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Clinical outcomes after primary PCI using contemporary drug eluting stents: evidence from a network meta-analysis

Ply Chichareon MD, Carlos Collet Bortone, MD, Rodrigo Modolo, MD, Erhan Tenekecioglu, MD, Taku Asano, MD, Yuki Katagiri, MD, Yosuke Miyazaki, MD, PhD, Yoshinobu Onuma, MD, PhD, and Patrick W. Serruys, MD, PhD

Objectives

To assess the safety and efficacy of contemporary drug-eluting stents (DES) in patients presenting with acute myocardial infarction (STEMI) undergoing primary PCI by mean of a network meta-analysis of individual patient level data.

Methods

Eligibility Criteria:

Dedicated RCT STEMI trials treated with any stent

Two reviewers systematically searched PUBMED / Embase / CENTRAL

We included randomized clinical trials with patients who:

1) underwent PCI for STEMI
2) had at least 12-month clinical follow-up
3) underwent PCI with implantation of any stent

Outcomes of interest

Primary outcome of interest:

MACE (composite of all-cause death, reinfarction and target vessel or target lesion revascularization)

Secondary outcomes of interests:

Individual components of the primary outcome and definite or probable stent thrombosis.

20 randomized controlled trials included in this network meta-analysis 12595 patients

	Study	N	Year
1	HORIZIONS AMI	3006	2007
2	EXAMINATION	1498	2009
3	COMFORTABLE AMI	1157	2010
4	DEBATER	870	2007
5	MULTISTRATEGY	744	2005
6	TYPHOON	712	2003
7	XAMI	625	2008
8	PASSION	619	2003
9	RACES-MI	500	2014
10	KOMER	409	2007

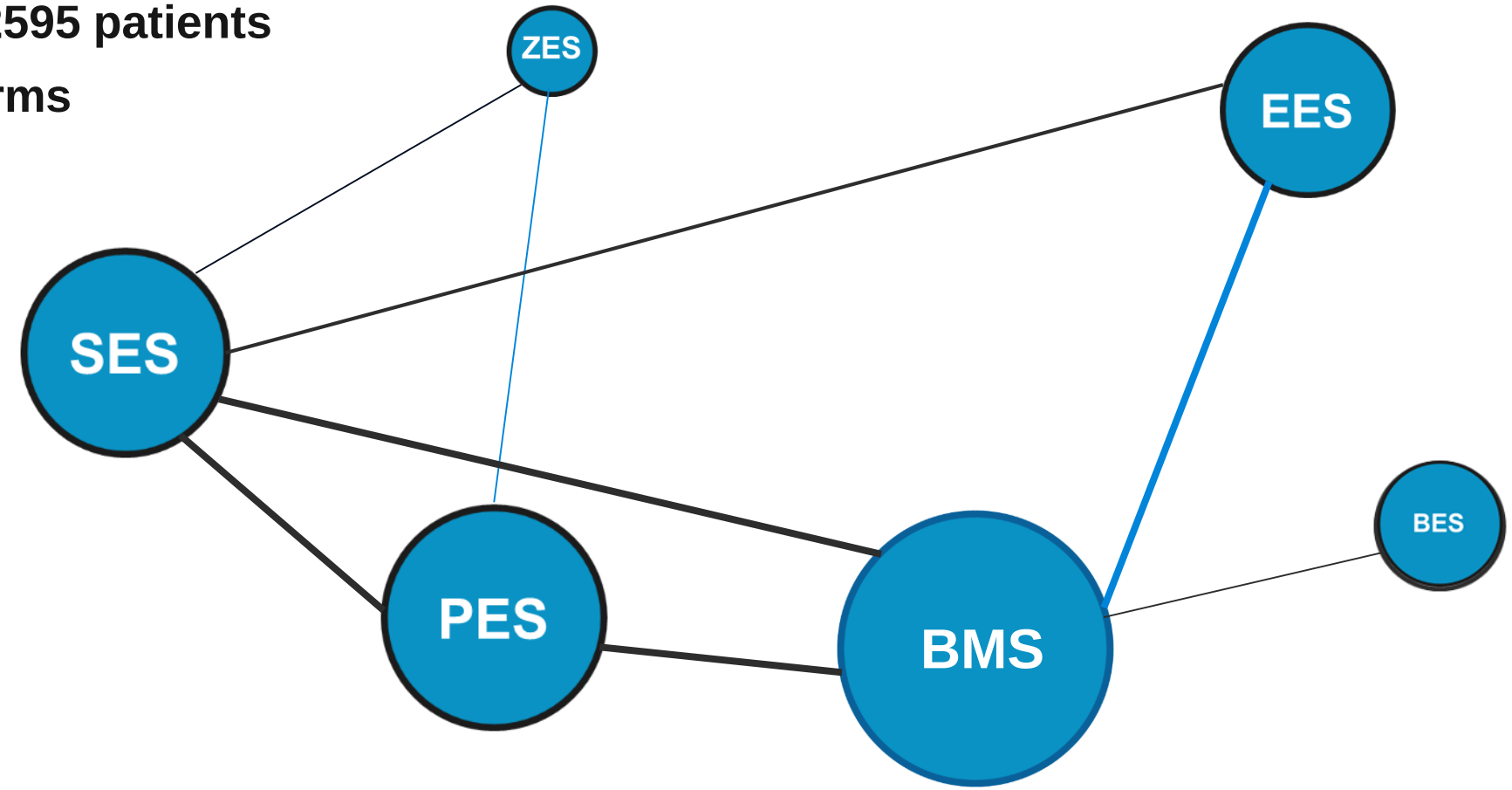
	Study	N	Year
11	JUWANA ET AL.	329	2007
12	SESAMI	320	2003
13	MISSION	310	2004
14	PROSIT	308	2006
15	PASEO	270	2004
16	Li et al.	228	2006
17	ZEST AMI	218	2006
18	STRATEGY	175	2003
19	SEZE	120	2008
20	Diaz de la llera et al.	114	2005

