Does the choice of ACEi & ARB really matter in the initiation and Management of Hypertension?

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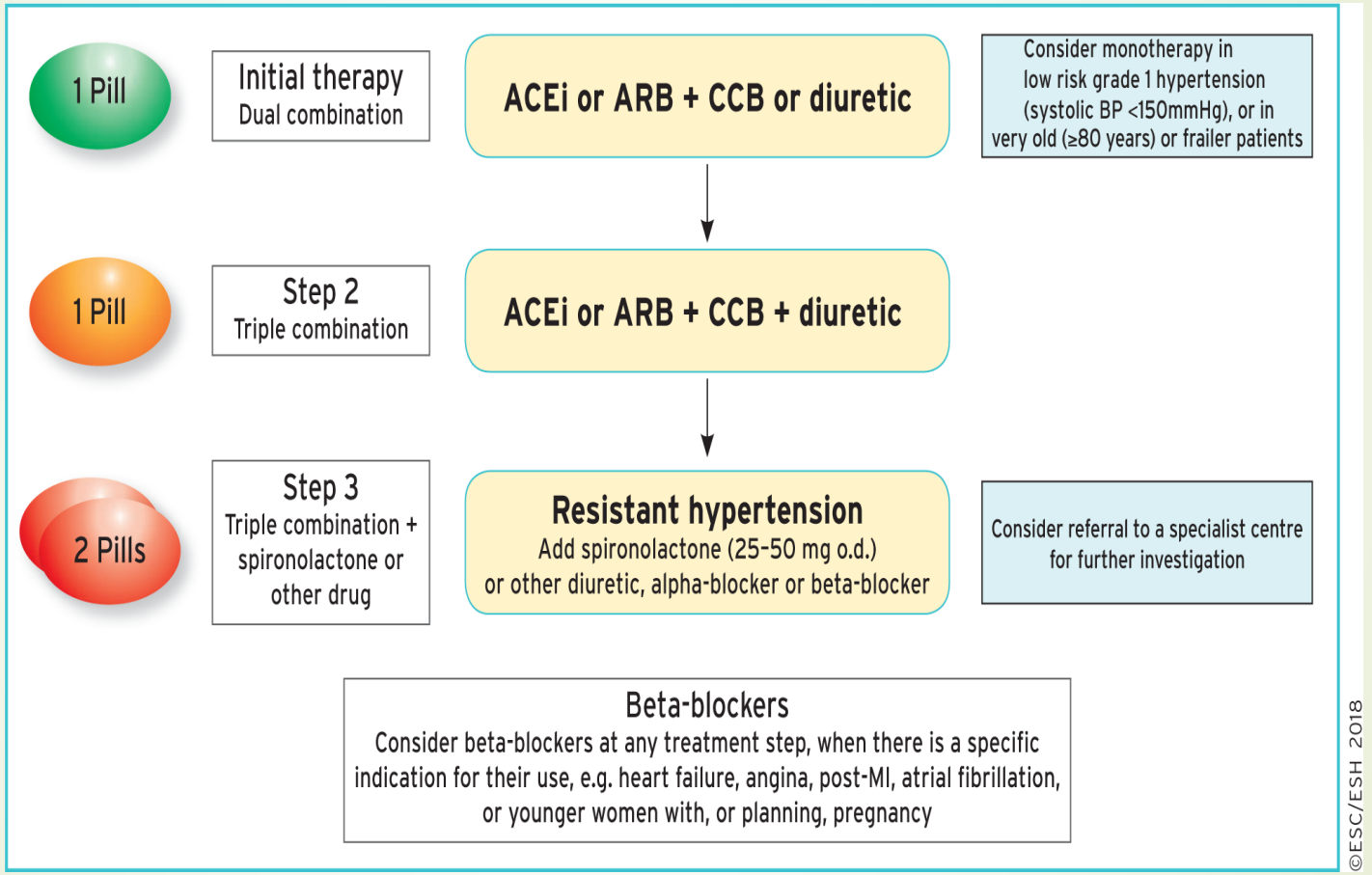
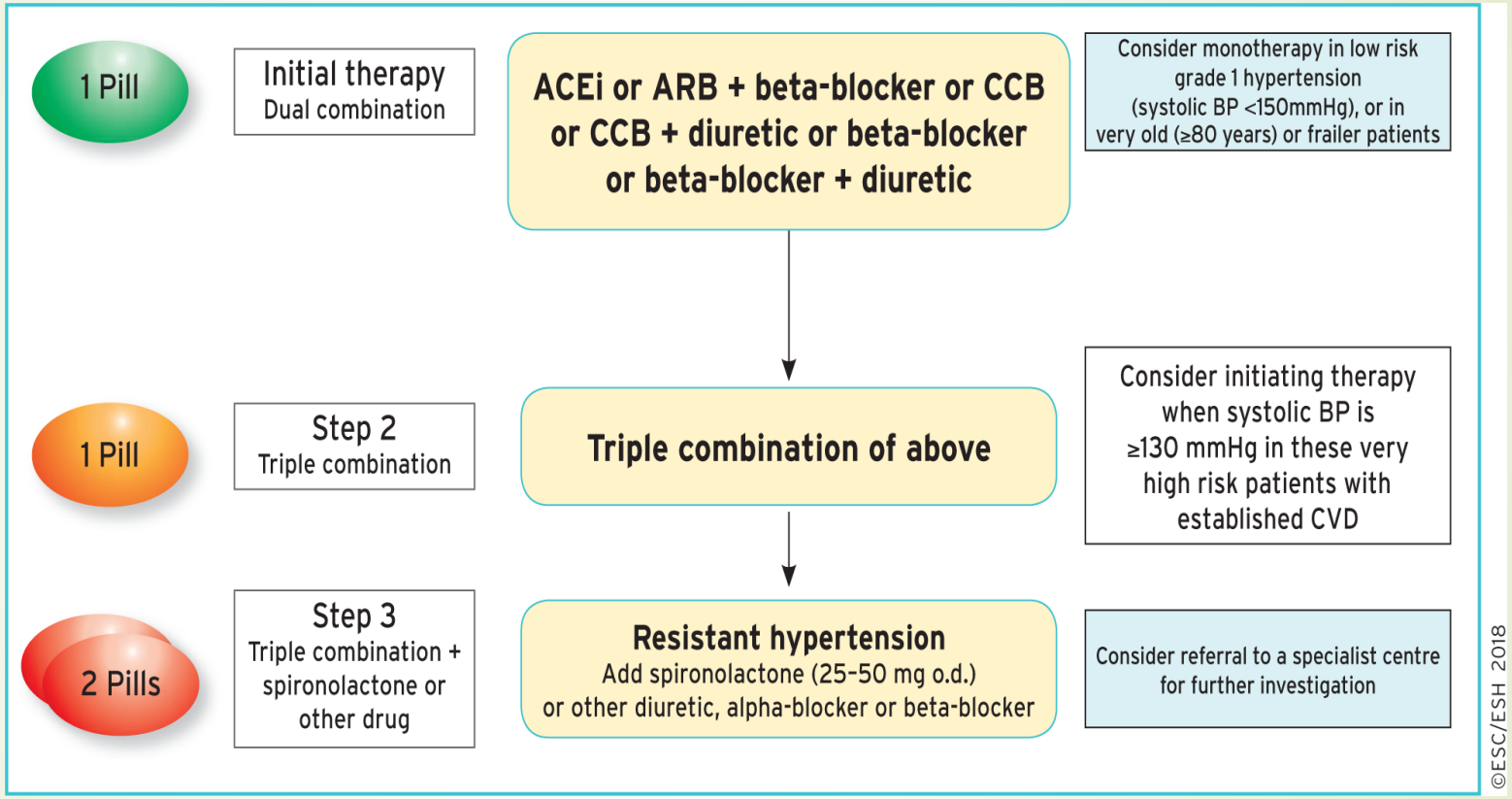
CONSULTANT CARDIOLOGIST
COLOMBO SRI LANKA

Core drug treatment strategy for uncomplicated hypertension. The core algorithm is also appropriate for most ...



European Heart Journal, Volume 39, Issue 33, 01 September 2018, Pages 3021–3104, https://doi.org/10.1093/eurheartj/ehy339

Drug treatment strategy for hypertension and coronary artery disease. ACEi = angiotensin-converting enzyme …



