

P2Y12 Inhibitor or Aspirin for Long-term Antiplatelet Management

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• Within the past 12 months I have had a financial interest/arrangement or affiliation with the organization(s) listed below

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Speaker's fee

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InnoN Pharmaceutical

Daewoong Pharmaceutical

JW Pharmaceutical





2018 ESC/EACTS Guideline:

Algorithm for the use of antithrombotic drugs in patients undergoing PCI



SNUH 서울대학교병원

Neumann FJ, et al. Eur Heart J. 2018. doi: 10.1093/eurheartj/ehy394.



ENCORE SEOUL



Background

After due duration of DAPT, the comparative efficacy and safety of monotherapy with an oral P2Y 12 receptor inhibitor or aspirin remains incompletely understood in patients with established coronary artery disease and <u>current guidelines</u> recommend aspirin as first line treatment after DAPT cessation.

Post-interventional and maintenance treatment		
Life-long single antiplatelet therapy, usually aspirin, is recommended. ^{681,683}	I	A
Instruction of patients about the importance of complying with antiplatelet therapy is recommended.	I.	С
In patients with SCAD treated with coronary stent implantation, DAPT consisting of clopidogrel in addition to aspirin is generally recommended for 6 months, irrespective of the stent type. ^{c 690–694}	I	A
In patients with SCAD treated with BRS, DAPT should be considered for at least 12 months and up to the presumed full absorption of the BRS, based on an individual assessment of bleeding and ischaemic risk.	lla	с





Study Design and Patient Population

• 5,530 eligible patients screened, from 37 centers in Korea



✓ Key criterias

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Patients who recieved PCI with a drug-eluting stent (DES) and maintained DAPT without any clinical event during 12 ± 6 months after PCI.

No exclusion criteria of the clinical risk factors / clinical diagnosis / complexity of the PCI

Inclusion Criteria

- a) Subject must be \geq 20 years
- b) Maintenance of DAPT for at least 12 \pm 6 months after PCI with DES

c) No history of clinical event after PCI with DES before enrollment

d) Agreement to give written informed consent

Exclusion Criteria

- a) Known hypersensitivity or contraindication to key medications
- b) Patients with active pathologic bleeding
- c) Female of childbearing potential, unless a pregnancy test is negative
- d) History of bleeding diathesis, known coagulopathy
- e) Non-cardiac co-morbid conditions with life expectancy <1 year





Trial Flow







Primary Outcome







Secondary Outcomes



Koo BK, Park KW, Kang J, Kim HS et al. Lancet 2021.





Component of Outcomes for 2 years

	Clopidogrel (n=2710)	Aspirin (n=2728)		Durahua	
	No. of pat	ients (%)	Hazard Ratio (95% CI)	P value	
All-cause death	1.9% (51)	1.3% (36)	1.43 (0.93-2.19)	0.101	
Cardiac death	0.7% (19)	0.5% (14)	1.37 (0.69-2.73)	0.374	
Non-cardiac death	1.2% (32)	0.8% (22)	1.47 (0.85-2.52)	0.167	
Non-fatal myocardial infarction	0.7% (18)	1.0% (28)	0.65 (0.36-1.17)	0.150	
Stroke	0.7% (18)	1.6% (43)	0.42 (0.24-0.73)	0.002	
Ischemic stroke	0.5% (14)	1.0% (26)	0.54 (0.28-1.04)	0.064	
Hemorrhagic stroke	0.2% (4)	0.6% (17)	0.24 (0.08-0.70)	0.010	
Readmission due to ACS	2.5% (66)	4.1% (109)	0.61 (0.45-0.82)	0.001	
Major bleeding (BARC type ≥3)	1.2% (33)	2.0% (53)	0.63 (0.41-0.97)	0.035	
Any revascularization	2.1% (56)	2.6% (69)	0.82 (0.57-1.16)	0.261	
Target lesion revascularization	0.9% (24)	1.4% (36)	0.67 (0.40-1.12)	0.130	
Target vessel revascularization	1.4% (37)	1.8% (48)	0.78 (0.50-1.19)	0.245	
Definite or probable stent thrombosis	0.4% (10)	0.6% (16)	0.63 (0.29-1.39)	0.251	
Any minor GI complications	10.2% (272)	11.9% (320)	0.85 (0.72-1.00)	0.048	

Study Design and Patient Population



5,530 eligible patients screened, from 37 centers in Korea



HOST-EXAM Extended study period

Clinical events and final clinical status ascertained at March, 2022. The vital status of all patients coss-checked via the National Health Insurance Service system.