NETWORK PLOT

20 studies

n=12595 patients

44 arms



Study-level analysis

Patient Characteristics

Trial	Comparators	Sex (male,%)	HT (%)	DM (%)	Hyperlipidemia (%)	Smoker (%)	Prior MI (%)	Prior PCI (%)	Prior CABG (%)
HORIZIONS AMI	PES (n=2257) vs BMS (n=749)	76.8	51.5	15.9	41.9	47.7	9.5%	9.1	2.1
EXAMINATION	EES (n=751) vs BMS (n=747)	83	48.5	17	43.5	72	5	4	0.7
COMFORTABLE AMI	BES (n=575) vs BMS (n=582)	79.3	47	15.1	56.7	50.1	5.5	4	1.2
DEBATER	SES (n=424) vs BMS (n=446)	76.5	29	10	28	62.4	NA	NA	NA
MULTISTRATEGY	BMS (n=372) vs SES (n=372)	75.9	57.3	14.5	53.2	37.2	7.7	5.4	1.1
TYPHOON	SES (n=355) vs BMS (n=357)	78.4	40.6	16.3	42.2	50	NA	4.2	NA
XAMI	EES (n=404) vs SES (n=221)	73.7	29.6	9.7	NA	54.7	NA	3.7	0.8
PASSION	PES (n=310) vs BMS (n309)	75.9	31.1	11	25.5	51.5	5.1	4.4	0.6
RACES-MI	SES (n=250) vs EES (n=250)	64.8	41.6	26.4	NA	34	13.2	11	7.4
KOMER	ZES (n=205) vs SES (n=204) vs PES (n=202)	78.7	41.8	20.8	31.9	54.8	2	2.8	0

Mean age 60.8 years (SD±1.65), 26.3% female, 16.7% diabetics. Median follow up 24 months [range 12-60 months]