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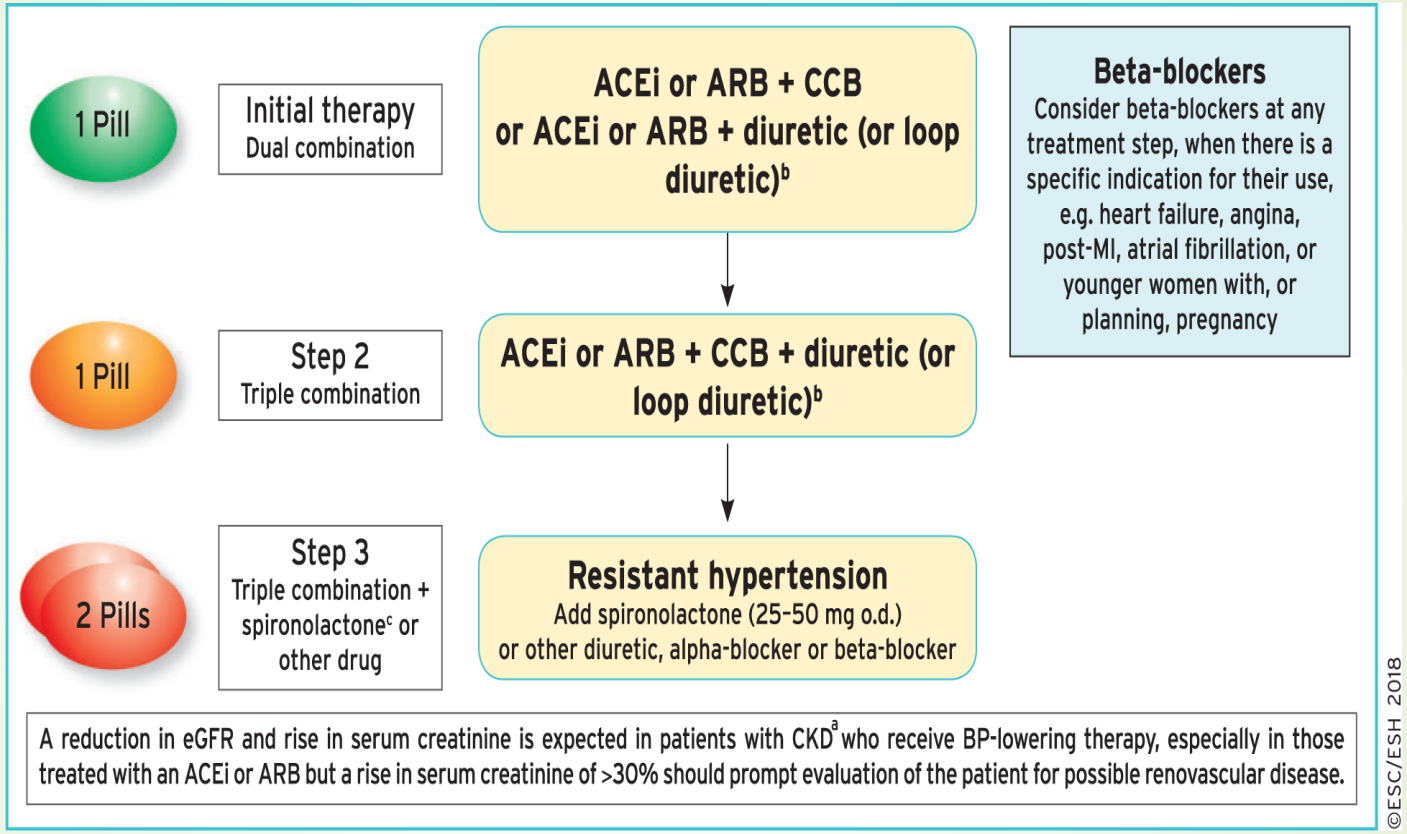
Drug treatment strategy for hypertension and chronic kidney disease. ACEi = angiotensin-converting enzyme ...



European Heart Journal, Volume 39, Issue 33, 01 September 2018, Pages 3021–3104,
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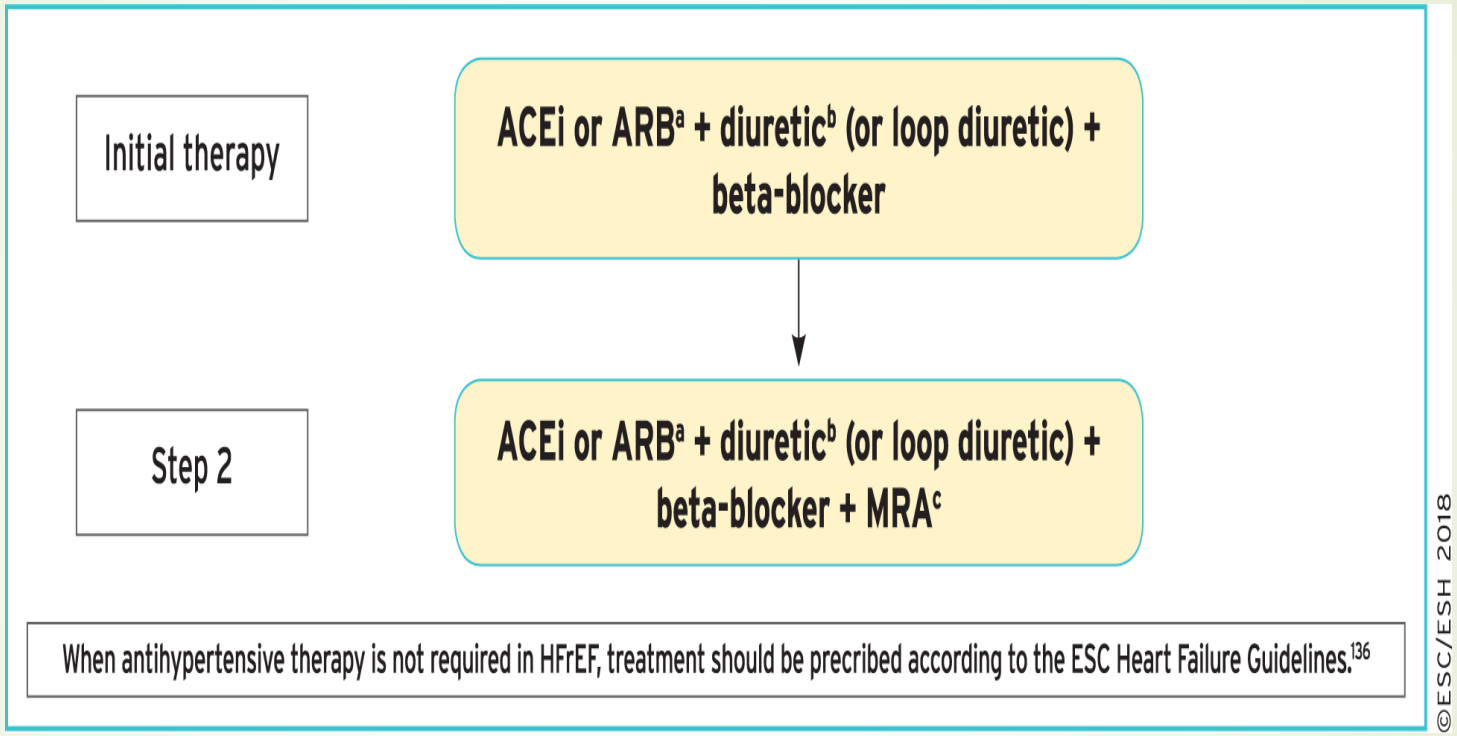
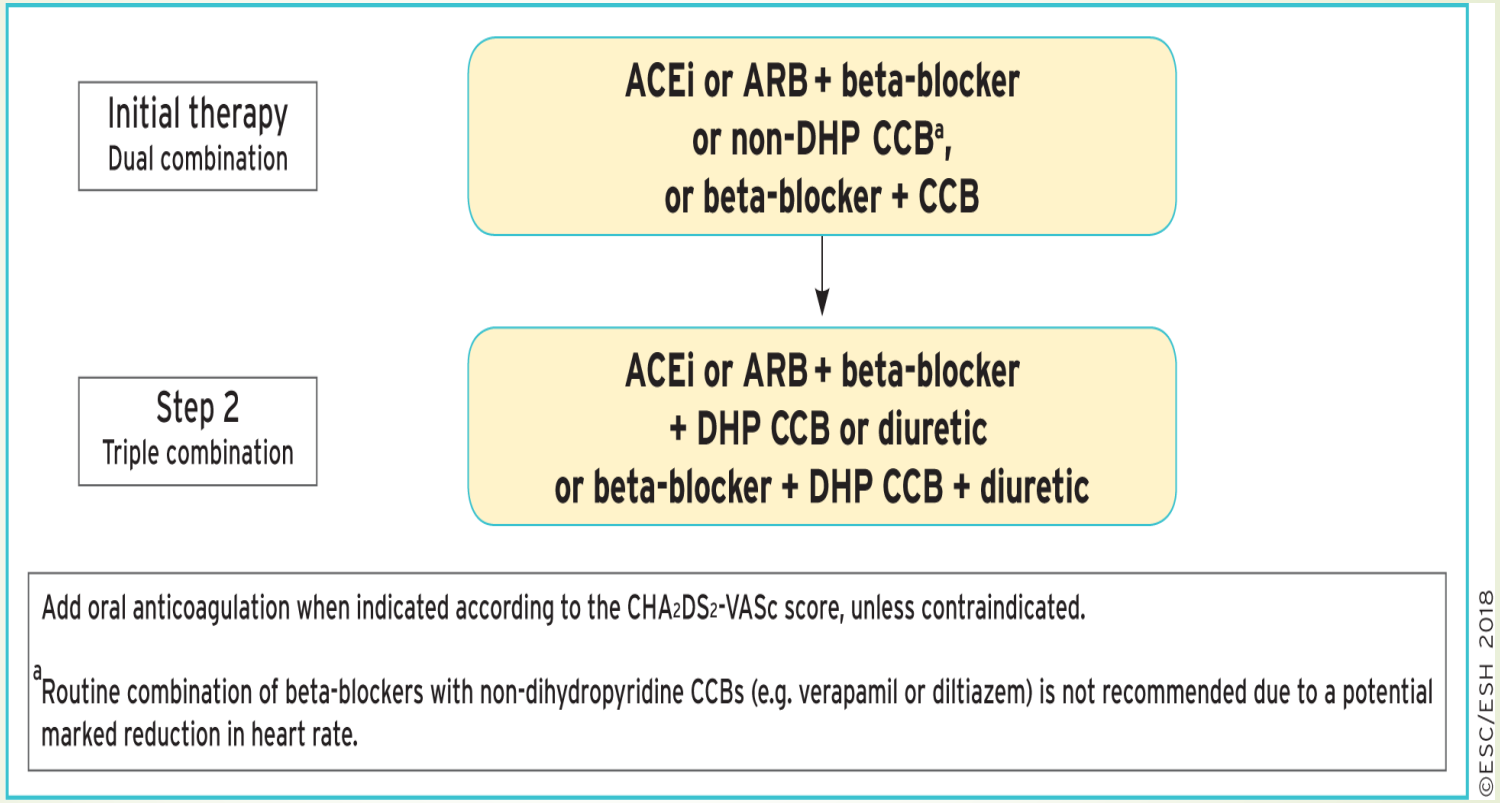
Drug treatment strategy for hypertension and hear failure with reduced ejection fraction. Do not use ...