Clinical Outcomes Primary Endpoint

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Clinical Outcomes

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Landmark analysis



of the Primary Endpoint





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Clinical Outcomes

Mortality





No. of patients	Clopidogrel (N=2431)	Aspirin (N=2286)	P value
Total mortality	150 (6.2%)	136 (6.0%)	0.753
Cardiovascular cause	69 (2.8%)	71 (3.1%)	0.587
Cardiac arrest	21	22	
Heart failure aggravation	5	3	
Cerebrovascular accident	7	3	
Unknown origin of death	36	43	
Non-cardiovascular cause	81 (3.3%)	65 (2.8%)	0.334
Malignancy	34	29	
- Gastrointestinal origin	15	12	
- Respiratory origin	8	11	
- Endocrinology origin	1	1	
- Genitourinary origin	4	3	
- Other	3	2	
- Unknown primary	3	0	
Infectious disease	4	5	
Suicide or Trauma	8	3	
Others	20	16	

	Clopidogrel group	Aspirin group				
	(events/patients)	(events/patient	s)	Hazard Ratio (95% CI)	P value	Interaction P
Age (years)						
≥65	200/1040	232/992		0.80 (0.66-0.96)	0.019	0.176
<65	110/1390	155/1294	_ _	0.65 (0.51-0.83)	<0.001	
Sex						
Male	222/1807	287/1723		0.72 (0.60-0.85)	<0.001	0.563
Female	89/624	100/563		0.79 (0.59-1.05)	0.107	
Body Mass Index	≥ 25 kg/m²					
Yes	119/1103	140/976		0.74 (0.58-0.94)	0.014	0.936
No	179/1244	231/1233	— •–	0.75 (0.61-0.91)	0.003	
Diabetes Mellitus						
Yes	128/817	165/776	— •—	0.71 (0.57-0.90)	0.004	0.764
No	182/1613	222/1510	— •–	0.75 (0.62-0.91)	0.004	
Chronic Kidney Di	sease					
Yes	77/313	95/274	——	0.67 (0.50-0.90)	0.009	0.614
No	233/2117	292/2012	—	0.74 (0.62-0.88)	0.001	
Multivessel Diseas	se					
Yes	170/1201	227/1145	— •	0.69 (0.57-0.85)	0.002	0.356
No	140/1229	159/1140		0.80 (0.64-1.00)	0.054	
Acute Myocardial	Infarction					
Yes	116/888	143/858	—— ●—	0.77 (0.60-0.98)	0.036	0.756
No	194/1542	244/1428	— •	0.72 (0.59-0.86)	<0.001	
Acute Coronary S	yndrome					
Yes	219/1758	274/1631	— •	0.72 (0.61-0.86)	<0.001	0.556
No	91/672	113/655		0.76 (0.58-1.00)	0.053	
Complex PCI						
Yes	60/530	92/499	—	0.59 (0.43-0.82)	0.002	0.138
No	249/1882	294/1769	— •—	0.78 (0.66-0.92)	0.004	
High Bleeding Ris	k					
Yes	113/461	126/390	— •—	0.71 (0.55-0.92)	0.009	0.860
No	161/1616	204/1536	— •–	0.74 (0.60-0.90)	0.004	
Proton Pump Inhit	pitor usage					
Yes	39/251	56/266		0.72 (0.48-1.08)	0.113	0.888
No	272/2180	331/2020	 _	0.74 (0.63-0.87)	<0.001	
			0.5 1.	0 1.5		
			←	\longrightarrow		
			Favors Clopidogrel	Favors Aspirin		



Subgroup Analysis

No significant interaction between the treatment effect and subgroups





The PANTHER Collaboration

- RCTs comparing monotherapy with oral P2Y12 inhibitor (i.e., clopidogrel, prasugrel, or ticagrelor) or aspirin for secondary prevention of adjudicated events in patients with established CAD w/o indication for OAC.