Patient Characteristics

Trial	Comparators	Sex (male,%)	HT (%)	DM (%)	Hyperlipidemia (%)	Smoker (%)	Prior MI (%)	Prior PCI (%)	Prior CABG (%)
Juwana et al.	SES (n=196) vs PES (n=201)	71.5	30	8.6	19	52.5	6	6.3	1.3
SESAMI	SES (n=160) vs BMS (160)	80	56.5	20.6	NA	54.3	9.1	10	0 .6
MISSION	SES (n=158) vs BMS (n=152)	77.7	28.1	9.7	20	54.5	3.9	1.6	0.6
PROSIT	SES (n=154) vs PES (n=152)	76.3	43.2	25.4	26	58.8	NA	NA	NA
PASEO	BMS (n=90) vs PES (n=90) vs SES n=(90)	70.4	26.3	25.6	NA	25.2	14.1	4.8	6.7
Li et al.	SES (n=164) vs SES (n=168)	75.9	54.8	29.5	39.4	63.3	4.8	2.7	0.6
ZEST-AMI	ZES (n=108) vs SES (n=110) vs PES (n=110)	82.3	46.6	25.9	45.1	56.7	NA	3	NA
STRATEGY	SES (n=87) vs BMS (n=88)	73	52.5	14.5	NA	40	11	3.5	2
SEZE	ZES (n=60) vs SES (n=61)	81	51.2	22.3	24.8	53.7	NA	NA	NA
DIAZ de la Llera et al.	BMS (n=54) vs SES (n=60)	79.2	NA	27.5	NA	68.3	7.4	5.8	0.8

Mean age 60.8 years (SD±1.65), 26.3% female, 16.7% diabetics. Median follow up 24 months [range 12-60 months]

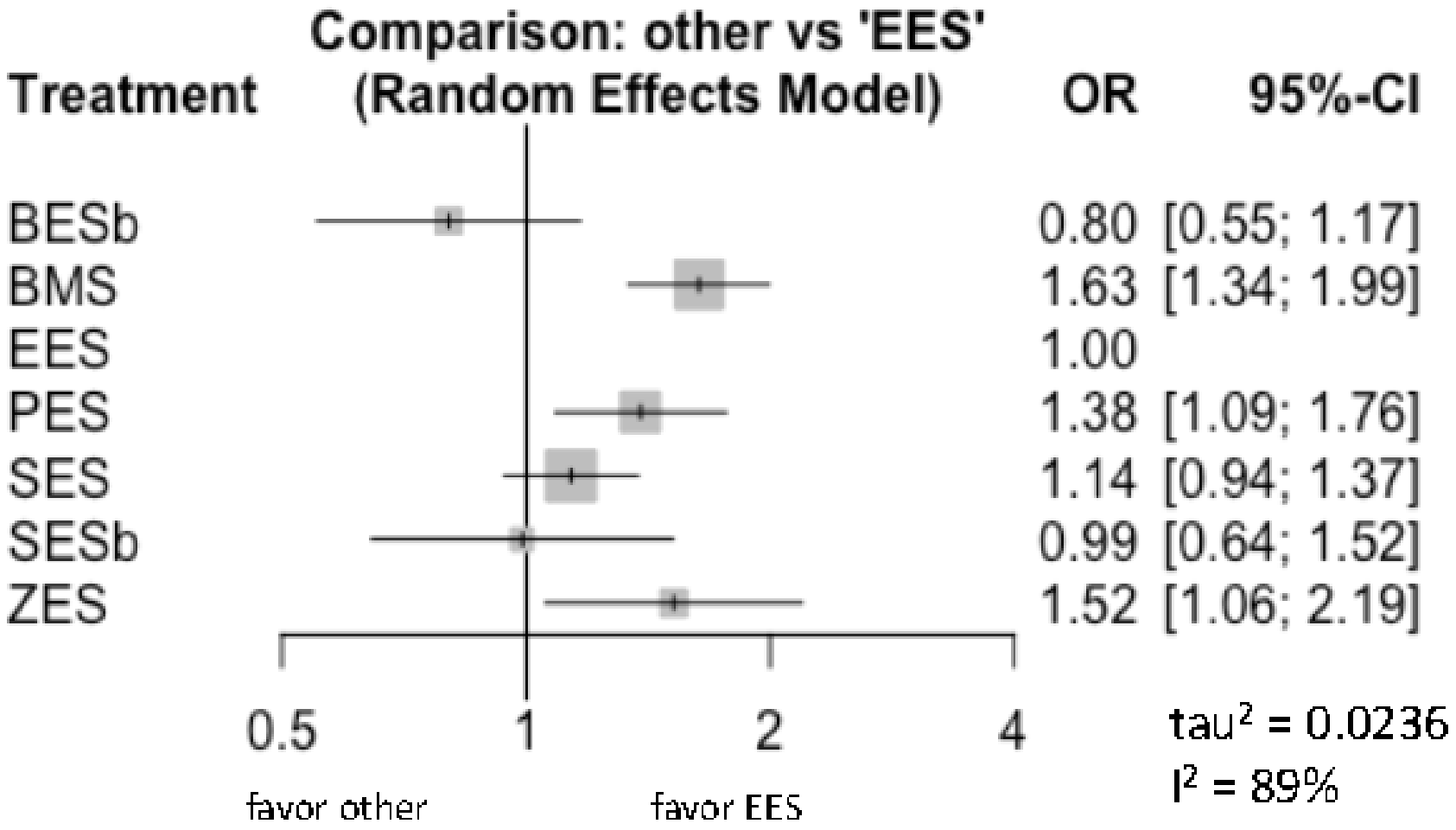
Angiographic and procedural characteristics