European Heart Journal, Volume 39, Issue 33, 01 September 2018, Pages 3021–3104, https://doi.org/10.1093/eurheartj/ehy339

Drug treatment strategy for hypertension and atrial fibrillation. ACEi = angiotensin-converting enzyme ...



European Heart Journal, Volume 39, Issue 33, 01 September 2018, Pages 3021–3104, https://doi.org/10.1093/eurheartj/ehy339

Natural history of coronary atherosclerosis

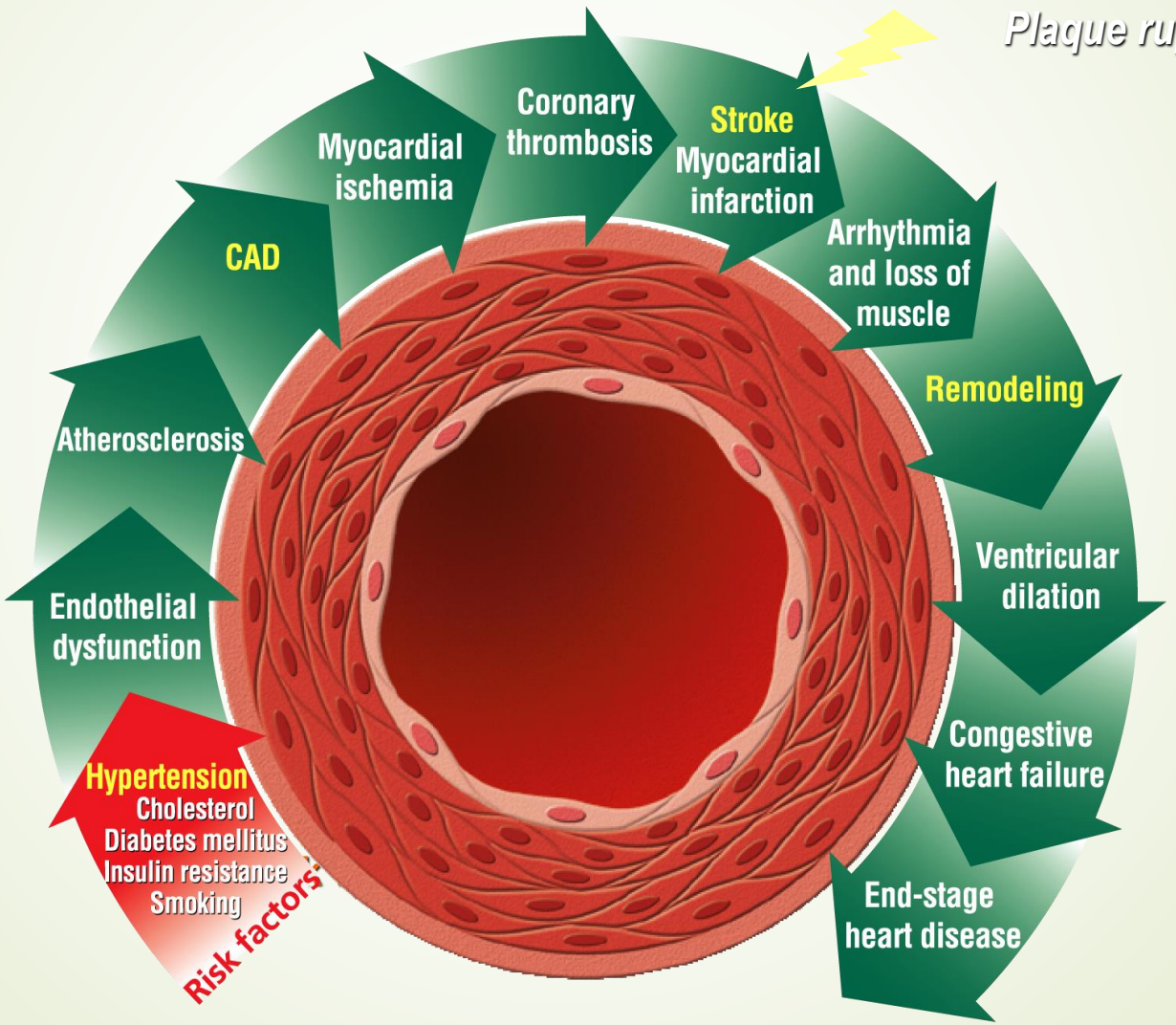


Table 5 Ten year cardiovascular risk categories (Systematic COronary Risk Evaluation system)

Very high risk	**People with any of the following:**
	Documented CVD, either clinical or unequivocal on imaging. • **Clinical CVD** includes acute myocardial infarction, acute coronary syndrome, coronary or other arterial revascularization, stroke, TIA, aortic aneurysm, and PAD • **Unequivocal documented CVD on imaging** includes significant plaque (i.e. ≥50% stenosis) on angiography or ultrasound; it does not include increase in carotid intima-media thickness • **Diabetes mellitus with target organ damage**, e.g. proteinuria or a with a major risk factor such as grade 3 hypertension or hypercholesterolaemia • **Severe CKD** (eGFR <30 mL/min/1.73 m^2) • **A calculated 10 year SCORE of ≥10%**
High risk	**People with any of the following:** • **Marked elevation of a single risk factor**, particularly cholesterol >8 mmol/L (>310 mg/dL), e.g. familial hypercholesterolaemia or grade 3 hypertension (BP ≥180/110 mmHg) • **Most other people with diabetes mellitus** (except some young people with type 1 diabetes mellitus and without major risk factors, who may be at moderate-risk)
	Hypertensive LVH
	Moderate CKD eGFR 30-59 mL/min/1.73 m^2)
	A calculated 10 year SCORE of 5-10%
Moderate risk	**People with:** • **A calculated 10 year SCORE of ≥1 to <5%** • **Grade 2 hypertension** • **Many middle-aged people belong to this category**
Low risk	**People with:** • **A calculated 10 year SCORE of <1%**

Table 7 Correction factors for the Systemic COronary Risk Evaluation (SCORE) cardiovascular risk estimates in first-generation immigrants to Europe[35]

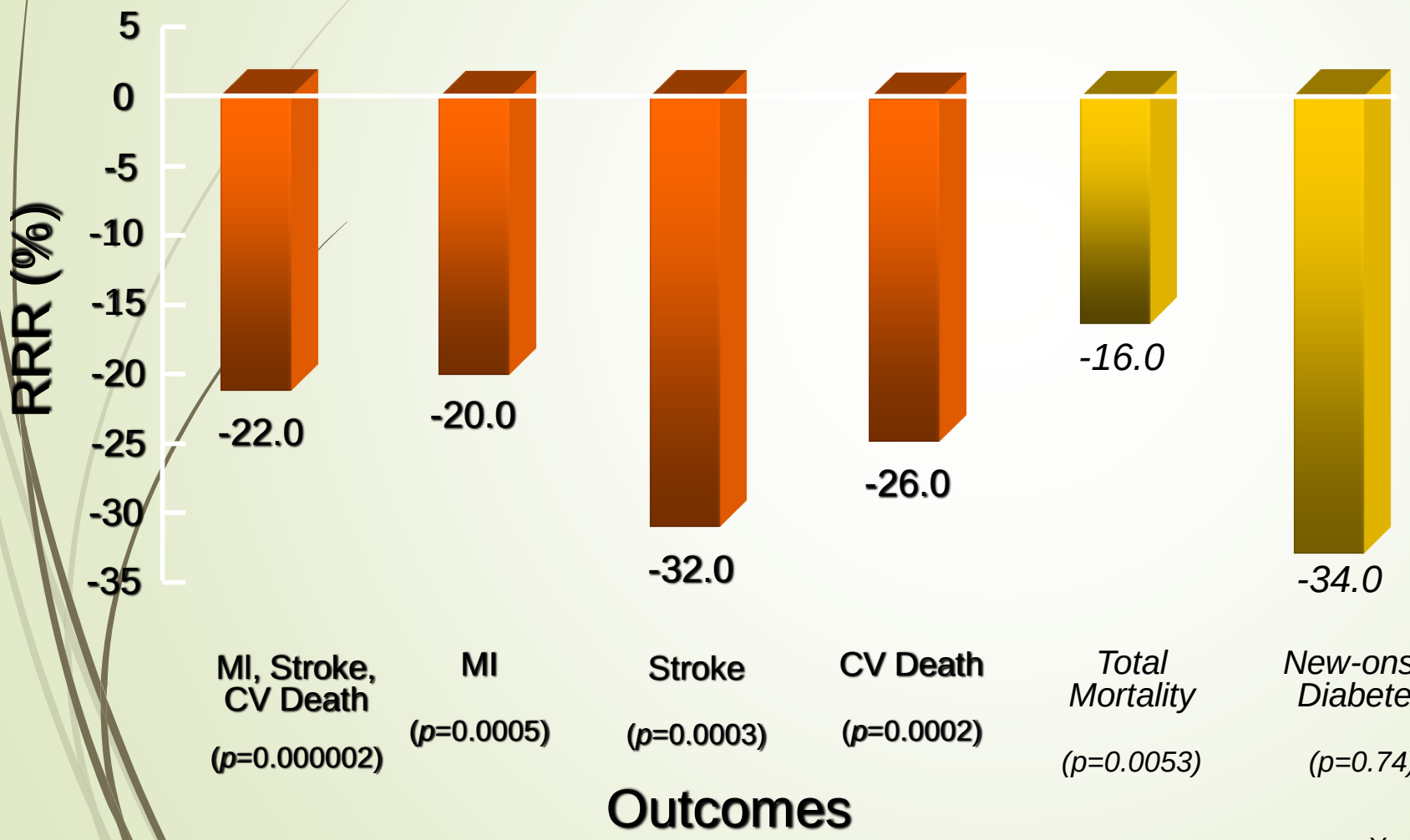
Region of origin	Multiplication factor
Southern Asia	1.4
Sub-Saharan Africa	1.3
Caribbean	1.3
Western Asia	1.2
Northern Africa	0.9
Eastern Asia	0.7
Southern America	0.7

HOPE STUDY

- The HOPE study, which involved 9,297 high-risk patients with vascular disease or diabetes plus one other cardiovascular risk factor without a history of HF or left ventricular dysfunction, showed that ramipril was associated with significant reductions in all-cause mortality, MI and stroke in these patients.
- The findings of the HOPE study support the prescription of an ACE inhibitor for prevention of cardiovascular complications in all high-risk patients, which therefore includes those with stable angina .

