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Clinical outcome comparison of percutaneous coronary intervention and bypass surgery in diabetic patients with coronary artery disease: a meta-analysis of randomized controlled trials and observational studies

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Abstract

Background: The optimal revascularization technique in diabetic patients with complex coronary artery disease (CAD), including left main CAD and multivessel coronary disease (MVD), remains controversial. The current study aimed to compare adverse clinical endpoints of coronary artery bypass graft (CABG) and percutaneous coronary intervention (PCI) in patients with diabetes mellitus (DM).

Methods: Relevant studies were found from MEDLINE, OVID, Science Direct, Embase and the Cochrane Central database from January 2010 to April 2019. Risk ratio (RR) with 95% confidence interval (CI) was used to express the pooled effect on discontinuous variables. Outcomes evaluated were all-cause mortality, major adverse cardiac/cerebrovascular events (MACCE), cardiac death, myocardial infarction, stroke, and repeat revascularization.

Results: Sixteen studies were included (18,224 patients). PCI was associated with the increase risk for MACCE (RR 1.59, 95% CI 1.38–1.85), cardiac death (RR 1.76, 95% CI 1.11–2.80), MI (RR 1.98, 95% CI 1.53–2.57), repeat revascularization (RR 2.61, 95% CI 2.08–3.29). The risks for all-cause mortality (RR 1.23, 95% CI 1.00–1.52) and stroke (RR 0.71, 95% CI 0.48–1.03) were similar between two strategies. Stratified analysis based on studies design and duration of follow-up showed largely similar findings with the overall analyses, except for a significant increased risk of all-cause mortality (RR 1.32, 95% CI 1.04–1.67) in long-term group, and CABG was associated with a higher stroke rate compared to PCI, which are results that were found in RCTs (RR 0.47, 95% CI 0.28–0.79) and mid-term groups (RR 0.39, 95% CI 0.23–0.66).

Conclusions: CABG was superior to PCI for diabetic patients with complex CAD (including left main CAD and/or MVD), but might be associated with a higher risk of stroke mid-term follow-up.

Number of Protocol registration PROSPERO CRD 42019138505.

Keywords: Diabetes mellitus, Coronary artery bypass surgery, Percutaneous coronary intervention, Meta-analysis

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Background

In recent years, the occurrence of diabetes mellitus (DM) in patients worldwide has been increasing rapidly [1]. The total number of patients with DM is expected to rise to

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nearly 600 million by 2035 [2]. As the critical risk factor for coronary artery disease (CAD), DM typically presents with diffuse comorbid atherosclerosis and multiple-vessel stenosis, which are poor prognostic indicators of revascularization strategies [3, 4]. Currently, coronary artery bypass grafting (CABG) has been recommended as the standard of care for patients with diabetes and complex anatomic diseases, including left main CAD [5]. However, with the application of drug-eluting stents (DESs) and the improvement of interventional technology, the incidence of restenosis and repeat revascularization after percutaneous coronary intervention (PCI) has been significantly reduced [6, 7]. PCI is regarded as an alternative to CABG, as it is less invasive, which is favored by more patients. Thus, a number of clinical studies have been conducted globally to estimate and compare the clinical effects and end-point outcomes of the two approaches in an effort to determine the best revascularization strategy for patients with DM and complex CAD [8–11].

Recently, two meta-analyses based on several published studies (e.g., Dai et al. [12]) found that the incidence of all-cause mortality (1–5 years follow-up) of DM patients underwent PCI did not differ significantly from those who underwent CABG. Similarly, Xin et al. [13] found no clear difference in mortality between CABG and PCI in patients with DM and serious coronary disease. However, these analyses assessed a limited number of studies. Furthermore, the evidence was not examined through stratified analysis of follow-up time and/or study type. These issues are important, as a recently published clinical trial [14] showed that the rate of mortality after PCI was significantly higher than CABG, differing from previous results.

Therefore, this study comprehensively examined research completed in the last 10 years, evaluating and comparing clinical outcomes of PCI or CABG in patients with complex coronary disease (including left main CAD and/or MVD) in an effort to determine the most appropriate revascularization strategy for patients with DM.

Methods

This study was performed according to the Cochrane Collaboration guidelines and is reported in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analysis extension (PRISMA) statement [15, 16]. The protocol was registered in PROSPERO database (http://www.crd.york.ac.uk/PROSPERO/) under the number CRD42019138505.

Inclusion criteria

Inclusion criteria were as follows: (1) types of studies: we included all randomized controlled trials (RCTs) and observational studies (OS); (2) types of participants: all patients with DM (including type 1 and 2 diabetes) included in studies were diagnosed with left main CAD, MVD, or both; (3) types of interventions: all patients underwent direct percutaneous coronary intervention (PCI) or coronary artery bypass grafting surgery (CABG); and (4) outcomes: the incidence of all-cause mortality of patients underwent PCI, comparison to patients with CABG. Other outcomes included the risk of cardiac death, MACCE, myocardial infarction (MI), stroke, or repeat revascularization. MACCE refers to major adverse cardiac events and cerebrovascular events, including death, MI, stroke or repeat revascularization. Subgroups analyses of the incidence of these endpoints were conducted according to different study designs (included RCTs and observational studies) and duration of followup (midterm: 1–3 years, long-term: >3 years).

Exclusion criteria

Exclusion criteria were the following: (1) overlapping and/or repetitive data; (2) review articles, single case reports, and noncomparable studies; (3) the number of diabetic patients for comparison was less than 50; (4) DESs were not used in interventional therapy; and (5) a follow-up period < 1 year.

Search strategy

We searched for all relevant studies from MEDLINE (including PubMed), OVID, Science Direct, Embase and the Cochrane Central database, from January 2010 to April 2019. The following search terms were used to maximize search sensitivity and specificity: percutaneous coronary intervention, drug-eluting stents, coronary artery bypass graft, coronary bypass, left main coronary artery disease, multivessel disease, diabetes mellitus. Additionally, further relevant studies were identified through the reference list of review articles.

Study selection

In the present study, two reviewers (CN Zhai and K Hou) independently screened the titles and abstracts of articles for eligibility criteria. Then, the full text of studies that potentially met inclusion criteria was inspected to determine which studies were included in analyses. If the two reviewers disagreed regarding the inclusions of a study, a consensus was reached by consulting a third researcher (HL Cong).

Data extraction and quality assessment

Data from all included articles were extracted independently by two investigators (CN Zhai and K Hou). Data included the study title, publication date, authors, studies design, number of patients, coronary lesion, duration of follow-up, and the risk of every endpoint, etc. the corresponding authors of the included studies were contacted to obtain any required information that was missing. The total extracted data were verified by a third investigator (HL Cong). Three reviewers (CN Zhai, K Hou, and YY Zhang) independently evaluated the potential risk of bias of randomized trials by applying the Cochrane Collaboration's tool [17] and the quality of observational studies by using the Newcastle–Ottawa Scale criteria [18].

Statistical analysis

Data analysis was conducted using the RevMan software, version 5.1 (the Nordic Cochrane Centre, the Cochrane collaboration, Copenhagen, Denmark) and STATA 12.0 software (StataCorp, College Station, TX, USA). The risk ratios (RRs) and 95% confidence intervals (CIs) were used to evaluate the dichotomous outcomes, such as the incidence of all-cause mortality. To combine the separate statistics, the inverse variance and Mantel-Haenszel techniques were used. The heterogeneity was investigated by the use of the Q statistic, and P values < 0.05 was regarded as statistically significant, a random-effects model was used in the above circumstances. Sensitivity analysis was conducted using an exclusion method whereby multiple analyses were performed, with a different study excluded in each analysis of the clinical outcome.

Publication bias was evaluated statistically using Begg funnel plots and Egger's bias test. The above methods measured the degree of funnel-plot asymmetry statistically [19, 20]. The Begg adjusted rank correlation test was used to evaluate the relationship between the test accuracy estimate and their variances. The deviation of Spearman ρ values from zero provided an estimate of the funnel-plot asymmetry. Positive values indicated a trend toward higher levels of test accuracy in studies with smaller sample sizes. The Egger bias test detects funnel-plot asymmetry by determining whether the intercept deviates significantly from zero in a regression of the standardized effect estimates against their precision values.

Results

Search results and characteristics of included studies

A total of 425 articles were found during the initial electronic search, after removal of duplicate studies. After screening, 409 failed to meet eligibility criteria. Eventually, a total of 16 articles, which included 7 randomized controlled trails [5, 8, 9, 14, 21–23] and 9 observational studies [11, 24–31], met all eligibility criteria (Fig. 1).

A total of 18,224 patients with DM receiving PCI (n=9863) and CABG (n=8361) were included in the present analysis. Table 1 showed the general

characteristics of the individuals included in the studies investigated. Some raw data of characteristics were not fully available. Although contact with the authors of the original studies was attempted, no responses were received. The methodological quality of included RCTs was presented in Fig. 2. Judgement about each risk of bias item are presented as percentages across RCTs in Fig. 3. Although the nature of the intervention made trials blinded for patients impossible, this was not considered a source of significant bias. The quality of observational studies is presented in Table 2 and they had high quality in their data outcome and clinical design.

All-cause mortality

All-cause mortality was reported in 15 studies (18,032 patients) (Table 3). Comparing with patients undergoing CABG, all-cause mortality was significantly higher in patients who received PCI (RR 1.23, 95% CI 1.00–1.52, P=0.05). In analysis stratified by study design and duration of follow-up, consistent findings were observed in the subgroup of long-term follow-up (RR 1.32, 95% CI 1.04–1.67, P=0.02). A trend toward increased risk was detected in the subgroups of RCTs (RR 1.30, 95% CI 0.86–1.98, P=0.08), OS (RR 1.22, 95% CI 0.95–1.56, P=0.12) and mid-term follow-up (RR 1.12, 95% CI 0.76–1.65, P=0.58; Fig. 4a, b).

Macce

The overall incidence of MACCE was higher in the PCI group compared with CABG group (8 studies; 11,791 patients; RR 1.59, 95% CI 1.38–1.85, P<0.001) (Table 3). The same statistically significant differences were found in stratified analyses [RCTs (RR 1.40, 95% CI 1.20–1.63, P<0.001); OS (RR 1.87, 95% CI 1.72–2.03, P<0.001); mid-term follow-up (RR 1.31, 95% CI 1.11–1.54, P=0.001); and long-term follow-up (RR 1.84, 95% CI 1.70–1.99, P<0.001); Fig. 5a, b].

Cardiac death

Compared to the CABG group, patients receiving PCI demonstrated a higher risk of cardiac death (7 studies; 5683 patients; RR 1.76, 95% CI 1.11–2.80, P=0.02) (Table 3). This was seen in the RCTs subgroup (RR 2.25, 95% CI 1.28–3.98, P=0.005). In other stratified analyses, although there was no statistically significant findings, the similar trend toward increased risk was observed in OS (RR 1.20, 95% CI 0.92–1.56, P=0.18), mid-term follow-up (RR 1.99, 95% CI 0.96–4.15, P=0.07), and long-term follow-up (RR 1.37, 95% CI 0.99–1.90, P=0.06) subgroups (Fig. 6a, b).



Myocardial infarction

There was a statistically significant increase in the risk of myocardial infarction in patients undergoing PCI compared to patients undergoing CABG (11 studies, 12,885 patients, RR 1.98, 95% CI 1.53–2.57, P<0.001) (Table 3). This result was consistent in OS (RR 2.44, 95% CI 2.07–2.88, P<0.001) and long-term follow-up (RR 2.35, 95% CI 2.01–2.73, P<0.001) subgroups. A trend toward increased risk was observed in RCTs (RR 1.35, 95% CI 0.97–1.86, P=0.07) and mid-term follow-up subgroups (RR 1.53, 95% CI 0.95–2.48, P=0.08; Fig. 7a, b).