Trial	Comparators	Left main (%)	LAD (%)	LCX (%)	RCA (%)	Direct stenting attempted (%)	Post dilation (%)	Thrombus aspiration(%)
HORIZIONS AMI	PES (n=2257) vs BMS (n=749)	0.3	40.4	15.1	44.1	30.1	NA	11.2
EXAMINATION	EES (n=751) vs BMS (n=747)	0.7	40.5	14.5	43.5	59	15	65
COMFORTABLE AMI	BES (n=575) vs BMS (n=582)	0.2	39.5	14.9	45.2	37.4	NA	60.6
DEBATER	SES (n=424) vs BMS (n=446)	NA	37	17	45.5	NA	NA	NA
MULTISTRATEGY	BMS (n=372) vs SES (n=372)	1	43	15.5	39	NA	NA	NA
TYPHOON	SES (n=355) vs BMS (n=357)	NA	45.4	14.3	40.3	46.9	NA	NA
XAMI	EES (n=404) vs SES (n=221)	0.2	40.2	19	40.3	NA	NA	62.6
PASSION	PES (n=310) vs BMS (n309)	0.3	50.1	8.1	39.9	NA	NA	NA
RACES-MI	SES (n=250) vs EES (n=250)	2.8	43.8	18.4	33.4	NA	NA	22.2
KOMER	ZES (n=205) vs SES (n=204) vs PES (n=202)	NA	53.8	9	37.2	NA	NA	4.9