Hope Ramipril vs Placebo

CV Benefits of Ramipril in High Risk Patients



Yusuf S. et al. N Engl J Med; 2000, 342(3) :145-53

HOPE - Secondary and Other Endpoint Results

Endpoint	Ramipril (n=4645)	Placebo (n=46532)	RR	P value
Secondary Outcomes - %				
Revascularization	**16.0**	**18.6**	**0.84**	**<0.001**
Hospitalization for UA	12.2	12.4	0.98	0.68
Complications/DM	**6.2**	**7.4**	**0.84**	**<0.03**
Hospitalization for HF	3.3	3.8	0.87	0.19
Other Outcomes - %				
Heart failure	**9.2**	**11.7**	**0.77**	**<0.001**
Cardiac arrest	**0.8**	**1.2**	**0.63**	**0.03**
Worsening angina	**23.8**	**26.2**	**0.89**	**0.003**
New diagnosis of DM	**3.7**	**5.3**	**0.68**	**0.002**
Unstable angina with ECG changes	3.9	4.0	0.96	0.72

UA = unstable angina; DM = diabetes mellitus; HF = heart failure

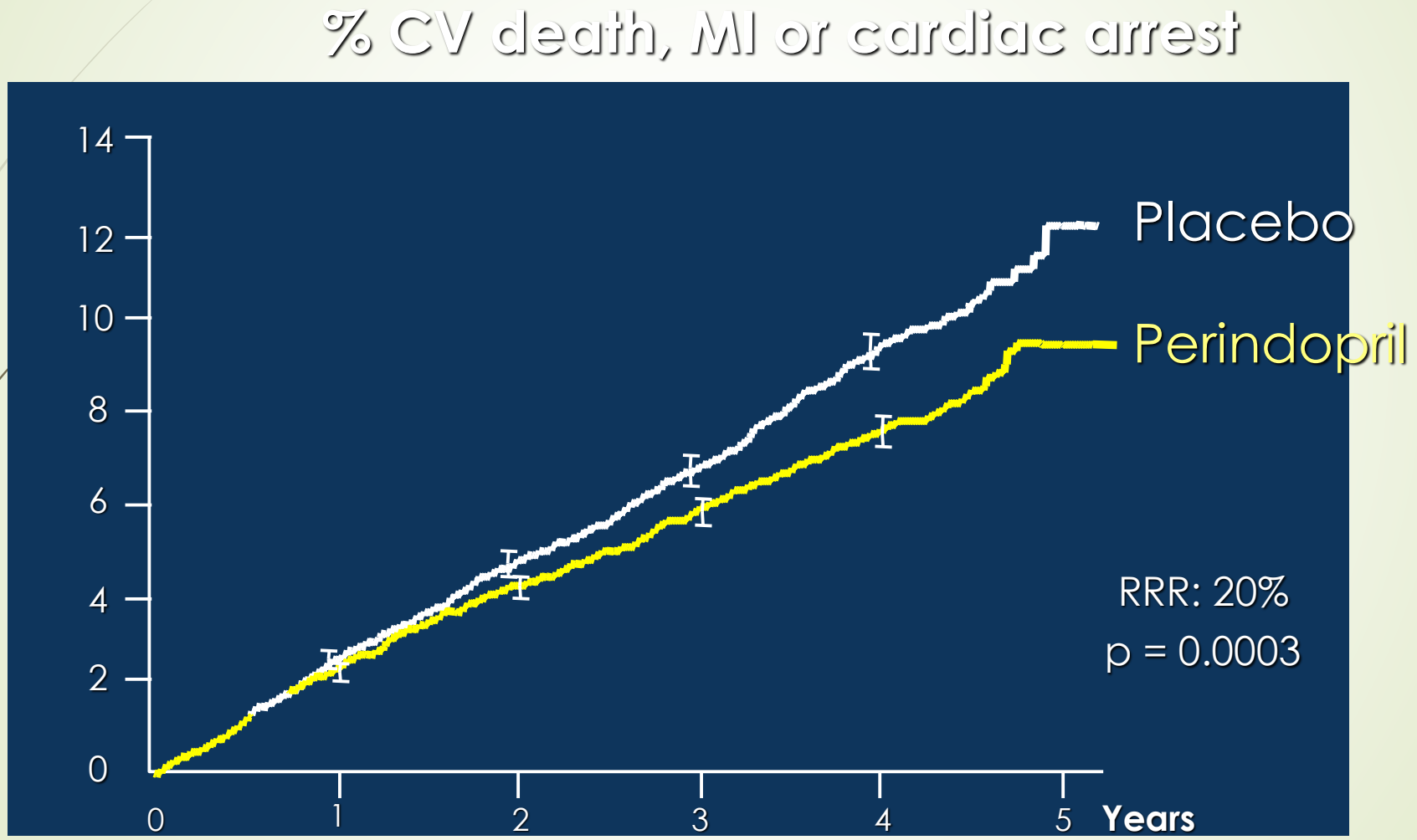
N Engl J Med, January 20, 2000

EUROPA STUDY

- The use of perindopril in the EUROPA study, involving 13,655 patients with stable coronary disease and no clinical evidence of HF, reduced the risk of cardiovascular death, MI or cardiac arrest.

- The results of the EUROPA study further demonstrated that these ACE inhibitors should be considered in all patients with CAD

Primary End Point



Placebo annual event rate: 2.4%

EUROPEAN SOCIETY OF CARDIOLOGY®

European Heart Journal (2012) **33**, 2088–2097
doi:10.1093/eurheartj/ehs075

CLINICAL RESEARCH
Hypertension

Angiotensin-converting enzyme inhibitors reduce mortality in hypertension: a meta-analysis of randomized clinical trials of renin–angiotensin–aldosterone system inhibitors involving 158 998 patients

Laura C. van Vark[1]*, Michel Bertrand[2], K. Martijn Akkerhuis[1], Jasper J. Brugts[1], Kim Fox[3], Jean-Jacques Mourad[4], and Eric Boersma[1]

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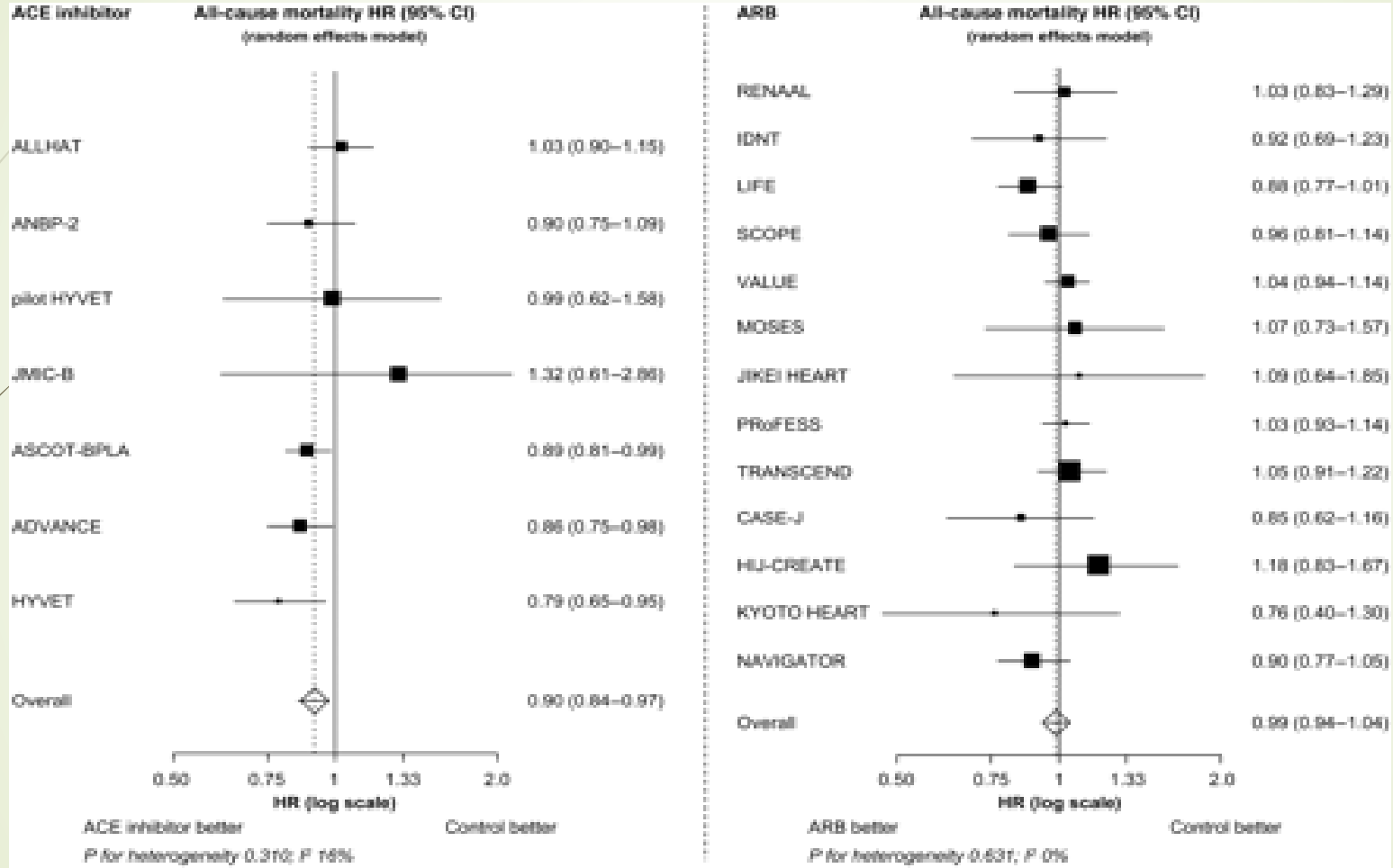
Received 24 August 2011; revised 15 February 2012; accepted 5 March 2012; online publish-ahead-of-print 17 April 2012