Stroke

There showed no significant difference in incidence of stroke between PCI and CABG (12 studies; 14,849 patients; RR 0.71, 95% CI 0.48–1.03, P=0.07) (Table 3). Analysis by study design and follow-up time found that

the rate of stroke was lower in the PCI patients compared with CABG patients in RCTs (RR 0.44, 95% CI 0.27–0.71, P < 0.001) and mid-term follow-up subgroups (RR 0.39, 95% CI 0.23–0.66, P < 0.001). The risk of stroke was similar in both OS (RR 0.95, 95% CI 0.62–1.45, P = 0.81) and long-term follow-up subgroups (RR 0.95, 95% CI 0.64–1.41, P = 0.79; Fig. 8a, b).

Repeat revascularization

Overall, there was a statistically significant increase in the risk of repeat revascularization in patients undergoing PCI compared with CABG (12 studies; 15,461 patients; RR 2.61, 95% CI 2.08–3.29, P<0.001) (Table 3). This effect was also demonstrated in all multiple stratified analyses [RCTs (RR 2.22, 95% CI 1.46–3.39, P<0.001); OS (RR 2.92, 95% CI 2.21–3.87, P<0.001); mid-term follow-up (RR 2.88, 95% CI 1.66–4.99, P<0.001); and long-term

	ear Follow-up years	o Samples P/C	Age, years P/C	Male, % P/C	HTN, % P/C	Smoke, % P/C	Dsl, % P/C	Stent type	Study design	Coronary lesion
Kapur et al. [21] 2(10 1	172/178	64.3/63.6	70.7/77.9	20.8/18.7	24.6/23.2	NA	DES	RCT	MVD (2- or 3-vessel disease)
Luo et al. [24] 2(012 3	99/127	65/66	70/98	72/87	43.0/54.0	15.0/31.0	DES	OS	Unprotected LM disease (and/ or 1-, 2-, or 3-vessel coronary disease)
Farkouh et al. [5] 2(012 1	953/947	63.2/63.1	73.2/69.5	NA	14.8/16.6	AN	SES or PES	RCT	MVD with stenosis of more than 70% in 2 or more major epicar- dial vessels
Kamalesh et al. [8] 20)13 2	101/97	62.7/62.1	0.66/0.66	96.0/95.7	27.7/20.6	NA	DES	RCT	MVD (2- or 3-vessel disease)
Kappetein et al. [9] 2()13 5	231/221	NA	NA	NA	NA	NA	PES	RCT	LM and/or 3-vessel disease
Ben-Gal et al. [23] 2(115 1	1349/423	65.0/65.0	73.0/66.3	79.4/85.9	21.0/24.0	61.8/72.7	DES	RCT	LM and/or 2-, 3-vessel disease
Bangalore et al. [25, 34] 2(015 4	773/773	64.9/64.7	68.0/68.0	NA	АА	NA	EES	SO	MVD (2-, 3-vessel disease and without LM)
Marui et al. [26] 2()15 5	1065/933	68.7/67.8	68.0/73.0	88.0/84.0	25.0/25.0	NA	DES	OS	LM and/or 3-vessel disease
Ahn et al. [22] 2()15 5	102/90	NA	ЧV	NA	AA	NA	SES	RCT	Unprotected LM disease with stenosis of more than 50%
Naito et al. [27] 2()15 3.8	256/227	72.7/72.7	78.1/68.3	77.0/74.0	58.6/62.6	76.6/68.7	DES	OS	LM and/or 2-, 3-vessel disease
Yu et al. [28] 2(015 7.1	143/131	65.0/66.0	72.0/77.9	68.5/65.6	49.7/45.8	53.8/37.4	DES	OS	Unprotected LM and 1-, 2-, or 3-vessel coronary disease
Zheng et al. [29] 2(016 3	348/806	NA	NA	NA	NA	NA	DES	OS	LM and/or 1-, 2-, 3-vessel disease
Li et al. [30] 2(17 10	406/406	41.9/42.0	366/369	60.8/63.5	66.0/65.3	NA	DES	OS	LM and/or 1-, 2-, 3-vessel disease
Ramanathan et al. [11] 2(017 5	2710/1865	67.3/65.2	72.0/73.2	88.1/91.8	NA	77.5/79.5	DES	SO	MVD with stenosis of more than 70% in 2 or more major epicar- dial vessels
Nagendran et al. [31] 2(018 5	869/869	65.1/65.1	23.0/21.0	83.0/85.0	18.0/20.0	80.0/82.0	DES	OS	LM and/or 2-, 3-vessel disease
Milojevic et al. [14] 2(019 3	286/268	NA	AA	NA	AN	NA	EES	RCT	LM and/or 1-, 2-, or 3-vessel coro- nary disease



follow-up (RR 2.56, 95% CI 2.02–3.24, *P*<0.001); Fig. 9a, b].

Sensitivity analyses and publication bias

Publication bias tests were performed for all endpoints of included studies. There was no evidence of publication bias (Table 4). Sensitivity analyses in overall endpoints showed that the results of these analyses were not excessively influenced by any of the included studies.

Discussion

The optimal revascularization strategy for patients with DM and complex CAD, including left main CAD, is an important issue for cardiovascular experts. In clinical practice, PCI is more acceptable to patients with DM because of less trauma and faster recovery. CABG is more invasive than PCI and has a higher risk of adverse cerebral vascular events during perioperative period [32]. Although PCI is more likely to be associated with higher rate of adverse events after revascularization, previous studies [13] have reported no difference in mortality between PCI and CABG and CABG was associated with excess stroke [33, 34], making it difficult for physicians to assess the two strategies. This study pooled data from 16 studies, which included 18,224 diabetic patients (follow $up \ge 1$ year) with left main CAD and/or MVD, undergoing either PCI or CABG. At the long-term follow-up (>3 years), we found that PCI was significantly associated with a high risk of all-cause mortality, MACCE, MI, repeat revascularization, although the risk of stroke was lower at the midterm follow-up (1-3 years). CABG was significantly associated with a lower risk of long-term mortality and other adverse clinical endpoints compared to PCI in patients with DM.



Fig. 3 Risk of bias. Each risk-of-bias item is presented as percentages across included RCTs, which indicate the proportion of different levels of risk of bias for each item

Study	Selection				Comparability	Outcome			Total
	Representativeness of the exposed cohort	Selection of the nonexposed cohort	Ascertainment of exposure	Outcome not present at baseline	of the cohort	Assessment of outcome	Enough follow-up duration	Adequate follow-up	score
Luo et al. [24]	*	×	×	*	**	*	*	*	9
Bangalore et al. [25, 34]	*	*	×	*	**	*	×	×	9
Marui et al. [26]	*	*	×	*	**	*	×	×	9
Naito et al. [27]	*	*	*	*	**	_	*	*	8
Yu et al. [<mark>28</mark>]	*	*	*	*	**	*	*	×	9
Zheng et al. [29]	*	*	×	*	**	*	*	×	9
Li et al. [30]	*	*	*	*	**	-	*	×	8
Ramana- than et al. [11]	*	*	*	*	**	*	*	*	9
Nagend- ran et al.	*	*	*	×	**	*	×	×	9

Table 2 Newcastle-Ottawa scale (NOS) for assessing quality of observational studies

The scale assigns 4 points for selection, 2 points for comparability and 3 points for outcome (* 1 point; ** 2 points). Score of 5 to 6 considered as moderate quality and 7 to 9 as high quality

Previous studies have compared the two revascularization strategies and found different results than those observed in the current study. Although no separate analysis of diabetic cohorts was performed, a meta-analysis by Zhang et al. [35] suggested that PCI, with newer generation DES, might be a safe alternative revascularization strategy for left main CAD. However, it was noted that this method presented a higher risk of repeat revascularization. Mahmoud et al. [36] compared the clinical outcomes between these two strategies found that PCI was associated with a lower early risk of MACCE, while the risk of all-cause mortality, MI, and stroke were similar to CABG at long-term follow-up. Additionally, an in-depth comparative study of patients with DM [12] found that the risk of mortality (1–5 year follow-up) was not significantly different between PCI and CABG patients with DM; results that were supported by a recent study found no obvious difference in the incidence of all-cause mortality between the two strategies [13].

While the above-mentioned studies differ from the current results, several other studies have reported results similar to those reported here. For example, a study by Bundhun et al. [33], which involved 1297 patients with insulin-treated type 2 DM, found that, compared to PCI, CABG was associated with lower risk of several adverse long-term clinical outcomes, including mortality. However, it was also found that the rate of stroke was higher in patients who received CABG. A meta-analysis by Lee et al. [37] found a lower rate of mortality and MACCE in patients who underwent CABG. These authors also pointed out that insulin dependence had no influence on the clinical endpoints between the two therapy strategies. Smit et al. [38] observed that CABG was associated with a significantly lower risk of mortality and repeat revascularization in patients with DM or MVD, but that stroke was more common after this procedure. However, it should be noted that the studies included in this metaanalysis had relatively few patients with DM.

A previous study [24] identified that there was a prognostic impact of DM on treatment effects by either PCI or CABG, and that, in terms of both safety and efficacy, PCI was inferior to CABG in the diabetic group. CABG is recommended as a more appropriate revascularization strategy in patients with DM and complex coronary lesions. A high risk of restenosis was observed in patients with DM who underwent PCI, which may be associated with the need for more than two stents in MVD, as well as the continuous progression of diffuse atherosclerosis in non-culprit vessels [39]. At present, it is recommended to apply SYNTAX scores to

Endpoints	Subgroup	Study, n	RR	95% CI	P _{value}	l ² (%)	$P_{\rm heterogeneity}$
All-cause death	Total	15	1.23	1.00–1.52	0.05	77	< 0.001
	RCT	6	1.30	0.86-1.98	0.08	70	0.005
	OS	9	1.22	0.95-1.56	0.12	81	< 0.001
	Mid-term	7	1.12	0.76-1.65	0.58	61	0.02
	Long-term	8	1.32	1.04–1.67	0.02	82	< 0.001
MACCE	Total	8	1.59	1.38–1.85	< 0.001	68	0.003
	RCT	5	1.40	1.20–1.63	< 0.001	26	0.25
	OS	3	1.87	1.72–2.03	< 0.001	0	0.52
	Mid-term	3	1.31	1.11–1.54	0.001	14	0.31
	Long-term	5	1.84	1.70–1.99	< 0.001	0	0.58
Cardiac death	Total	7	1.76	1.11–2.80	0.02	71	0.002
	RCT	4	2.25	1.28–3.98	0.005	65	0.04
	OS	3	1.20	0.92-1.56	0.18	0	0.93
	Mid-term	4	1.99	0.96-4.15	0.07	70	0.02
	Long-term	3	1.37	0.99-1.90	0.06	18	0.30
MI	Total	11	1.98	1.53–2.57	< 0.001	64	0.002
	RCT	5	1.35	0.97-1.86	0.07	42	0.14
	OS	6	2.44	2.07–2.88	< 0.001	3	0.40
	Mid-term	5	1.53	0.95-2.48	0.08	69	0.01
	Long-term	6	2.35	2.01–2.73	< 0.001	0	0.61
Stroke	Total	12	0.71	0.48-1.03	0.07	66	< 0.001
	RCT	6	0.44	0.27–0.71	< 0.001	0	0.76
	OS	6	0.95	0.62-1.45	0.81	72	0.003
	Mid-term	6	0.39	0.23–0.66	< 0.001	0	0.86
	Long-term	6	0.95	0.64-1.41	0.79	72	0.004
Repeat revascularization	Total	12	2.61	2.08-3.29	< 0.001	79	< 0.001
	RCT	5	2.22	1.46–3.39	< 0.001	78	0.001
	OS	7	2.92	2.21–3.87	< 0.001	79	< 0.001
	Mid-term	6	2.88	1.66–4.99	< 0.001	84	< 0.001
	Long-term	6	2.56	2.02-3.24	< 0.001	75	0.001

Table 3	Total	meta-analy	ysis	outcomes	and	stratified	analy	/sis o	f each	endpoint	based	on	study	/ desig	gn an	d du	ration
of follo	w-up																

Italic values indicate significance of P value (P_{value} and $P_{heterogeneity} < 0.05$)

RR risk ratio, CI confidence intervals, MACCE major adverse cardiac and cerebrovascular event, MI myocardial infarction, RCT randomized controlled trials, OS

observational studies, *Mid-term* 1–3 years follow-up, *Long-term* > 3 years follow-up

the selection of revascularization strategies [40, 41]. Although the SYNTAX score might be considered useful in interventional cardiology, it has some limitations [42]. Compared with PCI, there was a higher risk of periprocedural stroke in patients undergoing CABG [43]. Moreover, post-operative problems or complications, such excessive sedation, ventilation, the use of intra-aortic balloon pump to help the heart, administration of inotropes, wound infection, hemorrhage, and pneumonia in patients with DM, were also elevated than those in non-diabetic patients [44, 45] and needed to be monitored and reasonably prevented.