- 7 studies identified
- **PROSPERO** registration
 (www.crd.york.ac.uk/prospero,
 CRD42021290774)



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Gragnano F, Park KW, Kim HS, Valgimigli M et al. JACC in press 2023

Primary Efficacy Outcome: CV death, MI, stroke

CV death, MI or stroke: 5.5% vs. 6.3%; HR 0.88, 95% CI 0.79 to 0.97, P=0.014; NNTB: 123



Primary Safety Outcome: Major Bleeding

Major bleeding: 1.2% vs. 1.4%; HR 0.87, 95% CI 0.70 to 1.09, P=0.23







Key Secondary Outcome: Net Adverse Clinical Events

NACE: 6.4% vs. 7.2%; HR 0.89, 95% CI 0.81 to 0.98, P=0.02



Secondary Outcomes



Primary Efficacy Outcome: subgroup analysis

Subgroup	Ν	P2Y12i	Aspirin	HR (95% CI)	P value for	
Age		monotherapy (%)	monotherapy (%)		Interaction	
Male						
≤ 62 years	9,752	184 / 4,866 (3.8%)	245 / 4,886 (5.0%)	0.75 (0.62 to 0.90)	0.206	_ _
> 62 years	9,285	337 / 4,672 (7.2%)	337 / 4,613 (7.3%)	0.97 (0.83 to 1.13)		
Female						
≤ 67 years	2,562	56 / 1,292 (4.3%)	61 / 1,270 (4.8%)	0.93 (0.64 to 1.33)		· · · · · · · · · · · · · · · · · · ·
> 67 years	2,726	97 / 1,348 (7.2%)	119 / 1,378 (8.6%)	0.88 (0.67 to 1.15)		
Sex						
Male	19,037	521 / 9,538 (5.5%)	582 / 9,499 (6.1%)	0.88 (0.78 to 0.99)	0.921	
Female	5,288	153 / 2,640 (5.8%)	180 / 2,648 (6.8%)	0.87 (0.70 to 1.08)		
Diabetes						
Yes	6,040	193 / 3,036 (6.4%)	229 / 3,004 (7.6%)	0.83 (0.69 to 1.01)	0.504	
No	18,092	475 / 9,044 (5.3%)	525 / 9,048 (5.8%)	0.90 (0.80 to 1.02)		
Current smoker						
Yes	6,411	176 / 3,161 (5.6%)	217 / 3,250 (6.7%)	0.82 (0.67 to 0.99)	0.388	
No	17,903	498 / 9,014 (5.5%)	545 / 8,889 (6.1%)	0.90 (0.80 to 1.02)		
Peripheral artery disease						
Yes	2,203	103 / 1,085 (9.5%)	129 / 1,118 (11.5%)	0.78 (0.60 to 1.01)	0.308	
No	21,895	565 / 10,975 (5.1%)	625 / 10,920 (5.7%)	0.90 (0.80 to 1.01)		
Prior stroke						
Yes	1,598	131 / 807 (16.2%)	143 / 791 (18.1%)	0.88 (0.69 to 1.11)	0.999	
No	22,535	538 / 11,271 (4.8%)	611 / 11,264 (5.4%)	0.88 (0.78 to 0.99)		
History of CKD						
Yes	1,719	33 / 870 (3.8%)	46 / 849 (5.4%)	0.73 (0.46 to 1.14)	0.694	· · · ·
No	13,959	176 / 6,964 (2.5%)	225 / 6,995 (3.2%)	0.78 (0.64 to 0.96)		
Previous MI						
Yes	13,637	558 / 6,839 (8.2%)	607 / 6,798 (8.9%)	0.91 (0.81 to 1.02)	0.158	
No	10,648	115 / 5,320 (2.2%)	155 / 5,328 (2.9%)	0.75 (0.59 to 0.95)		
						0.50 0.75 10 20

P2Y12i monotherapy better

HR

Primary Efficacy Outcome: subgroup analysis (ii)