The all-cause mortality treatment effect of ACE inhibitor and ARB trials.



European Heart Journal, Volume 33, Issue 16, August 2012, Pages 2088–2097, https://doi.org/10.1093/eurheartj/ehs075

CONCLUSSION

- The overall reduction in all-cause mortality resulted almost completely from the class of ACE inhibitors, which were associated with a statistically significant 10% relative reduction in all-cause mortality, whereas no mortality reduction was observed with the ARBs
- BP-dependent beneficial effects in the prevention of stroke and heart failure are similar for ACE inhibitors and ARBs
- ACE inhibitors and ARBs have also been shown to be equally effective in preventing atrial fibrillation and new-onset diabetes
- In view of the high prevalence of hypertension in the general population, widespread use of ACE inhibitors may therefore result in a considerable gain in lives saved

Original Investigation

May 2014

Effect of Angiotensin-Converting Enzyme Inhibitors and Angiotensin II Receptor Blockers on All-Cause Mortality, Cardiovascular Deaths, and Cardiovascular Events in Patients With Diabetes Mellitus

A Meta-analysis

Jun Cheng, MD[1]; Wen Zhang, MMed[2]; Xiaohui Zhang, MMed[1]; et al

» Author Affiliations | Article Information

JAMA Intern Med. 2014;174(5):773-785. doi:10.1001/jamainternmed.2014.348

From: **Effect of Angiotensin-Converting Enzyme Inhibitors and Angiotensin II Receptor Blockers on All-Cause Mortality, Cardiovascular Deaths, and Cardiovascular Events in Patients With Diabetes Mellitus: A Meta-analysis**

JAMA Intern Med. 2014;174(5):773-785. doi:10.1001/jamainternmed.2014.348

Study or Subgroup	ACEIs Events	ACEIs Total	Control Events	Control Total	Risk Ratio M-H, Random, 95% CI	Weight, %
Placebo						
ADVANCE study,[34] 2007	408	5569	471	5571	0.87 (0.76-0.98)	21.1
Bauer et al,[41] 1992	1	18	0	15	2.53 (0.11-57.83)	0.1
DIABHYCAR study,[14] 2004	334	2443	324	2469	1.04 (0.90-1.20)	19.8
HOPE study,[30] 2000	196	1808	248	1769	0.77 (0.65-0.92)	17.1
Laffel et al,[42] 1995	1	70	0	73	3.13 (0.13-75.49)	0.1
Lewis et al,[25] 1993	8	207	14	202	0.56 (0.24-1.30)	1.7
Nankervis et al,[43] 1998	0	17	3	14	0.12 (0.01-2.13)	0.2
Parving et al,[44] 1989	1	15	1	17	1.13 (0.08-16.59)	0.2
PERSUADE substudy,[26] 2005	73	721	93	781	0.85 (0.64-1.14)	10.2
Ravid et al,[38] 1998	3	77	2	79	1.54 (0.26-8.96)	0.4
Sano et al,[45] 1994	1	31	0	31	3.00 (0.13-70.92)	0.1
Subtotal		**10976**		**11021**	**0.89 (0.79-0.99)**	**71.1**
Total Events	**1026**		**1156**			
Heterogeneity: $\tau^2=0.01$; $\chi^2=12.47$, $df=10$, $P=.25$; $I^2=20\%$						
Test for overall effect: $Z=2.13$, $P=.03$						
Active						
ABCD study,[33] 1998	13	235	27	235	0.48 (0.25-0.91)	2.9
Bakris et al,[40] 1996	1	18	5	34	0.38 (0.05-2.99)	0.3
CAPPP study,[29] 2001	20	309	34	263	0.50 (0.30-0.85)	4.1
DETAIL study,[54] 2004	6	130	6	120	0.92 (0.31-2.78)	1.0
FACET study,[31] 1998	4	189	5	191	0.81 (0.22-2.96)	0.8
Fogari et al,[37] 2002	3	102	4	103	0.76 (0.17-3.30)	0.6
JMIC-B study,[27] 2004	5	173	2	199	2.88 (0.57-14.64)	0.5
STOP-2 substudy,[24] 2000	56	235	67	253	0.90 (0.66-1.22)	9.4
UKPDS 39 study,[32] 1998	75	400	59	358	1.14 (0.83-1.55)	9.3
Subtotal		**1791**		**1756**	**0.80 (0.60-1.08)**	**28.9**
Total Events	**183**		**209**			
Heterogeneity: $\tau^2=0.06$; $\chi^2=13.26$, $df=8$, $P=.10$; $I^2=40\%$						
Test for overall effect: $Z=1.45$, $P=.15$						
Total		**12767**		**12777**	**0.87 (0.78-0.98)**	**100.0**
Total Events	**1209**		**1365**			
Heterogeneity: $\tau^2=0.01$; $\chi^2=25.79$, $df=19$, $P=.14$; $I^2=26\%$						
Test for overall effect: $Z=2.38$, $P=.02$						

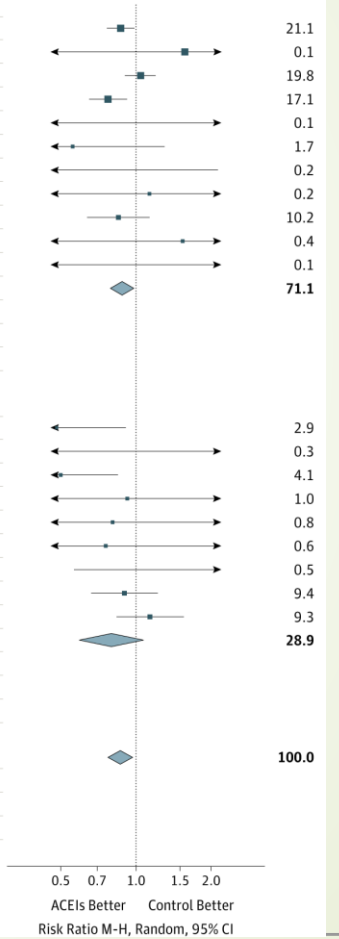
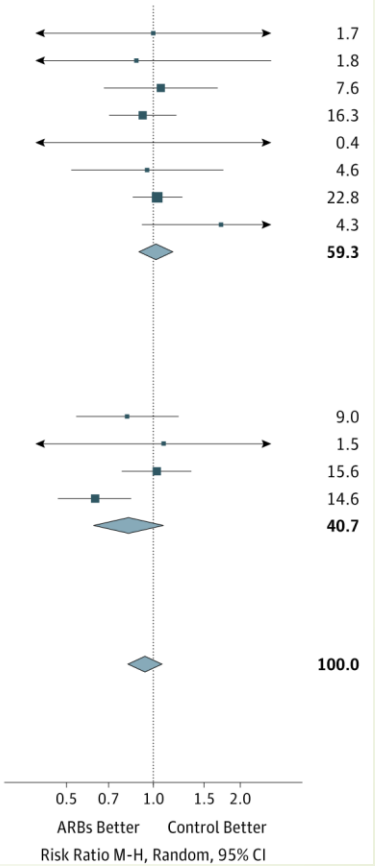


Figure Legend:

From: **Effect of Angiotensin-Converting Enzyme Inhibitors and Angiotensin II Receptor Blockers on All-Cause Mortality, Cardiovascular Deaths, and Cardiovascular Events in Patients With Diabetes Mellitus: A Meta-analysis**