Several studies have identified that adverse events were related to the severity of diabetes; for example, glycosylated hemoglobin (HbA1c) level and insulin therapy were independent risk factors for the development of post-surgery complications [46, 47]. Moreover, it is well-known that other risk factors such plasma homocysteine (Hcy) and c-reactive protein (CRP) have also an important role in CVD [48, 49], and it is a modifiable risk factors for restenosis [50]. Intervention for these risk factors and optimal glycemic control are the critical component of diabetes management. A recent study demonstrated that the use of sodium glucose cotransporter 2 inhibitors (SGLT2-is) reduces the risk of major cardiovascular events [51, 52]. In addition, the abnormal platelet activation observed in patients with DM is conducive to the formation of pathological



а	PCI		CAB	G		Risk Ratio		Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	Year	M-H, Random, 95% Cl
2.2.1 randomized co	ntrolled tr	ail						
Kapur 2010	31	172	23	178	6.4%	1.39 (0.85, 2.29)	2010	
Farkouh 2012	157	953	106	947	14.7%	1.47 [1.17, 1.85]	2012	
Kannetein 2013	105	231	59	221	13.4%	1 70 [1 31, 2 21]	2013	
Ben-Gal 2015	326	1349	88	423	15.7%	1.16 [0.94, 1.43]	2015	+ -
Ahn 2015	23	102	15	90	5.0%	1.35 [0.75, 2.43]	2015	
Subtotal (95% CI)	20	2807		1859	55.2%	1.40 [1.20, 1.63]	20.0	•
Total events	642		291					-
Heterogeneity: Tau ² =	0.01° Chi	² = 5.47	4 df=4 (P = 0 2	5): I ² = 26	%		
Test for overall effect:	Z = 4.25 (P < 0.0	1001)		-,,. 20			
	,		,					
2.2.2 observational s	tudy							
Li Y 2017	30	406	17	406	5.1%	1.76 (0.99, 3.15)	2017	
Ramanathan 2017	808	2710	311	1865	20.0%	1.79 [1.59, 2.01]	2017	
Nagendran 2018	484	869	246	869	19.8%	1.97 [1.74, 2.22]	2018	
Subtotal (95% CI)		3985		3140	44.8%	1.87 [1.72, 2.03]		•
Total events	1322		574					
Heterogeneity: Tau ² =	0.00: Chi	² = 1.31	1. df = 2 (P = 0.5	2): I ² = 0%	6		
Test for overall effect:	Z=14.74	(P < 0.	.00001)		-//	*		
			,					
Total (95% CI)		6792		4999	100.0%	1.59 [1.38, 1.85]		•
Total events	1964		865					
Heterogeneity: Tau ² =	0.03; Chi	z = 21.8	88. df = 7	(P = 0.	003); I ² =	68%		
Test for overall effect:	Z= 6.17 (P < 0.0	10001)	· ·	// -			0.5 0.7 1 1.5 2
Test for subaroup diff	erences:	Chi²=1	10.45. df:	= 1 (P =	= 0.001). I	² = 90.4%		Favours PCI Favours CABG
L-				_				
n	DC I		C 8 D	-		Dielz Datia		Rick Ratio
D Citation Catalogue	PU	T-4-1	CAB	и т				Nak Natio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	Year	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	Year	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010	Events 31	Total 172	Events 23	<u>Total</u> 178	<u>Weight</u> 6.4%	<u>M-H, Random, 95% Cl</u> 1.39 [0.85, 2.29]	Year 2010	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012	Events 31 157	Total 172 953	23 106	<u>Total</u> 178 947	6.4%	M-H, Random, 95% Cl 1.39 [0.85, 2.29] 1.47 [1.17, 1.85]	Year 2010 2012	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtatal (05%) CD	Events 31 157 326	Total 172 953 1349	23 106 88	178 947 423	6.4% 14.7% 15.7%	M-H, Random, 95% Cl 1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43]	Year 2010 2012 2015	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% CI)	31 157 326	Total 172 953 1349 2474	23 106 88	178 947 423 1548	6.4% 14.7% 15.7% 36.8%	M-H, Random, 95% Cl 1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54]	Year 2010 2012 2015	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% CI) Total events	31 157 326 514	Total 172 953 1349 2474	23 106 88 217	178 947 423 1548	6.4% 14.7% 15.7% 36.8%	M-H, Random, 95% CI 1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54]	Year 2010 2012 2015	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Total control of a superly of activity	Events 31 157 326 514 0.00; Chi	Total 172 953 1349 2474 ² = 2.32	23 106 88 217 2, df = 2 (178 947 423 1548 P = 0.3	<u>Weight</u> 6.4% 14.7% 15.7% 36.8 % 1); I ² = 14	M-H, Random, 95% CI 1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] %	Year 2010 2012 2015	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect:	Events 31 157 326 514 0.00; Chi Z = 3.19 (3.19 (Total 172 953 1349 2474 ?= 2.32 P = 0.0	23 106 88 217 2, df = 2 (101)	178 947 423 1548 P = 0.3	<u>Weight</u> 6.4% 14.7% 15.7% 36.8 % 1); I² = 14	M-H, Random, 95% CI 1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] %	Year 2010 2012 2015	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long form	31 157 326 514 0.00; Chi Z = 3.19 (Total 172 953 1349 2474 ² = 2.32 (P = 0.0	23 106 88 217 2, df = 2 (101)	178 947 423 1548 P = 0.3	<u>Weight</u> 6.4% 14.7% 15.7% 36.8% 1); I² = 14	M-H, Random, 95% CI 1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] %	<u>Year</u> 2010 2012 2015	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kapnetain 2012	31 157 326 514 0.00; Chi Z = 3.19 (Total 172 953 1349 2474 ² = 2.32 (P = 0.0	23 106 88 217 2, df = 2 (001)	178 947 423 1548 P = 0.3	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 12.4%	M-H, Random, 95% CI 1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] %	Year 2010 2012 2015	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Abp 2015	31 157 326 514 0.00; Chi Z = 3.19 (105 22	Total 172 953 1349 2474 ² = 2.32 (P = 0.0 231 102	23 106 88 217 2, df = 2 (001) 59	178 947 423 1548 P = 0.3	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0%	1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] %	2010 2012 2015 2015	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015	31 157 326 514 0.00; Chi Z = 3.19 (105 23 20	Total 172 953 1349 2474 ² = 2.32 (P = 0.0 231 102 406	23 106 88 217 2, df = 2 (101) 59 15	Total 178 947 423 1548 P = 0.3 221 90	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0% 5.1%	1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.00, 2.45]	Year 2010 2012 2015 2015 2013 2015 2017	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015 Li Y 2017 Ramasthan 2017	31 157 326 514 0.00; Chi Z = 3.19 (105 23 30 000	Total 172 953 1349 2474 ² = 2.32 (P = 0.0 231 102 406 2710	23 106 88 217 2, df = 2 (101) 59 15 17 211	Total 178 947 423 1548 P = 0.3 221 90 406	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0% 5.0%	1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.99, 3.15] 1.79 [1.59, 2.01]	Year 2010 2012 2015 2015 2013 2015 2017 2017	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015 Li Y 2017 Ramanathan 2017 Nagendran 2019	31 157 326 514 0.00; Chi Z = 3.19 (105 23 30 808 494	Total 172 953 1349 2474 ² = 2.32 (P = 0.0 231 102 406 2710 860	23 106 88 217 2, df = 2 (101) 59 15 17 311 246	Total 178 947 423 1548 P = 0.3 221 90 406 1865	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0% 5.1% 20.0%	1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.99, 3.15] 1.79 [1.59, 2.01] 1.97 [1.59, 2.01]	Year 2010 2012 2015 2015 2013 2015 2017 2017 2017	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015 Li Y 2017 Ramanathan 2017 Nagendran 2018 Subtotal (95% Cl)	31 157 326 514 0.00; Chi Z = 3.19 (105 23 30 808 484	Total 172 953 1349 2474 ² = 2.32 (P = 0.0 231 102 406 2710 869 4319	23 106 88 217 2, df = 2 (101) 59 15 17 311 246	Total 178 947 423 1548 P = 0.3 221 90 406 1865 869 3451	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0% 5.1% 20.0% 19.8%	1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.99, 3.15] 1.79 [1.59, 2.01] 1.97 [1.74, 2.22] 1.84 [1.70, 1.99]	Year 2010 2012 2015 2015 2015 2017 2017 2018	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015 Li Y 2017 Ramanathan 2017 Nagendran 2018 Subtotal (95% Cl) Total evente	31 157 326 514 0.00; Chi Z = 3.19 (105 23 30 808 484 1450	Total 172 953 1349 2474 ² = 2.32 (P = 0.0 231 102 406 2710 869 4318	23 106 88 217 2, df = 2 (101) 59 15 17 311 246 649	Total 947 423 1548 P = 0.3 221 90 406 1865 869 3451	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0% 5.1% 20.0% 19.8% 63.2%	1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.99, 3.15] 1.79 [1.59, 2.01] 1.97 [1.74, 2.22] 1.84 [1.70, 1.99]	Year 2010 2012 2015 2015 2015 2017 2017 2018	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015 Li Y 2017 Ramanathan 2017 Nagendran 2018 Subtotal (95% Cl) Total events Heterogeneity: Tau ² =	31 157 326 514 0.00; Chi Z = 3.19 (105 23 30 808 484 1450 0.00; Chi	Total 172 953 1349 2474 ² = 2.32 (P = 0.0 231 102 406 2710 869 4318 ² = 2.9	23 106 88 217 2, df = 2 (101) 59 15 17 311 246 648 4 df = 4 (Total 178 947 423 1548 P = 0.3 221 90 406 869 3451	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0% 5.1% 20.0% 19.8% 63.2% 8): I² = 0	1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.99, 3.15] 1.79 [1.59, 2.01] 1.97 [1.74, 2.22] 1.84 [1.70, 1.99]	Year 2010 2012 2015 2015 2015 2017 2017 2018	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015 Li Y 2017 Ramanathan 2017 Nagendran 2018 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect:	31 157 326 514 0.00; Chi Z = 3.19 (105 23 30 808 484 1450 0.00; Chi Z = 15.26	Total 172 953 1349 2474 ² = 2.32 (P = 0.0 231 102 406 2710 869 4318 ² = 2.84 (P < 0.0	23 106 88 217 2, df = 2 (101) 59 15 17 311 246 648 4, df = 4 (.00001)	Total 178 947 423 1548 P = 0.3 221 90 406 1865 869 3451 P = 0.5	Weight 6.4% 14.7% 15.7% 36.8% 1); I ² = 14 13.4% 5.0% 5.1% 20.0% 19.8% 63.2% 8); I ² = 0%	1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.99, 3.15] 1.79 [1.59, 2.01] 1.97 [1.74, 2.22] 1.84 [1.70, 1.99]	Year 2010 2012 2015 2013 2013 2015 2017 2017 2018	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% CI) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015 Li Y 2017 Ramanathan 2017 Nagendran 2018 Subtotal (95% CI) Total events Heterogeneity: Tau ² = Test for overall effect:	PCI	Total 172 953 1349 2474 *= 2.32 (P = 0.0 231 102 406 2710 869 4318 *= 2.84 (P < 0.	23 106 88 217 2, df = 2 (101) 59 15 17 311 246 648 4, df = 4 (.00001)	Total 178 947 423 1548 P = 0.3 221 90 406 1865 869 3451 P = 0.5 4999	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0% 5.0% 20.0% 19.8% 63.2% 8); I² = 0% 100.0%	1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.99, 3.15] 1.79 [1.59, 2.01] 1.97 [1.74, 2.22] 1.84 [1.70, 1.99] 5	Year 2010 2012 2015 2015 2017 2017 2017 2018	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015 Li Y 2017 Ramanathan 2017 Nagendran 2018 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect:	21 21 21 21 21 21 21 21 21 21	Total 172 953 1349 2474 *= 2.32 (P = 0.0 231 102 406 2710 869 4318 *= 2.84 (P < 0.	23 106 88 217 2, df = 2 (101) 59 15 17 311 246 648 4, df = 4 (.00001) 865	Total 178 947 423 1548 P = 0.3 221 90 406 1865 869 3451 P = 0.5 49999	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0% 5.0% 9.8% 8); I² = 0% 100.0%	M-H, Random, 95% CI 1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.99, 3.15] 1.79 [1.59, 2.01] 1.97 [1.74, 2.22] 1.84 [1.70, 1.99] %	Year 2010 2012 2015 2015 2017 2017 2018	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% CI) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015 Li Y 2017 Ramanathan 2017 Nagendran 2018 Subtotal (95% CI) Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Total events Heterogeneity: Tau ² =	PCI Events 31 157 326 514 0.00; Chi Z 30 808 484 1450 0.00; Chi Z = 15.26 1964 0.03; Chi	Total 172 953 1349 2474 *= 2.32 (P = 0.0 231 102 406 2710 869 4318 *= 2.84 (P < 0.	23 106 88 217 2, df = 2 (101) 59 15 17 311 246 648 4, df = 4 (.00001) 865 88, df = 7	Total 178 947 423 1548 P = 0.3 221 90 406 1865 869 3451 P = 0.5 4999 (P = 0.	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0% 20.0% 19.8% 63.2% 20.0% 100.0% 003); I² = 10	1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.99, 3.15] 1.79 [1.59, 2.01] 1.97 [1.74, 2.22] 1.84 [1.70, 1.99] 6 1.59 [1.38, 1.85]	Year 2010 2012 2015 2015 2017 2017 2017 2018	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015 Li Y 2017 Ramanathan 2017 Nagendran 2018 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect:	PCI Events 31 157 326 514 0.00; Chi Z 30 808 484 1450 0.00; Chi Z 30 808 484 1450 0.00; Chi Z 15.26 1964 0.03; Chi Z 1964	Total 172 953 1349 2474 *= 2.32 ?= 0.0 231 102 406 2710 869 4318 ?= 2.84 ?= 2.84 ?= 2.84 ?= 70.8 ?= 21.8 ?= 21.8 ?= 21.8 ?= 21.8 ?= 21.8	23 106 88 217 2, df = 2 (101) 59 15 17 311 246 648 4, df = 4 (.00001) 865 588, df = 7	Total 178 947 423 1548 P = 0.3 221 90 406 1865 869 3451 P = 0.5 4999 (P = 0.	Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0% 20.0% 19.8% 63.2% 20.0% 100.0% 003); I² =	M-H, Random, 95% CI 1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.99, 3.15] 1.79 [1.59, 2.01] 1.97 [1.74, 2.22] 1.84 [1.70, 1.99] 5 1.59 [1.38, 1.85]	Year 2010 2012 2015 2015 2017 2017 2017 2018	M-H, Random, 95% Cl
Study or Subgroup 2.1.1 midterm Kapur 2010 Farkouh 2012 Ben-Gal 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 2.1.2 long-term Kappetein 2013 Ahn 2015 Li Y 2017 Ramanathan 2017 Nagendran 2018 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect:	PCI Events 31 157 326 514 0.00; Chi Z 30 808 484 1450 0.00; Chi Z 30 808 484 1450 0.00; Chi Z 1964 0.03; Chi Z 1964	Total 172 953 1349 2474 2 = 2.32 2 = 2.32 2 = 2.32 2 = 0.0 231 102 406 2710 869 4318 2 = 2.84 (P < 0.	23 106 88 217 2, df = 2 (101) 59 15 17 311 246 648 4, df = 4 (.00001) 865 588, df = 7 10001) 13.81. df	J Total 178 947 947 423 1548 P = 0.3 2211 90 406 869 1865 869 3451 P = 0.5 49999 (P = 0. (P = 1.(P = 1.(Weight 6.4% 14.7% 15.7% 36.8% 1); I² = 14 13.4% 5.0% 5.0% 20.0% 19.8% 63.2% 100.0% 003); I² = 0.0002); I² =	M-H, Random, 95% CI 1.39 [0.85, 2.29] 1.47 [1.17, 1.85] 1.16 [0.94, 1.43] 1.31 [1.11, 1.54] % 1.70 [1.31, 2.21] 1.35 [0.75, 2.43] 1.76 [0.99, 3.15] 1.79 [1.59, 2.01] 1.97 [1.74, 2.22] 1.84 [1.70, 1.99] %	Year 2010 2012 2015 2015 2017 2017 2018	M-H, Random, 95% Cl

