2	NR		NR	
	PTCA	19	27.1	24	34.3				
OCBAS[107]	Stent	NR		NR		NR		NR	
	PTCA								
DEBATE II[114,115,117]	Stent	–	9	NR		NR		NR	
	PTCA	–	12						
DEBATE II[114,115,117]	Stent	–	5.3	NR		NR		NR	
	PTCA	–	15.5						
OPUS[116] †	Stent	–	6.1*	–	3.5*	NR		NR	
	PTCA	–	14.9*	–	9.7*				

* $p < 0.05$, *stent compared with PTCA*

† *Some information from press release in the Cordis industry submission*

TABLE 33 *Included RCTs: stents vs PTCA for IHD – long-term clinical results*

Study acronym or author	Procedure	Follow-up time	No. followed up	Death		MI		Q wave MI		Non-Q wave MI		Angina	
				n	%	*n*	%	*n*	%	*n*	%	*n*	%
BENESTENT[84]	Stent	1 year	259/259	3	1.2	13	–	9	3.5	4	1.5	43	17.8
	PTCA		257/257	2	0.8	11	–	5	1.9	6	2.3	37	14.4
BENESTENT[81]	Stent	5 years	248/259	15	6.0	22	–	19*	7.7	3	1.2	NR	
	PTCA		243/257	8	3.3	14	–	8*	3.3	6	2.5		
STRESS[86,88]	Stent	1 year	205/205	3	1.5	13	6.3	7	3.4	NR		26/161	16.1
	PTCA		202/202	4	2.0	16	7.9	7	3.5			25/155	16.1
STRESS II[79]	Stent	1 year	100	STRESS II patients cannot be distinguished from STRESS patients, so no data reported here									
	PTCA		89										
Versaci *et al.*[91]	Stent	1 year	60/60	1	1.7	3	5.0	NR		NR		6*	10.0
	PTCA		60/60	1	1.7	4	6.7					15*	25.0
START[92]	Stent	4 years	225/229	6	2.7	5	2.2	NR		NR		NR	
	PTCA		211/223	5	2.4	6	2.8						
BENESTENT II[27]	Stent	1 year	413/413	4	1.0	14	3.4	8	1.9	6	1.5	NR	
	PTCA		410/410	4	1.0	18	4.4	6	1.5	12	2.9		
AS Trial[110]	Stent	2 years	–	1	0.52	–	–	2	1.04	NR		NR	
	PTCA		–	0	0	–	–	2	1.02				
WIDEST[111]	Stent	1 year	154	NR		NR		NR		NR		NR	
	PTCA		146										
SICCO[99]	Stent	3 years	58	1	1.7	1	1.7	–	–	–	–	33	56.8
	PTCA	(± 6 months)	59	3	5.1	2	3.4	–	–	–	–	33	55.9
SARECCO[106]	Stent	2 years	55	NR		NR		NR		NR		NR	
	PTCA		55										
OCBAS[107]	Stent	9–23 months	57	0	0	NR		NR	1	1.8		NR	
	PTCA		59	1	1.7				1	1.7			

*$p < 0.05$, stent compared with PTCA

TABLE 34 *Included RCTs: stents vs PTCA for IHD – long-term event rates and re-intervention*

Study acronym or author	Procedure	Event rate		TVR		CABG		PTCA	
		n	%	*n*	%	*n*	%	*n*	%
BENESTENT[84]	Stent	60*	23.2	NR		18	6.9	26*	10.0
	PTCA	81*	31.5			13	5.1	53*	20.6
BENESTENT[81]	Stent	86	34.7	43*	17.3	30	12.1	NR	
	PTCA	96	29.5	66*	27.2	23	9.5		
STRESS[86,88]	Stent	51	24.9	24	11.7	12	5.8	39	19.0
	PTCA	61	30.2	38	17.3	18	8.9	42	20.8
STRESS II[79]	Stent	STRESS II patients cannot be distinguished from STRESS patients, so no data reported here							
	PTCA								
Versaci *et al.*[91]	Stent	8*	13.3	NR		4	6.7	4	6.7
	PTCA	18*	30.0			3	5.0	13	21.7
START[92]	Stent	38*	16.9	27*	12.0	NR		NR	
	PTCA	63*	29.9	52*	24.6				
BENESTENT II[27]	Stent	65*	15.7	NR		8	1.9	39	9.4
	PTCA	92*	22.4			6	1.5	64	15.6
AS Trial[110]	Stent	–	16.93*	31*	16.15	–	–	–	–
	PTCA	–	26.46*	48*	24.5	–	–	–	–
WIDEST[111]	Stent	32	20.8	NR		NR		NR	
	PTCA	28	19.2						
SICCO[99]	Stent	14*	24.1	14*	24.1	5	8.6	12	20.7
	PTCA	35*	59.3	31*	52.5	4	6.8	30	50.8
SARECCO[106]	Stent	–	26.0	NR		NR		NR	
	PTCA	–	52.0						
OCBAS[107]	Stent	–	19.2	10	17.5	4	7.0	6	10.5
	PTCA	–	16.9	8	13.6	2	3.4	6	10.2