JAMA Intern Med. 2014;174(5):773-785. doi:10.1001/jamainternmed.2014.348

Study or Subgroup	ARBs Events	ARBs Total	Control Events	Control Total	Risk Ratio M-H, Random, 95% CI	Weight, %
Placebo						
DIRECT-Prevent 1 study,[49] 2009	7	710	7	710	1.00 (0.35-2.84)	1.7
DIRECT-Protect 1 study,[49] 2009	7	951	8	951	0.88 (0.32-2.40)	1.8
DIRECT-Protect 2 study,[50] 2008	37	949	35	953	1.06 (0.67-1.67)	7.6
IDNT (placebo) study,[12] 2001	87	579	93	569	0.92 (0.70-1.20)	16.3
IRMA study,[48] 2001	3	194	1	201	3.11 (0.33-29.62)	0.4
ORIENT study,[47] 2011	19	288	20	289	0.95 (0.52-1.75)	4.6
RENAAL study,[46] 2001	158	751	155	762	1.03 (0.85-1.26)	22.8
ROADMAP study,[15] 2011	26	2232	15	2215	1.72 (0.91-3.24)	4.3
Subtotal		**6654**		**6650**	**1.03 (0.89-1.18)**	**59.3**
Total Events	**344**		**334**			
Heterogeneity: $\tau^2=0.00$; $\chi^2=4.32$, $df=7$, $P=.74$; $I^2=0\%$						
Test for overall effect: $Z=0.36$, $P=.72$						
Active						
CASE-J study,[51] 2010	40	1011	49	1007	0.81 (0.54-1.22)	9.0
DETAIL trial,[54] 2004	6	120	6	130	1.08 (0.36-3.27)	1.5
IDNT (active) study,[12] 2001	87	579	83	567	1.03 (0.78-1.35)	15.6
LIFE study,[28] 2002	63	586	104	609	0.63 (0.47-0.84)	14.6
Subtotal		**2296**		**2313**	**0.82 (0.62-1.09)**	**40.7**
Total Events	**196**		**242**			
Heterogeneity: $\tau^2=0.04$; $\chi^2=5.92$, $df=3$, $P=.12$; $I^2=49\%$						
Test for overall effect: $Z=1.38$, $P=.17$						
Total		**8950**		**8963**	**0.94 (0.82-1.08)**	**100.0**
Total Events	**540**		**576**			
Heterogeneity: $\tau^2=0.01$; $\chi^2=14.01$, $df=11$, $P=.23$; $I^2=22\%$						
Test for overall effect: $Z=0.85$, $P=.39$						



Twenty-three of 35 identified trials compared ACEIs with placebo or active drugs (32 827 patients)

Thirteen compared ARBs with no therapy (controls) (23 867 patients).

When compared with controls (placebo/active treatment), ACEIs significantly reduced the

Risk of all-cause mortality by 13% (RR, 0.87; 95% CI, 0.78-0.98),

CV deaths by 17% (0.83; 0.70-0.99),

Major CV events by 14% (0.86; 0.77-0.95), including myocardial infarction by 21% (0.79; 0.65-0.95)

Heart failure by 19% (0.81; 0.71-0.93).

Treatment with ARBs did not significantly affect

All-cause mortality

(RR, 0.94; 95% CI, 0.82-1.08)

CV death rate (1.21; 0.81-1.80),

Major CV events (0.94; 0.85-1.01)

with the exception of heart failure

(0.70; 0.59-0.82

Our meta-analysis shows that ACEIs reduce all-cause mortality, CV mortality, and major CV events in patients with DM, whereas ARBs have no beneficial effects on these outcomes. Thus, ACEIs should be considered as first-line therapy to limit the excess mortality and morbidity in this population.

European Journal of Preventive Cardiology

EAPC
European Association of Preventive Cardiology
European Society of Cardiology

Angiotensin-converting enzyme inhibitors reduce mortality compared to angiotensin receptor blockers: Systematic review and meta-analysis

Gabriel LO Salvador, Vinicius M Marmentini, Willian R Cosmo, more...

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First Published September 1, 2017 | Research Article | Check for updates

https://doi.org/10.1177/2047487317728766

Article information

Altmetric 6

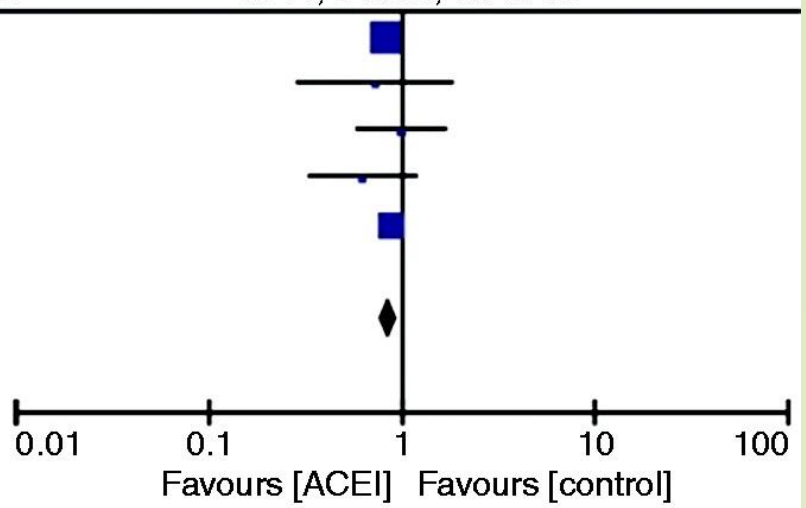
TOTAL DEATHS

(a)

Study or subgroup	ACEI Events	ACEI Total	Control Events	Control Total	Weight	Odds ratio M-H, Fixed, 95% CI
Yusuf et al, 2000[31]	482	4645	569	4652	52.8%	0.83 [0.73, 0.95]
SCAT, 2000[30]	8	229	11	231	1.1%	0.72 [0.29, 1.83]
QUIET, 2001[35]	27	878	27	872	2.7%	0.99 [0.58, 1.71]
MacMahon et al, 2000[29]	16	308	25	309	2.5%	0.62 [0.33, 1.19]
EUROPA, 2003[37]	375	6110	420	6108	40.9%	0.89 [0.77, 1.02]
Total (95% CI)		12170		12172	100.0%	0.85 [0.78, 0.93]
Total events	908		1052			

Heterogeneity: $Chi^2 = 1.75$, $df = 4$ ($P = 0.78$); $I^2 = 0\%$

Test for overall effect: $Z = 3.39$ ($P = 0.0007$)

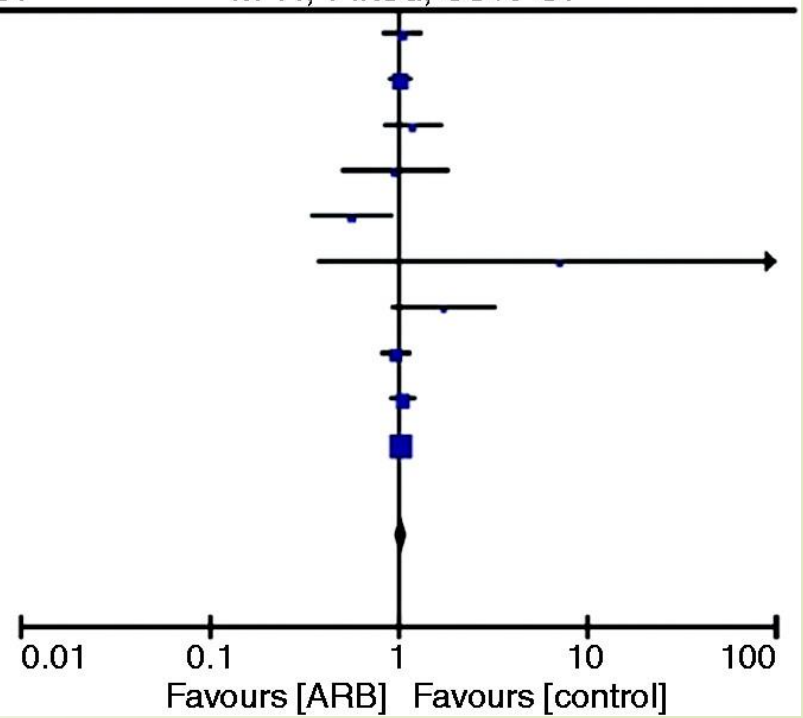


(b)

Study or subgroup	ARB Events	ARB Total	Control Events	Control Total	Weight	Odds ratio M-H, Fixed, 95% CI
Brenner et al, 2001[32]	158	751	155	762	6.5%	1.04 [0.81, 1.34]
Cohn et al, 2001[33]	495	2511	484	2499	20.8%	1.02 [0.89, 1.18]
HIJ-CREATE, 2009[43]	69	1024	59	1025	2.9%	1.18 [0.83, 1.69]
Imai et al, 2011[44]	19	282	20	284	1.0%	0.95 [0.50, 1.83]
Maggioni et al, 2002[36]	32	185	49	181	2.2%	0.56 [0.34, 0.93]
RENAAL, 2004[39]	3	751	0	762	0.0%	7.13 [0.37, 138.29]
ROADMAP, 2011[45]	26	2232	15	2215	0.8%	1.73 [0.91, 3.27]
SCOPE, 2003[38]	259	2477	266	2460	12.8%	0.96 [0.80, 1.15]
TRANSCEND, 2008[41]	364	2944	349	2964	16.3%	1.06 [0.90, 1.24]
Yusuf et al, 2008[42]	755	10146	740	10186	36.6%	1.03 [0.92, 1.14]
Total (95% CI)		23303		23338	100.0%	1.02 [0.96, 1.09]
Total events	2180		2137			

Heterogeneity: $Chi^2 = 10.95$, $df = 9$ ($P = 0.28$); $I^2 = 18\%$

Test for overall effect: $Z = 0.74$ ($P = 0.46$)



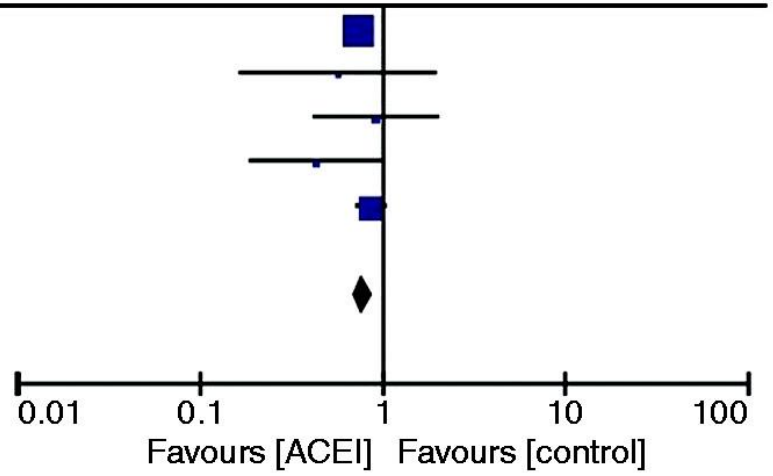
TOTAL CVS DEATHS

(a)