а	PCI		CABO	G		Risk Ratio			Risk Ratio	
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	Year		M-H, Random, 95% Cl	
6.2.1 randomized con	ntrolled tr	ail								
Kappetein 2013	28	231	13	221	16.1%	2.06 [1.10, 3.87]	2013			
Kamalesh 2013	11	101	5	97	10.9%	2.11 [0.76, 5.86]	2013			
Ben-Gal 2015	209	1349	16	423	18.1%	4.10 [2.49, 6.73]	2015			
Milojevic 2019	19	286	14	268	15.5%	1.27 [0.65, 2.49]	2019			
Subtotal (95% CI)		1967		1009	60.6%	2.25 [1.28, 3.98]			-	
Total events	267		48							
Heterogeneity: Tau ² = Test for overall effect: .	0.21; Chi Z = 2.80 (² = 8.57 P = 0.0	7, df = 3 (l 105)	P = 0.0	4); I² = 65	%				
6.2.2 observational st	tudv									
luo 2012	(uuy 4	aa	5	127	8.3%	1 03 0 28 3 721	2012			
Marui 2015	109	1065	80	033	21 296	1 10 [0.20, 3.12]	2012			
Naito 2015	103	256	5	222	10.0%	1 / 2 [0.31, 1.37]	2015		.	
Subtotal (95% CI)	0	1420	5	1287	39.4%	1.20 [0.92, 1.56]	2013		•	
Total events	121	1120	an	1201	00.170	1120 [0102, 1100]			·	
Heterogeneity: Tau ² =	0.00: Chi	Z = 0.14	5 df= 2 (l	P = N 9	3): IZ = 0.9					
Test for overall effect:	Z=1.35 (P = 0.1	8)	- 0.5	5),1 - 0 /	,				
Total (95% CI)		3387		2296	100.0%	1.76 [1.11, 2.80]			•	
Total events	388		138							
Heterogeneity: Tau² =	0.24; Chi	z = 21.0	04, df = 6	(P = 0.	002); I² =	71%		0.05	1 07 1 5	20
Test for overall effect:	Z = 2.39 (P = 0.0	2)					0.03	Eavours PCL Eavours CABG	20
Test for subaroup diff	erences: (Chi ^z = 3	3.92. df =	1 (P =	0.05). I² =	74.5%				
b	PCI		CAB	G		Risk Ratio			Risk Ratio	
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	Year		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	Year		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm luo 2012	Events 4	<u>Total</u> 99	Events 5	<u>Total</u> 127	Weight 8.3%	<u>M-H, Random, 95% Cl</u> 1.03 [0.28, 3.72]	<u>Year</u> 2012		M-H, Random, 95% Cl	
<u>Study or Subgroup</u> 6.1.1 midterm luo 2012 Kamalesh 2013	Events 4 11	<u>Total</u> 99 101	Events 5 5	Total 127 97	Weight 8.3% 10.9%	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86]	Year 2012 2013		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm luo 2012 Kamalesh 2013 Ben-Gal 2015	Events 4 11 209	<u>7otal</u> 99 101 1349	Events 5 5 16	Total 127 97 423	Weight 8.3% 10.9% 18.1%	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73]	Year 2012 2013 2015		M-H, Random, 95% Cl	
<u>Study or Subgroup</u> 6.1.1 midterm luo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019	Events 4 11 209 19	<u>99</u> 101 1349 286	Events 5 5 16 14	Total 127 97 423 268	Weight 8.3% 10.9% 18.1% 15.5%	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49]	Year 2012 2013 2015 2019		M-H, Random, 95% Cl	
<u>Study or Subgroup</u> 6.1.1 midterm luo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% CI)	Events 4 11 209 19	99 101 1349 286 1835	Events 5 16 14	Total 127 97 423 268 915	Weight 8.3% 10.9% 18.1% 15.5% 52.8 %	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15]	2012 2013 2015 2019		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm luo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events	Events 4 11 209 19 243	99 101 1349 286 1835	Events 5 16 14 40	127 97 423 268 915	8.3% 10.9% 18.1% 15.5% 52.8 %	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15]	2012 2013 2015 2019		M-H, Random, 95% Cl	
<u>Study or Subgroup</u> 6.1.1 midterm luo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² =	Events 4 11 209 19 243 : 0.37; Ch	<u>99</u> 101 1349 286 1835 i ² = 10. ⁻	Events 5 16 14 40 10, df = 3	Total 127 97 423 268 915 (P = 0.	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); I ² = 7	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0%	2012 2013 2015 2019		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect:	Events 4 11 209 19 243 : 0.37; Ch Z = 1.84	<u>99</u> 101 1349 286 1835 i ² = 10. [°] (P = 0.0	5 5 16 14 40 10, df = 3 07)	Total 127 97 423 268 915 (P = 0.	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); I² = 7	<u>M-H, Random, 95% Cl</u> 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0%	Year 2012 2013 2015 2019		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm luo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term	Events 4 11 209 19 243 :0.37; Ch Z = 1.84	<u>99</u> 101 1349 286 1835 i ² = 10. [°] (P = 0.0	Events 5 5 16 14 40 10, df = 3)7)	Total 127 97 423 268 915 (P = 0.	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); I² = 7 16.4%	<u>M-H, Random, 95% Cl</u> 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0%	Year 2012 2013 2015 2019		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Mundi 2015	Events 4 11 209 19 243 :0.37; Ch Z = 1.84 28	Total 99 101 1349 286 1835 i² = 10.° (P = 0.0 231	Events 5 5 16 14 40 10, df = 3)7) 13	Total 127 97 423 268 915 (P = 0.	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); I² = 7 16.1%	<u>M-H, Random, 95% Cl</u> 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0% 2.06 [1.10, 3.87] 4.19 [0.91, 4.63]	Year 2012 2013 2015 2019 2019		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm luo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Marui 2015	Events 4 11 209 19 243 :0.37; Ch Z = 1.84 28 109	Total 99 101 1349 286 1835 i ² = 10. (P = 0.0 231 1065	Events 5 16 14 10, df = 3 17) 13 80	Total 127 97 423 268 915 (P = 0. 221 933	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); I² = 7 16.1% 21.2%	<u>M-H, Random, 95% Cl</u> 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0% 2.06 [1.10, 3.87] 1.19 [0.91, 1.57] 1.19 [0.91, 1.57]	Year 2012 2013 2015 2019 2019 2013 2013 2015		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm luo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Marui 2015 Naito 2015 Subtot (95% Cl)	Events 4 11 209 19 243 :0.37; Ch Z = 1.84 28 109 8	Total 99 101 1349 286 1835 i ² = 10.: (P = 0.0 231 1065 256	Events 5 16 14 10, df = 3 17) 13 80 5	Total 127 97 423 268 915 (P = 0. 221 933 227	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); ² = 7 16.1% 21.2% 10.2%	<u>M-H, Random, 95% Cl</u> 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0% 2.06 [1.10, 3.87] 1.19 [0.91, 1.57] 1.42 [0.47, 4.27] 4.27 [0.90, 10.91]	Year 2012 2013 2015 2019 2019 2013 2015 2015		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Marui 2015 Naito 2015 Subtotal (95% Cl) Tetal events	Events 4 11 209 19 243 :0.37; Ch Z = 1.84 28 109 8	Total 99 101 1349 286 1835 i² = 10.: (P = 0.0 231 1065 256 1552	Events 5 16 14 10, df = 3 17) 13 80 5	Total 127 97 423 268 915 (P = 0. 221 933 227 1381	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); I² = 7 16.1% 21.2% 10.0% 47.2%	<u>M-H, Random, 95% Cl</u> 1.03 (0.28, 3.72) 2.11 (0.76, 5.86) 4.10 (2.49, 6.73) 1.27 (0.65, 2.49) 1.99 (0.96, 4.15) 0% 2.06 (1.10, 3.87) 1.19 (0.91, 1.57) 1.42 (0.47, 4.27) 1.37 (0.99, 1.90)	Year 2012 2013 2015 2019 2019 2013 2013 2015 2015		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Marui 2015 Naito 2015 Subtotal (95% Cl) Total events	Events 4 11 209 19 243 :0.37; Ch Z = 1.84 28 109 8 109 8	Total 99 101 1349 286 1835 i² = 10.: (P = 0.0 231 1065 256 1552	Events 5 16 14 10, df = 3 17) 13 80 5 98	Total 127 97 423 268 915 (P = 0. 221 933 227 1381	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); ² = 7 16.1% 21.2% 10.0% 47.2% 2%	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0% 2.06 [1.10, 3.87] 1.19 [0.91, 1.57] 1.42 [0.47, 4.27] 1.37 [0.99, 1.90]	Year 2012 2013 2015 2019 2013 2013 2015 2015		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm luo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Marui 2015 Naito 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect:	Events 4 11 209 19 243 :0.37; Ch Z = 1.84 109 8 145 :0.02; Ch Z = 1.88	Total 99 101 1349 286 1835 i² = 10. (P = 0.0 231 1065 256 1552 i² = 2.4. (P = 0.0	Events 5 16 14 40 10, df = 3)7) 13 80 5 98 4, df = 2 ()6)	Total 127 97 423 268 915 (P = 0. 221 933 227 1381 P = 0.3	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); I² = 7 16.1% 10.0% 47.2% 0); I² = 18 10.1%	<u>M-H, Random, 95% Cl</u> 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0% 2.06 [1.10, 3.87] 1.19 [0.91, 1.57] 1.42 [0.47, 4.27] 1.37 [0.99, 1.90] %	Year 2012 2013 2015 2019 2013 2013 2015 2015		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Marui 2015 Naito 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: Total (95% Cl)	Events 4 11 209 19 243 0.37; Ch Z = 1.84 (28 109 8 145 5: 0.02; Ch Z = 1.88 (Total 99 101 1349 286 1835 i² = 10. (P = 0.0 231 1065 256 1552 i² = 2.4. (P = 0.0 3387	Events 5 5 16 14 40 10, df = 3)7) 13 80 5 98 4, df = 2 ()6)	Total 127 97 423 268 915 (P = 0. 2211 933 9277 1381 P = 0.3 2296	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); ² = 7 16.1% 21.2% 10.0% 47.2% 0); ² = 18 100.0%	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0% 2.06 [1.10, 3.87] 1.19 [0.91, 1.57] 1.42 [0.47, 4.27] 1.37 [0.99, 1.90] % 1.76 [1.11, 2.80]	Year 2012 2013 2015 2019 2013 2015 2015		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm luo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Marui 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: Total (95% Cl) Total events	Events 4 11 209 19 243 0.37; Ch Z = 1.84 (28 109 8 145 5: 0.02; Ch Z = 1.88 (388	Total 99 101 1349 286 1835 i² = 10. (P = 0.0 231 1065 256 1552 i² = 2.4. (P = 0.0 3387	Events 5 5 16 14 40 10, df = 3)7) 13 80 5 98 4, df = 2 ()6) 138	Total 127 97 423 268 915 (P = 0. 221 933 227 1381 P = 0.3 2296	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); ² = 7 16.1% 21.2% 10.0% 47.2% 0); ² = 18 100.0%	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0% 2.06 [1.10, 3.87] 1.19 [0.91, 1.57] 1.42 [0.47, 4.27] 1.37 [0.99, 1.90] % 1.76 [1.11, 2.80]	Year 2012 2013 2015 2019 2013 2015 2015		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Marui 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² =	Events 4 11 209 19 243 0.37; Ch Z = 1.84 109 8 145 0.02; Ch Z = 1.88 388 0.024; Ch	Total 99 101 1349 286 1835 i² = 10. (P = 0.0 231 1065 256 1552 i² = 2.4. (P = 0.0 3387 i² = 21.1	Events 5 5 16 14 40 10, df = 3)7) 13 80 5 98 4, df = 2 ()6) 138 04, df = 6	Total 127 97 423 268 915 (P = 0. 2211 933 933 227 1381 P = 0.3 2296 (P = 0.	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); ² = 7 16.1% 21.2% 10.0% 0); ² = 18 100.0% 002); ² = 18	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0% 2.06 [1.10, 3.87] 1.19 [0.91, 1.67] 1.42 [0.47, 4.27] 1.37 [0.99, 1.90] % 1.76 [1.11, 2.80] 71%	Year 2012 2013 2015 2019 2013 2015 2015	+	M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Marui 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect: Cotal events Heterogeneity: Tau ² = Test for overall effect: Heterogeneity: Tau ² = Test for overall effect: Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect:	Events 4 11 209 19 243 0.37; Ch Z = 1.84 28 109 8 145 0.02; Ch Z = 1.88 388 0.24; Ch Z = 2.39	Total 99 101 1349 286 1835 i² = 10.° (P = 0.0 231 1065 256 1552 i² = 2.4. (P = 0.0 3387 i² = 21.0 (P = 0.0	Events 5 5 16 14 40 10, df = 3 77) 13 80 5 98 4, df = 2 (06) 138 04, df = 6 02)	Total 127 97 423 268 915 (P = 0. 221 933 227 1381 P = 0.3 2296 (P = 0.	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); ² = 7 16.1% 21.2% 10.0% 0); ² = 18 100.0% 002); ² = 18	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0% 2.06 [1.10, 3.87] 1.19 [0.91, 1.67] 1.42 [0.47, 4.27] 1.37 [0.99, 1.90] % 1.76 [1.11, 2.80] 71%	Year 2012 2013 2015 2019 2013 2015 2015		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Marui 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect: Test for subgroup diff	Events 4 11 209 19 243 0.37; Ch Z = 1.84 28 109 8 145 0.02; Ch Z = 1.88 388 0.24; Ch Z = 2.39 ferences:	Total 99 101 1349 286 1835 i ² = 10.: (P = 0.0 231 1065 256 1552 i ² = 2.4. (P = 0.0 3387 i ² = 21 (P = 0.0 Chi ² = 0.0	Events 5 5 16 14 40 10, df = 3 77) 13 80 5 98 4, df = 2 (06) 138 04, df = 6 02) 0.84, df = 6	Total 127 97 423 268 915 (P = 0. 221 933 227 1381 P = 0.3 2296 (P = 0.	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); I² = 7 16.1% 21.2% 10.0% 47.2% 0); I² = 18 100.0% 002); I² = 18 002); I² = 18	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0% 2.06 [1.10, 3.87] 1.19 [0.91, 1.57] 1.42 [0.47, 4.27] 1.37 [0.99, 1.90] % 1.76 [1.11, 2.80] 71% 0%	Year 2012 2013 2015 2019 2013 2013 2015 2015		M-H, Random, 95% Cl	
Study or Subgroup 6.1.1 midterm luo 2012 Kamalesh 2013 Ben-Gal 2015 Milojevic 2019 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: 6.1.2 long-term Kappetein 2013 Marui 2015 Subtotal (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: Total (95% Cl) Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect: Total events Heterogeneity: Tau ² = Test for overall effect: Test for subgroup diff	Events 4 11 209 19 243 :0.37; Ch Z = 1.84 28 109 8 145 :0.02; Ch Z = 1.88 :0.24; Ch Z = 2.39 ferences: rdiac deat	Total 99 101 1349 286 1835 $i^2 = 10.2$ $(P = 0.0)$ 231 1065 256 1552 $i^2 = 2.44$ $(P = 0.0)$ 3387 $i^2 = 21.2$ $(P = 0.0)$ Chi ² = 10.2 th bety	Events 5 5 16 14 40 10, df = 3 77) 13 80 5 98 4, df = 2 (06) 138 04, df = 6 02) 0.84, df = 6 12)	Total 127 97 423 268 915 (P = 0. 221 933 227 1381 P = 0.3 2296 (P = 0. 1 (P = 0. 1 (P = 0. 1 (P = 0.	Weight 8.3% 10.9% 18.1% 15.5% 52.8% 02); I² = 7 16.1% 21.2% 10.0% 47.2% 0); I² = 18 100.0% 002); I² = 2 8.3% 002); I² = 4 100.0% 002); I² = 4 002); I² = 5 0.36), I² = 4 ABG patie	M-H, Random, 95% Cl 1.03 [0.28, 3.72] 2.11 [0.76, 5.86] 4.10 [2.49, 6.73] 1.27 [0.65, 2.49] 1.99 [0.96, 4.15] 0% 2.06 [1.10, 3.87] 1.19 [0.91, 1.57] 1.42 [0.47, 4.27] 1.37 [0.99, 1.90] % 1.76 [1.11, 2.80] 71% 0%	Year 2012 2013 2015 2019 2013 2015 2015 2015	+ 0.05 (udy design:	M-H, Random, 95% Cl	