*$p < 0.05$, stent compared with PTCA

TABLE 35 *Included RCTs: stents vs CABG for IHD – patient characteristics and intervention*

Study acronym or author	Patient group	Inclusion criteria	Exclusion criteria	Intervention	Antithrombotics (intervention group)	Comparator(s)	Antithrombotics (comparator group)
ERACI II[120]	IHD	Multi-vessel disease	–	Stent	NR	CABG	NR
SIMA[121]	IHD	Isolated LAD stenosis LVF > 0.45	–	Stent	NR	CABG	NR
Spyrantis *et al.*[122]	IHD	Proximal high grade lesions of LAD artery	–	Stent	NR	Minimal invasive CABG	NR

LVF, left ventricular function

TABLE 36 *Included RCTs: stents vs CABG for IHD – numbers randomised and baseline characteristics*

Study acronym or author	No. of patients eligible	Total no. randomised	No. randomised to:		Mean age (years)/sex	Baseline characteristics	Relevant differences between trial arms at baseline	Dropouts (*n*/*n* randomised [%]) Crossovers (*n*/*n* results reported for [%])	
			Stents	CABG				Stents	CABG
ERACI II[120]	NR	450	225	225	NR	SA, – UA, 86.6% PMI, – AMI, – CO, –	Basal demographic and angiographic characteristics similar	NR	NR
SIMA[121]	–	123	63	60	NR	SA, – UA, – PMI, – AMI, – CO, –	Characteristics similar in 2 groups	0 0	0 5/60 (8.3%)
Spyrantis *et al.*[122]	NR	136	71	65	NR	SA, – UA, – PMI, – AMI, – CO, –	All patients had stress-induced angina pectoris	0 0	0 3 conventional CABG

TABLE 37 *Included RCTs: stents vs CABG for IHD – design, quality and execution*

Study acronym or author	Multicentre?	Method of randomisation	Description of withdrawals and dropouts?	Jadad score
ERACI II[120]	Yes	Not stated	No	1
SIMA[121]	Yes	Not stated	No	1
Spyrantis *et al.*[122]	No	Not stated	No	1

TABLE 38 *Included RCTs: stents vs CABG for IHD – short-term clinical results*

Study acronym or author	Procedure	Follow-up time	No. followed up	Death		MI		Q wave MI		Non-Q wave MI		Major bleed	
				n	%	*n*	%	*n*	%	*n*	%	*n*	%
ERACI II[120]	Stent	30 day	225	2*	0.9	2*	0.9	NR		NR		NR	
	CABG		225	13*	5.7	13*	5.7						
SIMA[121]	Stent	In hospital	63	1	1.6	3	–	0	0	3	4.8	2*	3.2
	CABG		60	0	0	2	–	1	1.7	1	1.7	18*	30.0
Spyrantis *et al.*[122]	Stent	In hospital	71	NR		NR		NR		NR		NR	
	CABG		65										

*$p < 0.05$, stent compared with CABG

TABLE 39 *Included RCTs: stents vs CABG for IHD – short-term event rates and re-intervention*