Study or subgroup	ACEI Events	ACEI Total	Control Events	Control Total	Weight	Odds ratio M-H, Fixed, 95% CI
Yusuf et al, 2000[31]	282	4645	377	4652	56.0%	0.73 [0.62, 0.86]
SCAT, 2000[30]	4	229	7	231	1.1%	0.57 [0.16, 1.97]
QUIET, 2001[35]	12	878	13	872	2.0%	0.92 [0.42, 2.02]
MacMahon et al, 2000[29]	8	308	18	309	2.8%	0.43 [0.18, 1.01]
EUROPA, 2003[37]	215	6110	249	6108	38.1%	0.86 [0.71, 1.03]
Total (95% CI)		12170		12172	100.0%	0.77 [0.69, 0.87]
Total events	521		664			

Heterogeneity: $Chi^2 = 3.87$, df = 4 ($P = 0.42$); $I^2 = 0\%$

Test for overall effect: $Z = 4.25$ ($P < 0.0001$)

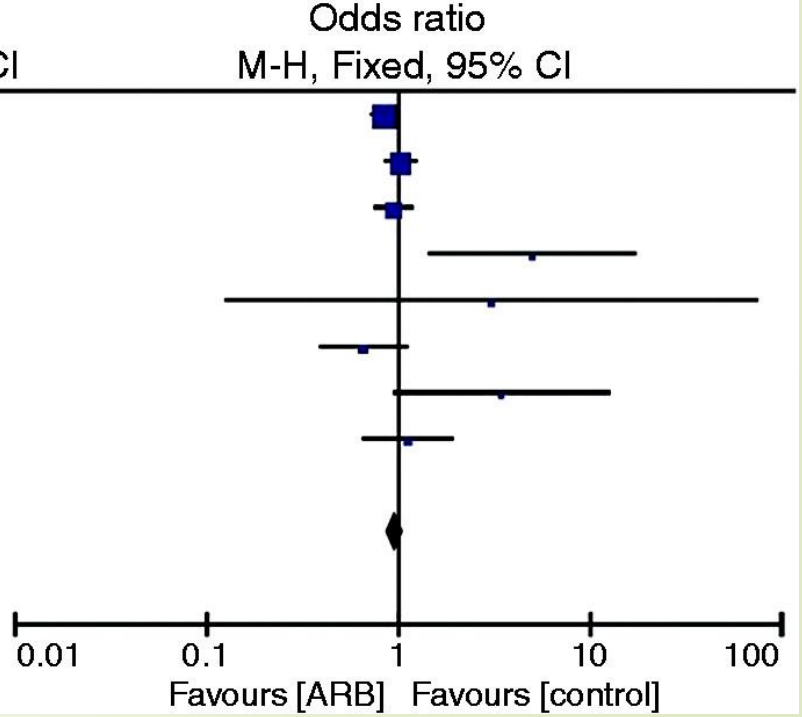


(b)

Study or subgroup	ARB Events	ARB Total	Control Events	Control Total	Weight	Odds ratio M-H, Fixed, 95% CI
Yusuf et al, 2008[42]	223	10146	263	10186	38.3%	0.85 [0.71, 1.02]
TRANSCEND, 2008[41]	227	2944	223	2964	30.6%	1.03 [0.85, 1.24]
SCOPE, 2003[38]	145	2477	152	2460	21.4%	0.94 [0.75, 1.19]
ROADMAP, 2011[45]	15	2232	3	2215	0.4%	4.99 [1.44, 17.26]
RENAAL, 2004[39]	1	751	0	762	0.1%	3.05 [0.12, 74.94]
Maggioni et al, 2002[36]	29	185	40	181	5.1%	0.66 [0.39, 1.11]
Imai et al, 2011[44]	10	282	3	284	0.4%	3.44 [0.94, 12.65]
HIJ-CREATE, 2009[43]	28	1024	25	1025	3.6%	1.12 [0.65, 1.94]
Total (95% CI)		20041		20077	100.0%	0.95 [0.86, 1.06]
Total events	678		709			

Heterogeneity: $Chi^2 = 15.57$, df = 7 ($P = 0.03$); $I^2 = 55\%$

Test for overall effect: $Z = 0.84$ ($P = 0.40$)



Conclusion

Angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker use is similar in preventing major cardiovascular outcomes regarding acute myocardial infarction, stroke and heart failure/hospitalisation. However, the use of angiotensin-converting enzyme inhibitors is more effective in reducing total deaths and cardiovascular deaths than angiotensin II receptor blockers.

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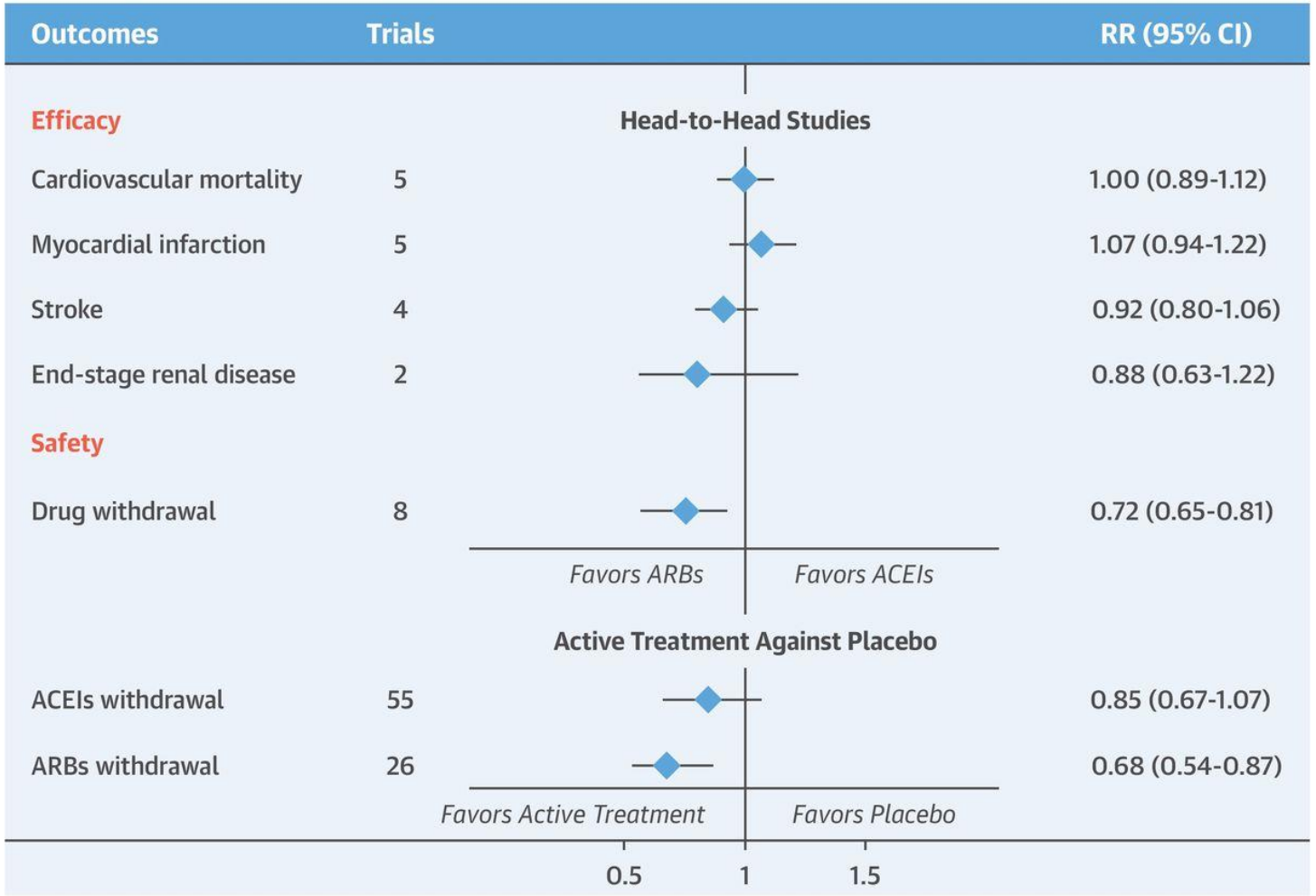
Angiotensin-Converting Enzyme Inhibitors in Hypertension
To Use or Not to Use?

Franz H. Messerli, Sripal Bangalore, Chirag Bavishi and Stefano F. Rimoldi

CENTRAL ILLUSTRATION: Efficacy and Safety of ACE Inhibitors and ARBs From Head-to-Head Studies and Compared With Placebo Trials



Messerli, F.H. et al. J Am Coll Cardiol. 2018;71(13):1474-82.