thrombosis and the progression of cardiovascular diseases [53]. Therefore, improve interventional techniques, optimize antiplatelet/glycemic management, and the reduction of long-term adverse prognosis require further research. In addition, despite subgroup analysis, heterogeneity still exited. We deemed that several clinical heterogeneity could not be eliminated. Among possible reasons for heterogeneity, differences in surgical techniques and differences in procedures of percutaneous transluminal

a	PCI		CAB	6		Risk Ratio			Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	Year		M-H, Random, 95% Cl
3.2.1 randomized cont	rolled tr	ail							
Kapur 2010	25	172	14	178	8.5%	1.85 [0.99, 3.43]	2010		
Farkouh 2012	54	953	30	947	11.2%	1.79 [1.16, 2.77]	2012		
Kappetein 2013	19	231	11	221	7.3%	1.65 [0.80, 3.39]	2013		
Kamalesh 2013	19	101	20	97	9.2%	0.91 [0.52, 1.60]	2013		
Milojevic 2019	28	286	28	268	10.2%	0.94 [0.57, 1.54]	2019		
Subtotal (95% CI)		1743		1711	46.4%	1.35 [0.97, 1.86]			◆
Total events	145		103						
Heterogeneity: Tau ² = 0	3.06: Ch	i ^z = 6.85	5. df = 4.(P = 0.1	4): ² = 42	%			
Test for overall effect: Z	(= 1.79	(P = 0.0	7)		.,,				
3.2.2 observational stu	udy								
luo 2012	15	99	3	127	3.6%	6.41 [1.91, 21.54]	2012		
Marui 2015	74	1065	28	933	11.3%	2.32 [1.51, 3.54]	2015		
Bangalore 2015	57	773	23	773	10.6%	2.48 [1.54, 3.98]	2015		
Yu 2015	36	143	8	131	7.2%	4.12 [1.99, 8.54]	2015		
Ramanathan 2017	420	2710	127	1865	15.0%	2.28 [1.88, 2.75]	2017		-
Li Y 2017	20	406	7	406	6.0%	2.86 [1.22, 6.68]	2017		
Subtotal (95% CI)	20	5196		4235	53.6%	2.44 [2.07. 2.88]			•
Total events	622		196						-
Heterogeneity: Tau ² = 0	1.00° CM	i ² = 5 1 6	,30 idf=54	P = 0 /	0): I 2 = 3%	6			
Test for overall effect: Z	(= 10.63) (P < 0.	00001)	- 0.4		~			
Total (95% CI)		6939		5946	100.0%	1.98 [1.53, 2.57]			◆
Total events	767		299						
Heterogeneity: Tau ² = 0	0.11; Chi	i ^z = 28.1	0, df = 1	D (P = 0).002); l² =	= 64%			
Test for overall effect: Z	1 = 5,15 ((P < 0.0	0001)					0.05	0.2 1 5 20
Test for subaroup diffe	rences:	Chi ^z = 1	0.33. df:	= 1 (P =	= 0.001). (^z = 90.3%			Favours PCI Favours CABG
b	PCI		CAB	6		Risk Ratio			Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	Year		M-H, Random, 95% Cl
3.1.1 midterm									
Kapur 2010	25	172	14	178	8.5%	1.85 [0.99, 3.43]	2010		
			30	947	11.2%	1.79 [1.16, 2.77]	2012		
Farkouh 2012	54	953	~~~						
Farkouh 2012 luo 2012	54 15	953 99	3	127	3.6%	6.41 [1.91, 21.54]	2012		
Farkouh 2012 luo 2012 Kamalesh 2013	54 15 19	953 99 101	3 20	127 97	3.6% 9.2%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60]	2012 2013		
⊦arkouh 2012 luo 2012 Kamalesh 2013 Milojevic 2019	54 15 19 28	953 99 101 286	3 20 28	127 97 268	3.6% 9.2% 10.2%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54]	2012 2013 2019		
⊦arkouh 2012 luo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI)	54 15 19 28	953 99 101 286 1611	3 20 28	127 97 268 1617	3.6% 9.2% 10.2% 42.7 %	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48]	2012 2013 2019		
⊦arkouh 2012 luo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events	54 15 19 28 141	953 99 101 286 1611	3 20 28 95	127 97 268 1617	3.6% 9.2% 10.2% 42.7 %	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48]	2012 2013 2019		•
⊦arkouh 2012 luo 2012 Kamalesh 2013 Milojevic 2019 S ubtotal (95% CI) Total events Heterogeneity: Tau² = 0	54 15 19 28 141).20; Chi	953 99 101 286 1611 i ² = 12.9	3 20 28 95 34, df = 4	127 97 268 1617 (P = 0.	3.6% 9.2% 10.2% 42.7 % 01); I ² = 6	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9%	2012 2013 2019		
⊦arkouh 2012 luo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z	54 15 19 28 141 0.20; Chi (= 1.74 (953 99 101 286 1611 i ² = 12.9 (P = 0.0	3 20 28 95 94, df = 4 8)	127 97 268 1617 (P = 0.	3.6% 9.2% 10.2% 42.7 % 01); I ² = 6	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9%	2012 2013 2019		•
- arkouh 2012 uo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = C Test for overall effect: Z 3.1.2 long-term	54 15 19 28 141 0.20; Chi (= 1.74 (953 99 101 286 1611 i [≈] = 12.9 (P = 0.0	3 20 28 95 34, df = 4 8)	127 97 268 1617 (P = 0.	3.6% 9.2% 10.2% 42.7 % 01); I ² = 6	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9%	2012 2013 2019		
⊦arkouh 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013	54 15 19 28 141 0.20; Chi (= 1.74 (953 99 101 286 1611 i ² = 12.9 (P = 0.0 231	3 20 28 95 94, df = 4 8) 11	127 97 268 1617 (P = 0.	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9%	2012 2013 2019 2013		
⊦arkouh 2012 luo 2012 Kamalesh 2013 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015	54 15 19 28 141 J.20; Chi J.20; Chi J.20; Chi J.20; 74	953 99 101 286 1611 i ² = 12.9 (P = 0.0 231 1065	3 20 28 95 94, df = 4 8) 11 28	127 97 268 1617 (P = 0. 221 933	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54]	2012 2013 2019 2013 2013 2013		
⊦arkouh 2012 luo 2012 Kamalesh 2013 Subtotal (95% CI) Total events Heterogeneity: Tau ^z = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Yu 2015	54 15 19 28 141).20; Chi (= 1.74 (19 74 36	953 99 101 286 1611 i ² = 12.9 (P = 0.0 231 1065 143	3 20 28 95 94, df = 4 8) 11 28 8	127 97 268 1617 (P = 0. 221 933 131	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3% 7.2%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54]	2012 2013 2019 2013 2013 2015 2015		
⊦arkouh 2012 luo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Bangalore 2015	54 15 19 28 141).20; Chi (= 1.74 (19 74 36 57	953 99 101 286 1611 i ² = 12.9 (P = 0.0 231 1065 143 773	3 20 28 95 34, df = 4 8) 11 28 8 23	127 97 268 1617 (P = 0. 221 933 131 773	3.6% 9.2% 10.2% 4 2.7 % 01); I² = 6 7.3% 11.3% 7.2% 10.6%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98]	2012 2013 2019 2013 2015 2015 2015 2015		
Farkouh 2012 Iuo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Bangalore 2015 Li Y 2017	54 15 19 28 141 0.20; Chi (= 1.74 (19 74 36 57 20	953 99 101 286 1611 i ² = 12.9 (P = 0.0 231 1065 143 773 406	3 20 28 95 34, df = 4 8) 11 28 8 23 7	127 97 268 1617 (P = 0. 221 933 131 773 406	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3% 7.2% 10.6% 6.0%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68]	2012 2013 2019 2013 2015 2015 2015 2015 2017		
Farkouh 2012 Iuo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Yu 2015 Bangalore 2015 Li Y 2017 Ramanathan 2017	54 15 19 28 141 0.20; Chi (= 1.74 (19 74 36 57 20 420	953 99 101 286 1611 (P = 0.0 231 1065 143 773 406 2710	3 20 28 95 94, df = 4 8) 11 28 8 23 7 7 127	127 97 268 1617 (P = 0. 221 933 131 773 406 1865	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3% 7.2% 10.6% 6.0%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68] 2.28 [1.88, 2.75]	2012 2013 2019 2013 2015 2015 2015 2015 2017 2017		
Farkouh 2012 Iuo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Bangalore 2015 Li Y 2017 Ramanathan 2017 Subtotal (95% CI)	54 15 19 28 141 0.20; Chi 1.74 (19 74 36 57 20 420	953 99 101 286 1611 P = 12.9 (P = 0.0 231 1065 143 773 406 2710 5328	3 20 28 95 34, df = 4 8) 11 28 8 23 7 127	127 97 268 1617 (P = 0. 221 933 131 773 406 1865 4329	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3% 7.2% 10.6% 6.0% 15.0% 57.3%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68] 2.28 [1.88, 2.75] 2.35 [2.01, 2.73]	2012 2013 2019 2013 2015 2015 2015 2017 2017		