Subgroup	N	P2Y12i monotherapy (%)	Aspirin monotherapy (%)	HR (95% CI)	P value for interaction	
Clinical presentation						
ACS	14,746	394 / 7,394 (5.3%)	433 / 7,352 (5.9%)	0.91 (0.79 to 1.04)	0.360	
Stable CAD	9,579	280 / 4,784 (5.9%)	329 / 4,795 (6.9%)	0.82 (0.70 to 0.96)		
Type of revascularisation						
Surgical	2,547	95 / 1,260 (7.5%)	110 / 1,287 (8.5%)	0.89 (0.68 to 1.17)	0.074	· · · · · · · · · · · · · · · · · · ·
PCI	13,241	145 / 6,634 (2.2%)	206 / 6,607 (3.1%)	0.70 (0.56 to 0.86)		
Surgical & PCI	1,053	36 / 501 (7.2%)	46 / 552 (8.3%)	0.90 (0.58 to 1.40)		•
No revascularisation	7,294	393 / 3,687 (10.7%)	392 / 3,607 (10.9%)	0.98 (0.85 to 1.13)		
Bleeding risk						
PRECISE DAPT < 25	11,581	133 / 5,803 (2.3%)	168 / 5,778 (2.9%)	0.79 (0.63 to 0.99)	0.723	
PRECISE DAPT ≥ 25	2,500	55 / 1,240 (4.4%)	69 / 1,260 (5.5%)	0.84 (0.59 to 1.20)		· · · · · · · · · · · · · · · · · · ·
Use of proton pump inhibitors						
Yes	5,761	101 / 2,866 (3.5%)	108 / 2,895 (3.7%)	1.00 (0.76 to 1.31)	0.287	5
No	18,380	568 / 9,218 (6.2%)	646 / 9,162 (7.1%)	0.86 (0.77 to 0.96)		
BMI						
< 25 kg/m²	8,268	237 / 4,127 (5.7%)	260 / 4,141 (6.3%)	0.90 (0.76 to 1.08)	0.247	
25 kg/m² ≤ BMI < 30 kg/m²	10,731	278 / 5,383 (5.2%)	338 / 5,348 (6.3%)	0.81 (0.69 to 0.95)		
≥ 30 kg/m²	4,769	150 / 2,391 (6.3%)	151 / 2,378 (6.3%)	1.02 (0.81 to 1.27)		
Region						
Asia	5,770	59 / 2,876 (2.1%)	94 / 2,894 (3.2%)	0.63 (0.46 to 0.87)	0.101	←
Europe	13,974	381 / 6,997 (5.4%)	418 / 6,977 (6.0%)	0.91 (0.79 to 1.04)		
North America	4,581	234 / 2,305 (10.2%)	250 / 2,276 (11.0%)	0.92 (0.77 to 1.10)		
Type of P2Y12 inhibitor*						
Clopidogrel	15,069	554 / 7,545 (7.3%)	615 / 7,524 (8.2%)	0.89 (0.80 to 1.00)	0.524	
Ticagrelor	9,256	120 / 4,633 (2.6%)	147 / 4,623 (3.2%)	0.82 (0.64 to 1.04)		•
Aspirin dose**						
High dose	9,447	494 / 4,741 (10.4%)	522 / 4,706 (11.1%)	0.94 (0.83 to 1.06)	0.058	
Low dose	14,878	180 / 7,437 (2.4%)	240 / 7,441 (3.2%)	0.75 (0.62 to 0.91)		·