Franz H. Messerli et al. JACC 2018;71:1474-1482

Cardio-protection form ACE Inhibitors in At Risk Patients: Evidences from recent meta-analyses

	ACEI vs Placebo				ARB vs Placebo			
	Myocardial Infarction	Cardiovascular Death	All-Cause Death	N	Myocardial Infarction	Cardiovascular Death	All-Cause Death	N
High risk, Bangalore et al[3]	0.83 (0.78–0.9)	0.83 (0.7–0.99)	0.89 (0.80–1.0)	62 398	0.93 (0.85–1.03)	1.02 (0.92–1.14)	1.01 (0.96–1.06)	66 282
High risk, Savarese[4]	0.81 (0.75–0.88)	0.9 (0.78–1.03)	0.91 (0.85–0.98)	53 791	0.9 (0.8–1.02)	1.03 (0.85–1.26)	1.01 (0.94–1.08)	54 421
Diabetes mellitus, Cheng[5]	NA	0.83 (0.70–0.99)	0.89 (0.79–0.99)	21 997	NA	1.21 (0.81–1.8)	1.03 (0.89–1.18)	13 304
Hypertension, Thomopoulos et al[6]	NA	0.87 (0.78–0.98)	0.91 (0.85–0.98)	49 440	NA	1.03 (0.94–1.13)	1.01 (0.97–1.06)	65 256

Values indicate hazard ratio (95% confidence interval). ACEI indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin II receptor blocker.

Risk of MI, CV Mortality, and All-Cause Mortality in Parallel Meta-Analyses of Placebo-Controlled Trials of ACEI & ARBs

Overall results demonstrated

- 9% to 11% risk reduction in all-cause mortality (P<0.05)
- 10% to 17% risk reduction in cardiovascular mortality (P<0.05)
- 17% to 19% risk reduction in MI (P<0.05)

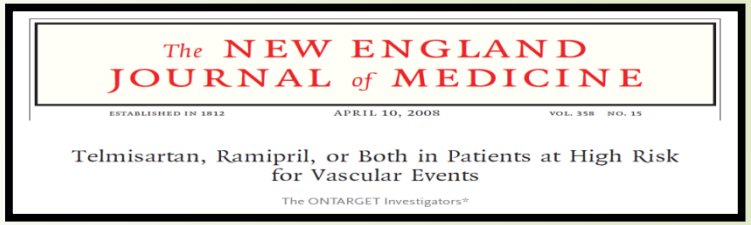
Circulation. 2017;135:2088–2090

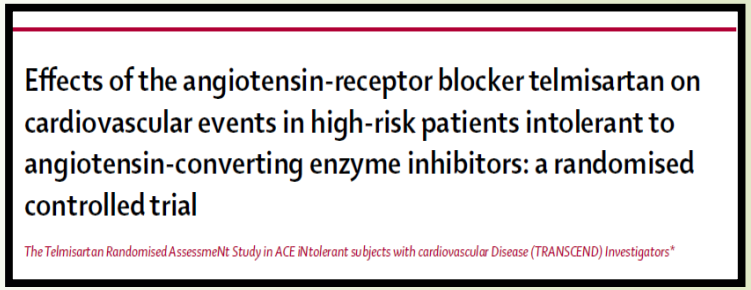
Do ARBs Increase the Risk of MI? Evidence from ONTARGET Study

ARB achieved a lower BP than ACEI (0.9/0.6 mmHg) but paradoxically had a Non significant 7% excess of MI[2]

Table 3. Incidence of the Primary Outcome, Its Components, and Death from Any Cause.

Outcome	Ramipril (N=8576)	Telmisartan (N=8542)	Combination Therapy (N=8502)	Telmisartan vs. Ramipril	Combination Therapy vs. Ramipril
	number (percent)			*risk ratio (95% CI)*	
Death from cardiovascular causes, myocardial infarction, stroke, or hospitalization for heart failure*	1412 (16.5)	1423 (16.7)	1386 (16.3)	1.01 (0.94–1.09)	0.99 (0.92–1.07)
Death from cardiovascular causes, myocardial infarction, or stroke†	1210 (14.1)	1190 (13.9)	1200 (14.1)	0.99 (0.91–1.07)	1.00 (0.93–1.09)
Myocardial infarction‡	413 (4.8)	440 (5.2)	438 (5.2)	1.07 (0.94–1.22)	1.08 (0.94–1.23)
Stroke‡	405 (4.7)	369 (4.3)	373 (4.4)	0.91 (0.79–1.05)	0.93 (0.81–1.07)
Hospitalization for heart failure‡	354 (4.1)	394 (4.6)	332 (3.9)	1.12 (0.97–1.29)	0.95 (0.82–1.10)
Death from cardiovascular causes	603 (7.0)	598 (7.0)	620 (7.3)	1.00 (0.89–1.12)	1.04 (0.93–1.17)
Death from noncardiovascular causes	411 (4.8)	391 (4.6)	445 (5.2)	0.96 (0.83–1.10)	1.10 (0.96–1.26)
Death from any cause	1014 (11.8)	989 (11.6)	1065 (12.5)	0.98 (0.90–1.07)	1.07 (0.98–1.16)





ARB (Telmisartan) was not inferior to the ACEI (Ramipril) for reducing the risk of major CV events overall, including CV death[1]

1.N Engl J Med 2008; 358:1547-1559 2. Eur Heart J. 2012 Aug;33(16):2088-97

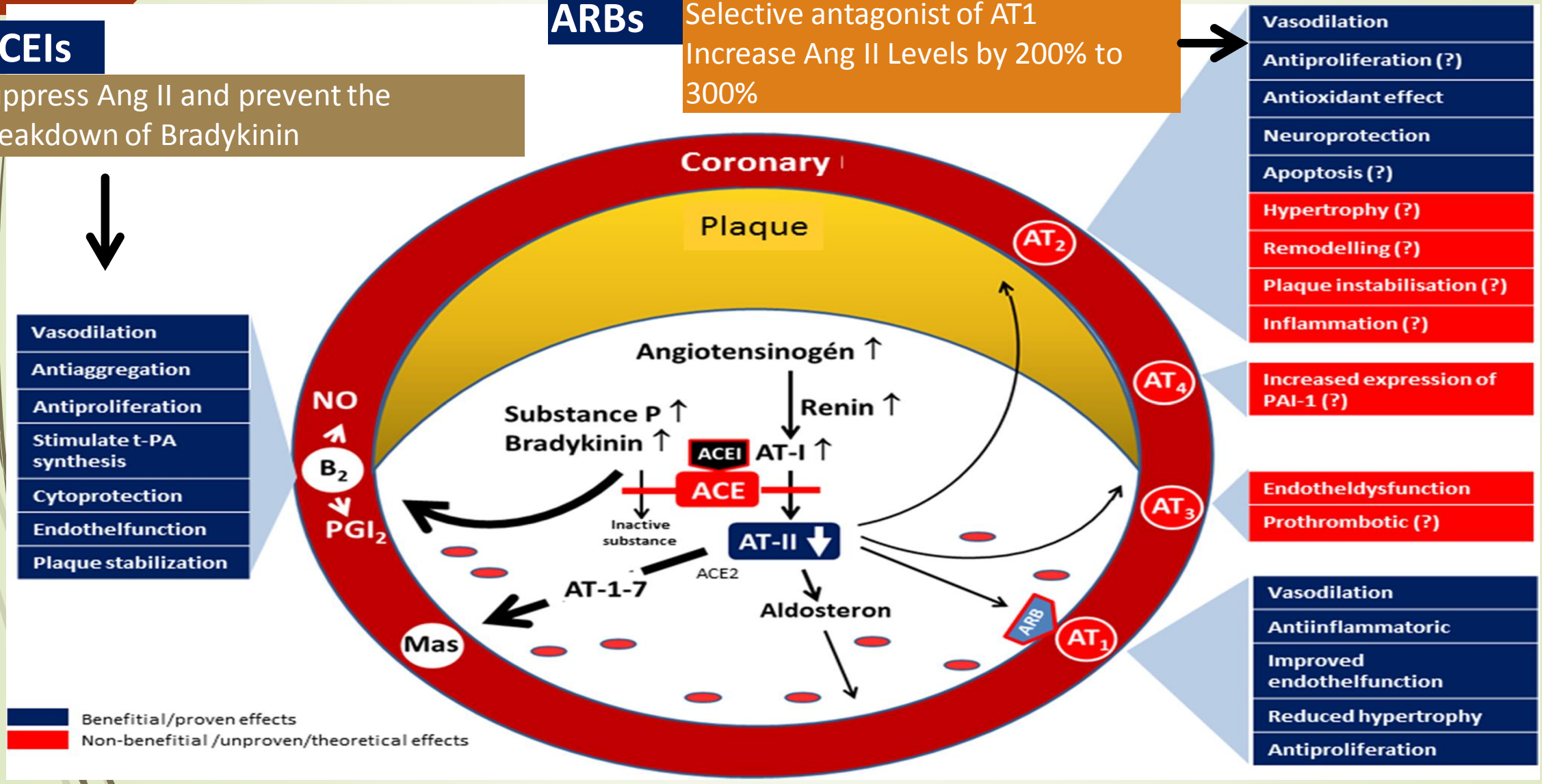
Different Mechanisms of ACE Inhibitors and ARBs

ACEIs

Suppress Ang II and prevent the breakdown of Bradykinin

ARBs

Selective antagonist of AT1
Increase Ang II Levels by 200% to 300%



CONCLUSSIONS

- Ace inhibitors have the strongest evidence in treatment and prevention of cardiovascular disease.
- Clinical trials comparing ACE and ARB blockers are rare.
- Most meta analysis studies have shown that ACE inhibitors reduce cardiovascular mortality in high risk patients when comparing with ARB blockers.
- In lower risk patients both ACE and ARB blockers has equal effect on CVS Mortality.
- Withdrawal of medication due to side effects are higher in ACE inhibitors than ARB Blockers.

CONCLUSION

“ARBs might be inferior to ACEis with respect to prevention of MI and CV death”

Biological plausibility
Clinical evidence
Meta-analyses

STILL REMAIN

“ACEis is the preferred choice as initial therapy (or an ARB if an ACEi is not tolerated) at present hypertension treatment recommendation”

.