Farkouh 2012 Iuo 2012 Kamalesh 2013 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Bangalore 2015 Li Y 2017 Ramanathan 2017 Subtotal (95% CI) Total events	54 15 19 28 141 0.20; Chi 1.74 (19 74 36 57 20 420 626	953 99 101 286 1611 i ² = 12.9 (P = 0.0 231 1065 143 773 406 2710 5328	3 20 28 95 34, df = 4 8) 11 28 8 23 7 127 204	127 97 268 1617 (P = 0. 221 933 131 773 406 1865 4329	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3% 7.2% 10.6% 6.0% 15.0% 57.3 %	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68] 2.28 [1.88, 2.75] 2.35 [2.01, 2.73]	2012 2013 2019 2013 2015 2015 2015 2017 2017		
Farkouh 2012 Iuo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Bangalore 2015 Li Y 2017 Ramanathan 2017 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0	54 15 19 28 141).20; Chi (= 1.74 (19 74 36 57 20 420 626 100; Chi	953 99 101 286 1611 i ² = 12.9 (P = 0.0 231 1065 143 773 406 2710 5328 i ² = 3.58	3 20 28 95 34, df = 4 8) 11 28 8 23 7 127 204 3 df = 5 0	127 97 268 1617 (P = 0. 221 933 131 773 406 1865 4329 P = 0.6	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3% 7.2% 10.6% 6.0% 15.0% 57.3%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68] 2.28 [1.88, 2.75] 2.35 [2.01, 2.73] 6	2012 2013 2019 2013 2015 2015 2015 2015 2017 2017		
Farkouh 2012 Iuo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Bangalore 2015 Li Y 2017 Ramanathan 2017 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z	54 15 19 28 141 0.20; Chi 20; Chi 36 57 20 420 626 0.00; Chi 20; Chi	953 99 101 286 1611 i ^P = 12.9 (P = 0.0 231 1065 143 773 406 2710 5328 i ^P = 3.58 i (P < 0.	3 20 28 95 34, df = 4 8) 11 28 8 23 7 127 204 3, df = 5 (0 00001)	127 97 268 1617 (P = 0. 221 933 131 773 406 1865 4329 P = 0.6	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3% 7.2% 10.6% 6.0% 15.0% 57.3% 1); I ² = 09	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68] 2.28 [1.82, 2.65] 2.35 [2.01, 2.73] 6	2012 2013 2019 2013 2015 2015 2015 2017 2017		
Farkouh 2012 Iuo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Bangalore 2015 Li Y 2017 Ramanathan 2017 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z Total (95% CI)	54 15 19 28 141).20; Chi (= 1.74 (19 74 36 57 20 420 626).00; Chi (= 10.96	953 99 101 286 1611 (P = 0.0 (P = 0.0 231 1065 143 773 406 2710 5328 (P < 0. 6939	3 20 28 95 94, df = 4 8) 11 28 8 23 7 127 204 3, df = 5 (0 00001)	127 97 268 1617 (P = 0. 221 933 131 773 406 1865 4329 P = 0.6 5946	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3% 7.2% 10.6% 6.0% 15.0% 57.3% 1); I ² = 0%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68] 2.28 [1.88, 2.75] 2.35 [2.01, 2.73] 6 1.98 [1.53, 2.57]	2012 2013 2019 2013 2015 2015 2015 2015 2017 2017		
Farkouh 2012 Iuo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Bangalore 2015 Li Y 2017 Ramanathan 2017 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z Total (95% CI) Total events	54 15 19 28 141 0.20; Chi (= 1.74 (19 74 36 57 20 420 626 0.00; Chi (= 10.96	953 99 101 286 1611 ; = 12.9 (P = 0.0 231 1065 143 773 406 2710 5328 ; = 3.58 ; (P < 0. 6939	3 20 28 95 94, df = 4 8) 11 28 8 23 7 127 204 8, df = 5 (00001) 299	127 97 268 1617 (P = 0. 221 933 131 773 406 1865 4329 P = 0.6 5946	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 10.3% 7.2% 6.0% 15.0% 57.3% 1); I ² = 0% 100.0%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68] 2.28 [1.88, 2.75] 2.35 [2.01, 2.73] 6 1.98 [1.53, 2.57]	2012 2013 2019 2013 2015 2015 2015 2017 2017		
Farkouh 2012 Iuo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Yu 2015 Bangalore 2015 Li Y 2017 Ramanathan 2017 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Total (95% CI) Total events Heterogeneity: Tau ² = 0	54 15 19 28 141 0.20; Chi (= 1.74 (19 74 36 57 20 420 626 0.00; Chi (= 10.96 767 0.11; Chi	953 99 101 286 1611 i ² = 12.9 (P = 0.0 231 1065 143 773 406 2710 5328 i ² = 3.58 b (P < 0. 6939 i ² = 281	3 20 28 95 34, df = 4 8) 11 28 8 23 7 127 204 3, df = 5 (0 00001) 299 0, df = 1	127 97 268 1617 (P = 0. 221 933 131 773 406 1385 4329 P = 0.6 5946 0 (P = 1)	3.6% 9.2% 10.2% 42.7% 01); ² = 6 7.3% 11.3% 7.2% 10.6% 6.0% 15.0% 57.3% 1); ² = 0% 100.0%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68] 2.28 [1.88, 2.75] 2.35 [2.01, 2.73] 6 1.98 [1.53, 2.57] = 64%	2012 2013 2019 2013 2015 2015 2015 2017 2017	-	
Farkouh 2012 Iuo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Bangalore 2015 Li Y 2017 Ramanathan 2017 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Total (95% CI) Total events Heterogeneity: Tau ² = 0 Total events Heterogeneity: Tau ² = 0	54 15 19 28 141 0.20; Chi 20; Chi 36 57 20 420 626 0.00; Chi 2= 10.96 767 0.11; Chi 2= 5.15 (953 99 101 286 1611 i ² = 12.9 (P = 0.0 231 1065 143 773 406 2710 5328 i ² = 3.58 0 (P < 0. 6939 i ² = 28.1 (P < 0.0	3 20 28 95 34, df = 4 8) 11 28 8 23 7 127 204 3, df = 5 (0 00001) 299 0, df = 11 0001)	127 97 268 1617 (P = 0. 221 933 131 773 406 1865 4329 P = 0.6 5946 0 (P = (3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3% 7.2% 10.6% 6.0% 15.0% 57.3% 1); I ² = 09 100.0%	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68] 2.28 [1.88, 2.75] 2.35 [2.01, 2.73] 6 1.98 [1.53, 2.57] = 64%	2012 2013 2019 2013 2015 2015 2015 2017 2017		
Farkouh 2012 Iuo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Bangalore 2015 Li Y 2017 Ramanathan 2017 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Total (95% CI) Total events Heterogeneity: Tau ² = 0 Fost for overall effect: Z Fost for overall effect: Z	54 15 19 28 141 0.20; Chi 19 74 36 57 20 420 626 0.00; Chi 1= 10.96 767 0.11; Chi 1= 5.15 (953 99 101 286 1611 286 1611 1065 143 773 406 2710 5328 $ ^{2} = 3.58$ $ ^{2} = 3.58$ $ ^{2} = 3.58$ $ ^{2} = 3.58$ $ ^{2} = 28.1$ $ ^{2} = 2$	3 20 28 95 34, df = 4 8) 11 28 8 23 7 127 204 3, df = 5 ((00001) 299 10, df = 11 00001) 274, df =	127 97 268 1617 (P = 0. 221 933 131 773 406 1865 4329 P = 0.6 5946 0 (P = (1 (P = (3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3% 7.2% 10.6% 6.0% 57.3% 1); I ² = 09 100.0% 0.002); I ² = 0.10) I ² =	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68] 2.28 [1.88, 2.75] 2.35 [2.01, 2.73] 6 1.98 [1.53, 2.57] = 64%	2012 2013 2019 2013 2015 2015 2015 2017 2017		
Farkouh 2012 Iuo 2012 Kamalesh 2013 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Test for overall effect: Z 3.1.2 long-term Kappetein 2013 Marui 2015 Sangalore 2015 Li Y 2017 Ramanathan 2017 Subtotal (95% CI) Total events Heterogeneity: Tau ² = 0 Fotal events Fotal events	54 15 19 28 141 0.20; Chi 22; Chi 20; Chi 36 57 20 420 626 0.00; Chi 20; Chi 2	953 99 101 286 1611 286 1611 (P = 0.0 231 1065 143 773 406 2710 5328 $i^2 = 3.58$ i(P < 0.0) 6939 $i^2 = 28.1$ (P < 0.0) $Chi^2 = 2$	3 20 28 95 94, df = 4 8) 11 28 8 23 7 127 204 8, df = 5 ((00001) 299 10, df = 11 0001) 2.74. df =	127 97 268 1617 (P = 0. 221 933 131 773 406 1865 4329 P = 0.6 5946 0 (P = (1 (P = 0)	3.6% 9.2% 10.2% 42.7% 01); I ² = 6 7.3% 11.3% 7.2% 10.6% 6.0% 15.0% 57.3% 1); I ² = 0% 100.0% 0.002); I ² = 0.10). I ² =	6.41 [1.91, 21.54] 0.91 [0.52, 1.60] 0.94 [0.57, 1.54] 1.53 [0.95, 2.48] 9% 1.65 [0.80, 3.39] 2.32 [1.51, 3.54] 4.12 [1.99, 8.54] 2.48 [1.54, 3.98] 2.86 [1.22, 6.68] 2.28 [1.88, 2.75] 2.35 [2.01, 2.73] 6 1.98 [1.53, 2.57] = 64% 63.5%	2012 2013 2019 2013 2015 2015 2015 2017 2017	-+ 0.05	