Study acronym or author	Procedure	Event rate		TVR		CABG		PTCA	
		n	%	*n*	%	*n*	%	*n*	%
ERACI II[120]	Stent	8*	3.6	NR		NR		NR	
	CABG	28*	12.5						
SIMA[121]	Stent	4	6.3	NR		NR		NR	
	CABG	2	3.0						
Spyrantis *et al.*[122]	Stent	NR		NR		0	0	NR	
	CABG					2	3.1		

* $p < 0.05$, *stent compared with CABG*

TABLE 40 *Included RCTs: stents vs CABG for IHD – angiographic follow-up results*

Study acronym or author	Period of follow-up (for MLD/ for restenosis)	Loss to follow-up (*n*/*n* on which results reported [%])		Stent MLD (mm) and % stenosis		CABG MLD (mm) and % stenosis		Stent restenosis at follow-up		CABG restenosis at follow-up	
		Stent	CABG	Mean	SD/range	Mean	SD/range	*n*	%	*n*	%
ERACI II[120]	NR	NR	NR	NR		NR		NR		NR	
SIMA[121]	In hospital/N/A	NR	NR	3.0 9%	2.7–3.2 7–13%	N/A		NR		NR	
Spyrantis *et al.*[122]	N/A/6 months	21/71 (29.6%)	32/65 (49.2%)	NR		NR		18	36%	5	15%
There were no significant differences ($p > 0.05$)											

TABLE 41 *Included RCTs: stents vs CABG for IHD – medium-term event rates and re-intervention*

Study acronym or author	Intervention/ time	No. followed up	Event rate		TVR		CABG		PTCA	
			n	%	*n*	%	*n*	%	*n*	%
ERACI II[120]	Stent/6 months	225	NR		–	13.7*	–	–	–	–
	CABG	225			–	4.8*	–	–	–	–
SIMA[121]	Stent	–	NR		NR		NR		NR	
	CABG	–								
Spyrantis *et al.*[122]	Stent/6 months	50	NR		NR		NR		14*	28.0
	CABG	33							3*	9.1

*$p < 0.05$, stent compared with CABG

TABLE 42 *Included RCTs: stents vs PTCA for AMI – patient characteristics and intervention*

Study acronym or author	Patient group	Inclusion criteria	Exclusion criteria	Intervention	Antithrombotics (intervention group)	Comparator(s)	Antithrombotics (comparator group)
GRAMI[119]	AMI	Angiography within 24 hr MI symptom onset – chest pain > 30 mins, ST elevation or ST depression, age < 75 years (cardiogenic shock, previous CABG, any length stenosis included)	Bleeding risk prohibiting heparin/ antiplatelet treatment, non-cardiac illness with survival < 1 year. Reference vessel diameter < 2.5 mm, severe (> 50%) stenosis, left main, severe multi-vessel disease, culprit vessel stenosis < 50%	Stent (Gianturco-Roubin II)	I.v. nitroglycerine, aspirin, ticlopidine, heparin	PTCA	I.v. nitroclycerine, aspirin, ticlopidine, heparin
FRESCO[123]	AMI	Chest pain > 30 min with ST elevation, within 6 hr symptom onset or 6–24 hr of continuing ischaemia inc. cardiogenic shock; (any age, diffuse, tortuous, thrombus included)	Previous fibrinclytic treatment, stenosis < 70%, diameter < 2.5 mm, non-optimal PTCA	Stent (Gianturco-Roubin)	Heparin, aspirin, ticlopidine	PTCA	Heparin, aspirin, ticlopidine
ESCOBAR[124]	AMI	Within 6 hr symptom onset or 6–24 hr ongoing ischaemia, native artery suitable for stenting; (previous CABG, PTCA, MI included)	In another study, life expectancy < 1 year, unprotected L main disease, severe multi-vessel disease, bifurcation, diffuse disease, vessel tortuosity, no re-flow, thrombus	Stent (Palmaz-Schatz)	Heparin, aspirin, warfarin in 21%, ticlopidine in 79%	PTCA	Heparin
PASTA[125]	AMI	Diagnosis of MI by (a) chest pain > 30 min unresponsive to nitroglycerine; (b) ECG, ST elevation > 1 mm in > 2 leads; (c) CAG findings. Culprit lesion occluded or narrowed with flow < TIMI 2. Diameter > 2.5 mm	Excessive tortuosity, calcification proximal to stenosis	Stent (Palmaz-Schatz)	Aspirin, ticlopidine 200 mg, heparin	PTCA	Aspirin. heparin

continued

TABLE 42 contd *Included RCTs: stents vs PTCA for AMI – patient characteristics and intervention*