Angiographic and procedural characteristics

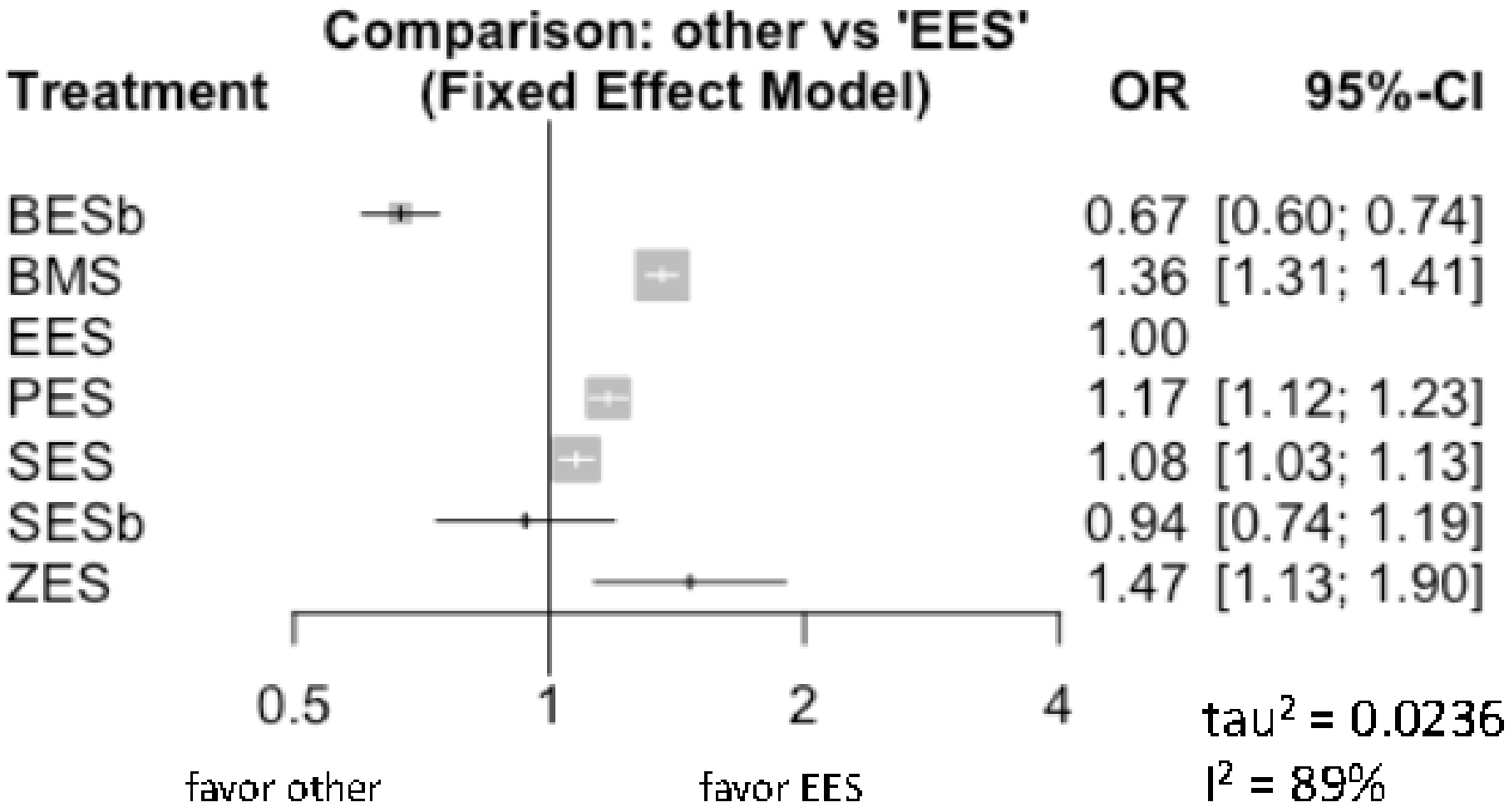
Trial	Comparators	Left main (%)	LAD (%)	LCX (%)	RCA (%)	Direct stenting attempted (%)	Post dilation (%)	Thrombus aspiration(%)
Juwana et al.	SES (n=196) vs PES (n=201)	NA	42.5	15.9	41.5	33.5	NA	1.3
SESAMI	SES (n=160) vs BMS (160)	NA	49.7	12.8	37.6	NA	NA	NA
MISSION	SES (n=158) vs BMS (n=152)	NA	54.9	15.8	29.4	37.4	NA	NA
PROSIT	SES (n=154) vs PES (n=152)	1.3	50.3	12.7	35.7	NA	48.1	29.9
PASEO	BMS (n=90) vs PES (n=90) vs SES n=(90)	NA	51.5	24.1	24.4	26.7	NA	4.4
Li et al.	SES (n=164) vs SES (n=168)	NA	45.5	15.7	38.8	NA	NA	NA
ZEST-AMI	ZES (n=108) vs SES (n=110) vs PES (n=110)	NA	46.4	11.6	42.1	4.9	NA	5.1
STRATEGY	SES (n=87) vs BMS (n=88)	NA	45	19	35.5	NA	NA	NA
SEZE	ZES (n=60) vs SES (n=61)	NA	58	9	33	9.1	NA	NA
DIAZ de la Llera et al.	BMS (n=54) vs SES (n=60)	0.8	42.3	13.3	43.7	NA	NA	NA

MACE



BESb = Biolimus eluting stent, BMS = Bare metal stent, EES = Everolimus eluting stent, PES = Paclitaxel eluting stent
SES = Sirolimus eluting stent with durable polymer, SESb = Sirolimus eluting stent with biodegradable polymer,
ZES = Zotarolimus eluting stent