coronary angioplasty (PTCA) (e.g., type of stent, concomitant medication, preparation for the prevention of contrast-induced nephropathy) could account for diversities in results across studies. Furthermore, heterogeneity may also have been caused by study design. Therefore, because of limited information obtained

а	PCI		CAB	3		Risk Ratio			Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	Year		M-H, Random, 95% Cl
5.2.1 randomized con	ntrolled tr	ail							
Farkouh 2012	117	953	42	947	9.9%	2.77 [1.97, 3.89]	2012		
Kappetein 2013	75	231	28	221	9.3%	2.56 [1.73, 3.80]	2013		
Kamalesh 2013	19	101	20	97	7.2%	0.91 [0.52, 1.60]	2013		
Ben-Gal 2015	209	1349	16	423	8.0%	4 10 [2 49 6 73]	2015		
Miloievic 2019	45	286	23	268	8.2%	1 83 [1 14 2 94]	2019		
Subtotal (95% CI)		2920	20	1956	42.6%	2 22 [1 46, 3 39]	2010		
Total evente	465	LOLO	120	1000	42.070	2122 [1110, 0100]			-
Heterogeneity: Tau ² = Test for overall effect: .	0.18; Chi Z = 3.70 (i ^z = 18.: (P = 0.0	129 27, df = 4 1002)	(P = 0.	001); I² =	78%			
5.2.2 observational st	tudy								
luo 2012	14	99	3	127	2.8%	5.99 (1.77, 20.26)	2012		
Marui 2015	492	1065	127	933	11 9%	3 39 [2 85 4 04]	2015		-
Yu 2015	402	143	20	131	0.0%		2015		
Ta 2015 Donaoloro 2015	202	770	23	770	11 304	2.55 [0.00, 2.00]	2015		
Dariyalore 2010 Zhana 2016	202	240	79 44	113	11.270 C.O.V	2.00 [2.01, 3.20]	2010		
Zneng zoro	42	348	14	806	0.9%	0.95 [3.85, 12.56]	2010		
LLY 2017	11	406	6	406	3.8%	1.83 [0.68, 4.91]	2017		
Ramanathan 2017	661	2710	145	1865	11.9%	3.14 [2.65, 3.72]	2017		
Subtotal (95% CI)		5544		5041	57.4%	2.92 [2.21, 3.87]			
Total events	1464		403						
Heterogeneity: Tau ² = Test for overall effect: .	0.09; Chi Z = 7.47 (i² = 29.1 (P < 0.0	16, df = 6 10001)	(P < 0.	0001); l²:	= 79%			
Total (95% CI)		8464		6997	100.0%	2.61 [2.08, 3.29]			•
Total events	1070	0.0.	632			2101 [2100, 0120]			-
Letave venesity Tav?-	0.111.06	iZ - 61 i	002 1 df=1	1 / D ~ (000043	12 - 70%		+	
		- 51.3	51, ui – 1	1 (1 - 1		1 - 75%		0.05	0.2 1 5
Test for sucrell offest:	7 - 0 224	m > 0 m	00041						
Test for overall effect: . Test for subgroup diffe	Z = 8.23 (erences:	(P ≤ 0.0 Chi ² = 1	10001) 1 11 df=	1 (P =	0 29) P=	10.3%			Favours PCI Favours CABG
Test for overall effect: . Test for subaroup diff	Z = 8.23 (erences:	(P < 0.0 Chi ² = 1	10001) 1.11. df=	1 (P =	0.29). I² =	10.3%			Favours PCI Favours CABG
Test for overall effect: Test for subaroup diffe b	Z = 8.23 (erences: PCI	(P < 0.0 Chi² = `	1.11. df = CAB(Events	1 (P =	0.29). ² =	10.3% Risk Ratio	Voar		Favours PCI Favours CABG Risk Ratio
Test for overall effect: Test for subaroup diffe b Study or Subgroup	Z = 8.23 (erences: PCI Events	(P < 0.0 Chi ² = 1 <u>Total</u>	10001) 1.11. df= CAB(Events	1 (P = G <u>Total</u>	0.29). I ² = Weight	10.3% Risk Ratio M-H, Random, 95% Cl	Year		Favours PCI Favours CABG Risk Ratio M-H, Random, 95% CI
b <u>Study or Subgroup</u> 5.1.1 midterm	Z = 8.23 (erences: PCI Events	(P < 0.0 Chi ² = 1 <u>Total</u>	10001) 1.11. df= CAB(Events	1 (P = G <u>Total</u>	0.29). I ^z =	10.3% Risk Ratio <u>M-H, Random, 95% CI</u>	Year		Favours PCI Favours CABG Risk Ratio M-H, Random, 95% Cl
b Study or Subgroup 5.1.1 midterm Farkouh 2012	Z = 8.23 (erences: PCI <u>Events</u> 117	(P < 0.0 Chi ² = 1 <u>Total</u> 953	10001) 1.11. df = CAB(<u>Events</u> 42	1 (P = G Total 947	0.29). I ² = <u>Weight</u> 9.9%	10.3% Risk Ratio <u>M-H, Random, 95% CI</u> 2.77 [1.97, 3.89]	Year 2012		Favours PCI Favours CABG Risk Ratio M-H, Random, 95% CI
Heterogeneny: Tau = Test for overall effect. Test for subaroup diffi b Study or Subgroup 5.1.1 midterm Farkouh 2012 luo 2012	Z = 8.23 (erences: PCI Events 117 14	(P < 0.0 Chi ² = ⁻ <u>Total</u> 953 99	10001) 1.11. df = CAB(Events 42 3	1 (P = 5 <u>Total</u> 947 127	0.29). I ² = <u>Weight</u> 9.9% 2.8%	10.3% Risk Ratio M-H, Random, 95% CI 2.77 [1.97, 3.89] 5.99 [1.77, 20.26]	Year 2012 2012		Favours PCI Favours CABG Risk Ratio M-H, Random, 95% CI
Test for overall effect. Test for subgroup diffi b <u>Study or Subgroup</u> 5.1.1 midterm Farkouh 2012 luo 2012 Kamalesh 2013	Z = 8.23 (erences: <u>PCI</u> <u>Events</u> 117 14 19	(P < 0.0 Chi ² = 1 Total 953 99 101	10001) 1.11. df = CAB(Events 42 3 20	1 (P = 5 Total 947 127 97	0.29). I ^z = <u>Weight</u> 9.9% 2.8% 7.2%	10.3% Risk Ratio <u>M-H, Random, 95% CI</u> 2.77 [1.97, 3.89] 5.99 [1.77, 20.26] 0.91 [0.52, 1.60]	Year 2012 2012 2013		Favours PCI Favours CABG Risk Ratio M-H, Random, 95% CI
Heterogeneny, rad = Test for overall effect. Test for subdroup diffe <u>5.1.1 midterm</u> Farkouh 2012 Luo 2012 Kamalesh 2013 Ben-Gal 2015	Z = 8.23 (erences: PCI Events 117 14 19 209	(P < 0.0 Chi ² = 1 Total 953 99 101 1349	10001) 1.11. df= CAB(Events 42 3 20 16	1 (P = 5 Total 947 127 97 423	0.29). I ^z = <u>Weight</u> 9.9% 2.8% 7.2% 8.0%	10.3% Risk Ratio <u>M-H, Random, 95% CI</u> 2.77 [1.97, 3.89] 5.99 [1.77, 20.26] 0.91 [0.52, 1.60] 4.10 [2.49, 6.73]	Year 2012 2012 2013 2015		Favours PCI Favours CABG Risk Ratio M-H, Random, 95% CI
Test for overall effect: Test for subgroup diffe b 5.1.1 midterm Farkouh 2012 Kamalesh 2013 Ben-Gal 2015 Zheng 2016	Z = 8.23 (erences: PCI Events 117 14 19 209 42	(P < 0.0 Chi ² = 1 953 99 101 1349 348	00001) 1.11. df= CAB(Events 42 3 20 16 14	1 (P = 5 Total 947 127 97 423 806	0.29). I ^z = <u>Weight</u> 9.9% 2.8% 7.2% 8.0% 6.9%	10.3% Risk Ratio <u>M-H, Random, 95% CI</u> 2.77 [1.97, 3.89] 5.99 [1.77, 20.26] 0.91 [0.52, 1.60] 4.10 [2.49, 6.73] 6.95 [3.85, 12.56]	Year 2012 2012 2013 2015 2016		Favours PCI Favours CABG
Test for overall effect. Test for subgroup diffect. b <u>Study or Subgroup</u> 5.1.1 midterm Farkouh 2012 Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Zheng 2016 Milojevic 2019	Z = 8.23 (erences: PCI Events 117 14 19 209 42 45	(P < 0.0 Chi ² = 953 99 101 1349 348 286	00001) 1.11. df= CAB(Events 42 3 20 16 14 23	1 (P = 3 Total 947 127 97 423 806 268	0.29). ² = <u>Weight</u> 9.9% 2.8% 7.2% 8.0% 6.9% 8.2%	10.3% Risk Ratio <u>M-H, Random, 95% CI</u> 2.77 [1.97, 3.89] 5.99 [1.77, 20.26] 0.91 [0.52, 1.60] 4.10 [2.49, 6.73] 6.95 [3.86, 12.56] 1.83 [1.14, 2.94]	Year 2012 2012 2013 2015 2016 2019		Favours PCI Favours CABG
Test for overall effect. Test for subgroup diffi Study or Subgroup 5.1.1 midterm Farkouh 2012 Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Zheng 2016 Milojevic 2019 Subtotal (95% CI)	Z = 8.23 (erences: <u>PCI</u> <u>Events</u> 117 14 19 209 42 45	(P < 0.0 Chi ² = 953 99 101 1349 348 286 3136	10001) 1.11. df= CAB(Events 42 3 20 16 14 23	1 (P = 3 Total 947 127 97 423 806 268 268	0.29). ² = <u>Weight</u> 9.9% 2.8% 7.2% 8.0% 8.0% 8.2% 43.0%	10.3% Risk Ratio <u>M-H, Random, 95% CI</u> 2.77 [1.97, 3.89] 5.99 [1.77, 20.26] 0.91 [0.52, 1.60] 4.10 [2.49, 6.73] 6.95 [3.85, 12.56] 1.83 [1.14, 2.94] 2.88 [1.66, 4.99]	Year 2012 2012 2013 2015 2016 2019		Favours PCI Favours CABG