Study acronym or author	Patient group	Inclusion criteria	Exclusion criteria	Intervention	Antithrombotics (intervention group)	Comparator(s)	Antithrombotics (comparator group)
PAMI-Stent[126]	AMI	Within 12 hr MI onset. Reference diameter 3–4.5 mm, lesions can be covered by 2 stents max	High likelihood of CABG within 6 months, cardiogenic shock, prior thrombolysis, contra-indication to antiplatelet treatment, excessive tortuosity, major side branch within lesion	Heparin-coated stent (Palmaz-Schatz)	Heparin	PTCA	Heparin
PSAAMI[127]	AMI	Angiography within 24 hr onset, stenosis > 70% or TIMI flow < 3 in infarct-related vessel (cardiogenic shock included)	–	Silicon carbide-coated stent (Tantal)	Abciximab in 48%	PTCA	Abciximab in 48%
STENTIM II[128]	AMI	Within 12 hr onset, ECG and enzyme confirmation of MI, vessel diameter < 3 mm, TIMI flow < 3, culprit lesion stenosis > 70%	In another study within 1 month, previous thrombolytic treatment, contraindication to antiplatelet treatment, cardiogenic shock, CABG or PTCA within 6 months, multiple vessel disease, bifurcation, left main, calcified lesions. Infarct-related artery unidentifiable	Stent (Wiktor)	Aspirin, heparin, ticlopidine, ACE inhibitors, beta blockers, abciximab (3%)	PTCA + provisional stent	Aspirin, heparin, ACE inhibitors, beta blockers, abciximab (2.7%)

TABLE 43 *Included RCTs: stents vs PTCA for AMI – number randomised and baseline characteristics*

Study acronym or author	No. of patients eligible	Total no. randomised	No. randomised to:		Mean age (years)/sex	Baseline characteristics	Relevant differences between trial arms at baseline	Dropouts (*n*/*n* randomised [%]) Crossovers (*n*/*n* results reported for [%])	
			Stents	PTCA				Stents	PTCA
GRAMI[119]	116	104	52	52	58.5 16.3% F	SA, – UA, – PMI, 10.6% AMI, 10% CO, –	More hypertension in stent group ($p < 0.03$)	0 1/52 (1.9%)	0 17/52 (32.7%)
FRESCO[123]	223	150	75	75	61.5 22.7% F	SA, – UA, – PMI, 8% AMI, 100% CO, –	More diabetics in stent group (p = NS). More current anterior MI stent group ($p < 0.05$)	0 0 0 0	
ESCOBAR[124]	532 (498 angio-graphy)	227	112	115	58 15.9% F	SA, – UA, – PMI, 13.2% AMI, 100% CO, –	No significant differences in patient demographic or clinical characteristics	0 2/112 (1.8%)	0 15/115 (13.0%)
PASTA[125]	230	142	70	72	67.3 28.7% F	SA, – UA, – PMI, 5.9% AMI, 100% CO, –	No significant differences	3/70 (4.3%) 1/67 (1.5%)	3/72 (4.2%) 7/69 (10.1%)
PAMI-Stent[126]	1458	900	452	448	60 ?% F	SA, – UA, – PMI, – AMI, – CO, –	Well matched except age (stent group older, $p = 0.03$) and time to presentation (stent group took longer $p = 0.06$)	NR 1.3%	NR 67/448 (15.1%)
PSAAMI[127]	134	88	44	44	60 24% F	SA, – UA, – PMI, 9.0% AMI, 100% CO, –	No significant differences for demographic or angiographic data	NR 1/44 (27.3%)	NR 12/44 (27.3%)
STENTIM II[128]	NR	216	101	110	57.4 18.4% F	SA, – UA, – PMI, 4.7% AMI, 100% CO, –	2 groups similar	3/104 (2.9%) 3/101 (3.0%)	2/112 (1.8%) 40/110 (36.4%)