MACE



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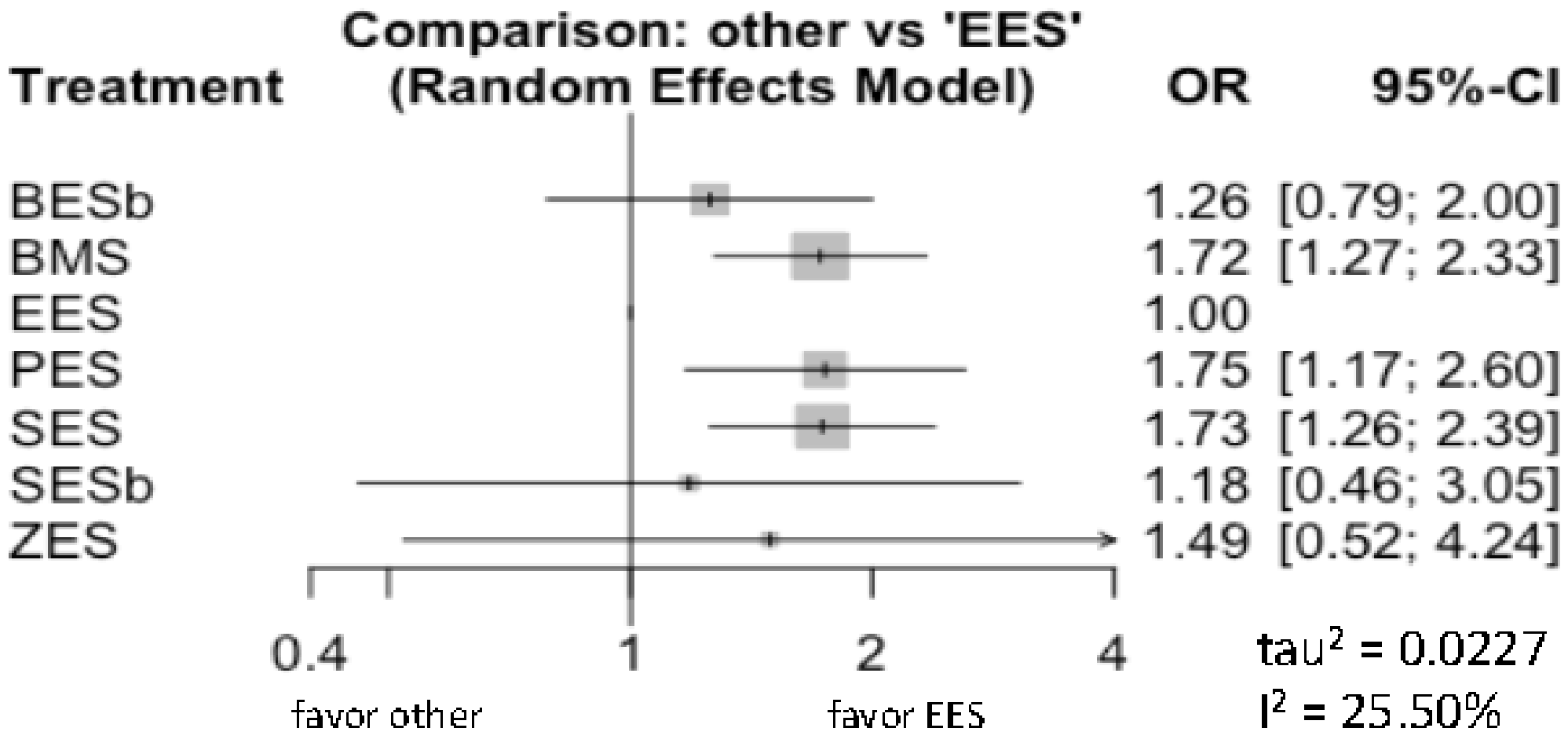
Definite or probable ST



Conclusions

- Everolimus-eluting stent and Biolimus-eluting stent had comparable clinical outcomes with respect to the MACE, all cause death, reinfarction, TVR or TLR, and stent thrombosis in patients presenting with acute myocardial infarction.

- Patients treated with Zotarolimus-eluting stent had an increased MACE compared with EES and BES.

- The rate of stent thrombosis was similar among EES, BES and ZES; however, patients treated with BMS had an increased rate of stent thrombosis.

- In the STEMI setting, EES and BES appear to have a better safety and efficacy profile.

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