b Study or Subgroup 5.1.1 midterm Farkouh 2012 Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Zheng 2016 Milojevic 2019 Subtotal (95% CI) Total events	Z = 8.23 (erences: <u>PCI</u> <u>Events</u> 117 14 19 209 42 45 446	(P < 0.0 Chi ² = 1 953 99 101 1349 348 286 3136	10001) 1.11. df= CAB (<u>Events</u> 42 3 20 16 14 23 118	1 (P = G Total 947 127 97 423 806 268 2668	0.29). ² = <u>Weight</u> 9.9% 2.8% 7.2% 8.0% 6.9% 8.2% 4 3.0 %	10.3% Risk Ratio <u>M-H, Random, 95% CI</u> 2.77 [1.97, 3.89] 5.99 [1.77, 20.26] 0.91 [0.52, 1.60] 4.10 [2.49, 6.73] 6.95 [3.85, 12.56] 1.83 [1.14, 2.94] 2.88 [1.66, 4.99]	Year 2012 2012 2013 2015 2016 2019		Favours PCI Favours CABG
b Study or Subgroup 5.1.1 midterm Farkouh 2012 Iuo 2012 Kamalesh 2013 Ben-Gal 2015 Zheng 2016 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = Test for overall effect.	Z = 8.23 (erences: PCI Events 117 14 19 209 42 45 446 0.38; Ch Z = 3.77	(P < 0.0 Chi ² = 1 953 99 101 1349 348 286 3136 (P = 0.0 (P = 0.0	1.11. df= CAB(<u>Events</u> 42 3 20 16 14 23 118 49, df = 5 1002)	1 (P = 5 Total 947 127 97 423 806 268 2668 (P < 0.	0.29). ² = <u>Weight</u> 9.9% 2.8% 7.2% 8.0% 6.9% 8.2% 43.0% 000001); P	10.3% Risk Ratio <u>M-H, Random, 95% CI</u> 2.77 [1.97, 3.89] 5.99 [1.77, 20.26] 0.91 [0.52, 1.60] 4.10 [2.49, 6.73] 6.95 [3.85, 12.56] 1.83 [1.14, 2.94] 2.88 [1.66, 4.99] ² = 84%	Year 2012 2012 2013 2015 2016 2019		Favours PCI Favours CABG
b Study or Subgroup 5.1.1 midterm Farkouh 2012 Kamalesh 2013 Ben-Gal 2015 Zheng 2016 Milojevic 2019 Subtotal (95% CI) Total events Heterogeneity: Tau ² = Test for overall effect. 5.1.2 long-term	Z = 8.23 (erences: PCI Events 117 14 19 209 42 45 45 446 0.38; Ch Z = 3.77 ((P < 0.0 Chi ² = 1 953 99 101 1349 348 286 3136 (P = 0.0	1.11. df= CAB (<u>Events</u> 42 3 20 166 14 23 118 49, df= 5 1002)	1 (P = G Total 947 127 97 423 806 268 2668 (P < 0.	0.29). ² = <u>Weight</u> 9.9% 2.8% 7.2% 8.0% 6.9% 8.2% 43.0% 000001); F	10.3% Risk Ratio <u>M-H, Random, 95% CI</u> 2.77 [1.97, 3.89] 5.99 [1.77, 20.26] 0.91 [0.52, 1.60] 4.10 [2.49, 6.73] 6.95 [3.85, 12.56] 1.83 [1.14, 2.94] 2.88 [1.66, 4.99] ² = 84%	Year 2012 2012 2013 2015 2016 2019		Favours PCI Favours CABG
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Table 4 Publication bias assessment of this meta-analysis

Endpoints	Egger's te	st	Begg's te	st
	t-value	p	t-value	p
All-cause mortality	- 1.39	0.189	0.40	0.692
Cardiac death	0.56	0.597	0.30	0.764
MACCE	- 1.68	0.144	0.37	0.711
MI	-0.14	0.889	0.62	0.533
Stroke	- 2.06	0.066	0.89	0.373
Repeat revascularization	- 0.89	0.395	0.34	0.732

MACCE major adverse cardiac and cerebrovascular event, MI myocardial infarction

from original studies, heterogeneity cannot be completely resolved. Accordingly, although the results of present meta-analysis should be considered appropriately, methodological quality defects and clinical heterogeneity should be considered when interpreting the findings.

The number of published large-scale studies on patients with DM is currently small. To the best of our knowledge, the current study has the largest sample size of patients left main CAD and/or MVD to date. In addition, the current study compared the mid-term and long-term clinical outcomes between PCI and CABG. We found that CABG is superior to PCI in patients with DM, especially in differences of MACCE and repeat revascularization in all multiple stratified analyses. Although, it should be noted that the risk of stroke in CABG patients was higher than PCI patients at the mid-term follow-up, no statistically significant difference was observed at long-term followup. Our meta-analysis has higher accuracy, reliability, and statistical power due to the amplified sample size, resulting from the combination of the original studies. Thus, the current results could be considered stronger evidence than any one individual study. We hope that these results will assist diabetics and physicians in choosing the most appropriate revascularization strategy.

Limitations

Some limitations of this meta-analysis should be considered: (1) because of the limited data available, this study was unable to conduct more in-depth stratified analysis based on the complex lesions of the coronary artery in diabetic patients; (2) we could not conduct a subgroup analysis comparing different type of DES (drug-eluting stent) and in-depth stratification on the basis of diabetic patients' different drugs or comorbidity, due to limited studies and inadequate access to data; (3) the results of the included observational studies may have been selectively reported; and (4) due to the incomplete demographic data of diabetes patients, we cannot evaluate for heterogeneity by patient-level covariates. Unfortunately, heterogeneity of these variables (e.g., surgical experience, interference of diabetic complications, differences in drugs strategies) can never be completely resolved.

Conclusions

CABG was superior to PCI in patients with DM and complex CAD (including left main CAD and/or MVD) regard to all-cause mortality, MACCE, MI, repeat revascularization, but is associated with a higher risk of stroke at mid-term follow-up. Further rigorous, high-quality research is required to confirm these conclusions, however, due to the several limitations of the current studies.

Abbreviations

CAD: coronary artery disease; MVD: multivessel coronary disease; CABG: coronary artery bypass graft; PCI: percutaneous coronary intervention; DM: diabetes mellitus; RR: risk ratio; CI: confidence interval; MACCE: major adverse cardiac/cerebrovascular events; MI: myocardial infarction; RCTs: randomized controlled trials; OS: observational studies; DESs: drug-eluting stent; HbA1c: glycosylated hemoglobin; Hcy: homocysteine; CRP: c-reactive protein; SGLT2-is: sodium glucose cotransporter 2 inhibitors.

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Authors' contributions

HLC designed the study. CNZ statistical analysis, participated in most of the study steps. CNZ, YCH, and KH prepared the manuscript and assisted in the study processes. KH, YXZ, and YYZ assisted in the data collection, and helped in the, interpretation of the study. All authors read and approved the final manuscript.

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Availability of data and materials

Datasets are available through the corresponding author upon reasonable request.

Ethics approval and consent to participate

All analyses were based on previous published studies, thus no ethical approval and patient consent are required. All previous published studies were approved by ethics committee, respectively.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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