0.50 P2Y12i monotherapy better

0.75

1.0

HR

Aspirin monotherapy better

2.0



Subgroup Analysis for Major Bleeding

		Subgroup Age	N	monotherapy (%)	Aspirin monotherapy (%)	HR (95% CI)	P value for interaction						
		Male						1.					
		≤ 52 years	9,752	42 / 4,866 (0.9%)	38 / 4,886 (0.8%)	1.08 (0.70 to 1.68)	0.713						
		Female	9,200	1314,012 (1.0%)	5574,015 (2.076)	0.00 (0.09 10 1.09)							
		≤ 67 years	2,562	9 / 1,292 (0.7%)	12 / 1,270 (0.9%)	0.78 (0.33 to 1.85)		· · ·					
		> 67 years	2,726	20 / 1,348 (1.5%)	24 / 1,378 (1.7%)	0.85 (0.47 to 1.54)		• •					
		Sex											
		Male	19,037	117 / 9,538 (1.2%)	131 / 9,499 (1.4%)	0.89 (0.69 to 1.14)	0.781						
		Female	5,288	29 / 2,640 (1.1%)	36 / 2,648 (1.4%)	0.81 (0.50 to 1.33)		· • •					
		Diabetes	2000										
		Yes	6,040	45 / 3,036 (1.5%)	60 / 3,004 (2.0%)	0.75 (0.51 to 1.10)	0.330						
		Current smoker	10,082	10073,044 (1.1%)	10079,046 (1.276)	0.54 (0.72 to 1.24)							
		Yes	6.411	28 / 3.161 (0.9%)	43 / 3.250 (1.3%)	0.64 (0.40 to 1.03)	0.166						
		No	17,903	118 / 9,014 (1.3%)	124 / 8,889 (1.4%)	0.95 (0.74 to 1.22)							
		Peripheral artery disease		2. 0.0 5		A		20					
Type of P2Y12 inhibitor*													
Clopidogrel	15,069	82 / 7,545 (1.1	%)	109 / 7,	524 (1.4%)	0.75	(0.56 to 1	.00)	0.098	_			
Ticagrelor	9,256	64 / 4,633 (1.4	%)	58 / 4,	623 (1.3%)	1.10	(0.77 to 1	.57)			_		—
Aspirin dose**													
High dose	9,447	48 / 4,741 (1.0	1%)	55 / 4,	706 (1.2%)	0.87	(0.59 to 1	.27)	0.958	-		•——	
Low dose	14,878	98 / 7,437 (1.3	%)	112 / 7,	441 (1.5%)	0.88	(0.67 to 1	.15)				▶ <u> </u>	
										0.50	0.75	10	20
										0.00		HR	2.0
		Bleeding risk					2022						
		PRECISE DAPT < 25	11,581	66 / 5,803 (1.1%)	60 / 5,778 (1.0%)	1.08 (0.76 to 1.54)	0.229						
		PRECISE DAPT 2 25	2,500	3071,240 (2.4%)	4271,200 (3.3%)	0.75 (0.47 to 1.19)							
		Yes	5.761	49 / 2.866 (1.7%)	50 / 2 895 (1.7%)	1.00 (0.68 to 1.49)	0.478						
		No	18,380	96 / 9,218 (1.0%)	116 / 9,162 (1.3%)	0.83 (0.63 to 1.08)							
		BMI											
		< 25 kg/m²	8,268	47 / 4,127 (1.1%)	73 / 4,141 (1.8%)	0.65 (0.45 to 0.94)	0.120	·					
		25 kg/m ² ≤ BMI < 30 kg/m ²	10,731	66 / 5,383 (1.2%)	63 / 5,348 (1.2%)	1.05 (0.74 to 1.48)			-				
		≥ 30 kg/m²	4,769	30 / 2,391 (1.3%)	27 / 2,378 (1.1%)	1.08 (0.64 to 1.82)		•					
		Region	5 330				0.000						
		Asia	5,770	34 / 2,876 (1.2%)	55 / 2,894 (1.9%) 85 / 6,077 (1.2%)	0.62 (0.41 to 0.95)	0.089	· · · · ·					
		North America	4 581	20 / 2 305 (0.9%)	27 / 2 276 (1 2%)	0.73 (0.41 to 1.30)							
		Type of P2Y12 inhibitor*	-,	2012,000 (0.070)	21 / 2,210 (1.2/0)			24 A					
		Clopidogrel	15,069	82 / 7,545 (1.1%)	109 / 7,524 (1.4%)	0.75 (0.56 to 1.00)	0.098						
		Ticagrelor	9,256	64 / 4,633 (1.4%)	58 / 4,623 (1.3%)	1.10 (0.77 to 1.57)							
		Aspirin dose**											
		High dose	9,447	48 / 4,741 (1.0%)	55 / 4,706 (1.2%)	0.87 (0.59 to 1.27)	0.958						
		Low dose	14,878	98 / 7,437 (1.3%)	112 / 7,441 (1.5%)	0.88 (0.67 to 1.15)		,					
SNUH V 서울대학교병원								0.50 0.75 1.0 HR	2.0				

Aspirin monotherapy better

P2Y12i monotherapy



Summary and Conclusions (I)

- 1. HOST EXAM was the first study to compare clopidogrel vs aspirin for secondary
- prevention in a dedicated PCI population in the contemporary era of high intensity statin
- 2. Clopidogrel was superior to aspirin for the composite of all-cause death, nonfatal MI, stroke, readmission due to ACS, and BARC type ≥3 bleeding.
- 3. The benefit of clopidogrel was also observed for the thrombotic composite outcomes as well as any bleeding. Results were consistent in various subgroups
- 4. Extended follow up (median 5.8yrs) of the HOST EXAM showed continued benefit of clopidogrel over aspirin with no differences in all-cause or cardiovascular mortality.



Summary and Conclusions (II)

5. The PANTHER IPD meta-analysis studied whether P2Y12 inhibitor or aspirin monotherapy should be the standard in chronic mx of CAD patients.

6. P2Y12 inhibitor monotherapy was associated with significantly lower rates of the composite of CV death, MI, stroke, mainly due to lower rates of MI, which resulted in a reduced risk of net adverse clinical events.

7. Major bleeding was similar but GI bleeding and hemorrhagic stroke were lower with P2Y12 inhibitor monotherapy.

8. Based on the HOST EXAM RCT and the PANTHER analysis, it may be reasonable to use clopidogrel over aspirin as chronic antiplt monotherapy in pts with stabilized CAD