ORIGINAL ARTICLE

Clinical Outcomes after Primary Percutaneous Coronary Intervention in Octogenarians with ST-Segment Elevation Myocardial Infarction

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Background: Older age is a significant predictor of adverse outcomes in patients with acute ST-segment elevation myocardial infarction (STEMI). However, data on clinical outcomes in octogenarian patients with STEMI undergoing primary percutaneous coronary intervention (PCI) is limited.

Objective: To determine the one-year mortality after primary PCI in octogenarian patients with STEMI undergoing primary PCI.

Materials and Methods: The present study was a retrospective descriptive study of STEMI patients undergoing primary PCI at Siriraj Hospital between July 1, 2010, and June 30, 2016. Patients were divided into two groups, octogenarians, aged 80 years or older, and non-octogenarians, younger than 80 years.

Results: Four hundred ninety-three STEMI patients who underwent primary PCI were analyzed in the present study, among whom 9.7% were octogenarians. There were 48 octogenarian patients, and their mean age was 83.6±3.6 years old. Females were more prevalent in octogenarians at 50% versus 23.6% (p<0.001). Octogenarian patients presented with higher-risk features, including a greater incidence of cardiogenic shock at 22.9% versus 11.7% (p=0.027), Killip class II or greater at 39.6% versus 23.4% (p=0.014), a higher GRACE risk score at 200.4±35.5 versus 155.5±42.0 (p<0.001), a higher prevalence of multivessel coronary artery disease (CAD) at 75.0% versus 57.8% (p=0.021), a higher percentage of chronic kidney disease at 66.7% versus 27.4% (p<0.001), and a lower left ventricular ejection fraction at 44.3±11.8% versus 50.0±13.5% (p=0.006). The 1-year all-cause mortality in octogenarians was 29.8% versus 14.7% in non-octogenarians (unadjusted HR 2.13, 95% CI 1.19 to 3.81, p=0.010) and the 1-year MACE rate in octogenarians was 55.6% versus 31.5% (unadjusted HR 2.02, 95% CI 1.32 to 3.09, p=0.001). After adjusting for differences in baseline characteristics, there remained significant differences in 1-year all-cause mortality (adjusted HR 2.18, 95% CI 1.19 to 3.97, p=0.011) and MACE between both groups (adjusted HR 2.00, 95% CI 1.29 to 3.09, p=0.002).

Conclusion: In the population of STEMI patients who underwent primary PCI, octogenarians exhibited a 1-year all-cause mortality rate of 29.8% and a 1-year MACE rate of 55.6%. After adjustments for differences in baseline characteristics, there were significant differences in 1-year all-cause mortality and MACE between octogenarian and non-octogenarian patients.

Keywords: Octogenarian patients; ST segment elevation myocardial infarction; Primary percutaneous coronary intervention

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In recent years, the elderly population has increased significantly. According to estimates by the World Health Organization, the number of people aged 60 and over is expected to double from 12% to 22% between 2015 and 2050, while those aged 80 years and above will increase to 125 million[1]. Cardiovascular diseases are prevalent in the elderly population[2], with coronary artery disease being a leading cause of morbidity and mortality in this age group[3].

In Western cohorts, it is estimated that around 13% of ST-segment elevation myocardial infarctions (STEMI) occur in patients aged 80 and above[4]. Approximately one-third of patients with acute coronary syndrome are over the age of 75[5,6]. For STEMI patients presenting within 12 hours of symptom onset, especially those aged between 80 and 89[7-9], a primary percutaneous coronary intervention

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(PCI) is the recommended treatment strategy. While primary PCI is associated with significantly higher survival rates compared to fibrinolysis, these findings are primarily based on subgroup analyses[10-13]. Nevertheless, older age remains a significant predictor of adverse outcomes in STEMI patients[14,15].

In the Korean Acute Myocardial Infarction Registry (KAMIR), Yamanaka et al.[16] reported that octogenarians with STEMI undergoing PCI with drug-eluting stents had an in-hospital mortality rate of 12.7%, which was significantly higher than the 3.6% observed in non-octogenarian patients. Similarly, the Thai Registry in Acute Coronary Syndrome (TRACS) reported an in-hospital mortality rate of 5.3% among acute STEMI patients[17]. The mean age of STEMI patients was 60.9±13 years, with 67.3% receiving reperfusion treatment. Among these, the use of thrombolytic therapy and primary PCI were 42.6% and 24.7%, respectively. Kiatchoosakun et al.[8] proposed the following prognostic factors to be associated with in-hospital mortality in patients with acute STEMI who underwent primary PCI, which is age more than 60 years, left ventricular ejection fraction (LVEF) under 40%, and a final thrombolysis in myocardial infarction (TIMI) flow grade 0 or 1. Age has been shown to be a significant predictor of in-hospital mortality in patients with STEMI undergoing primary PCI in the Thai population. However, data regarding clinical outcomes and predictors of adverse outcomes for octogenarian STEMI patients in Thailand remains limited.

The aim of the present study was to determine the one-year clinical outcomes in patients aged 80 and above, as octogenarian patients who underwent primary PCI for STEMI compared to patients below 80, as non-octogenarian patients, and to identify independent predictors of one-year mortality and major adverse cardiac events (MACE).

Material and Methods

Study design

The present study was a retrospective descriptive study conducted at Siriraj Hospital, a tertiary referral and university-affiliated center located in Bangkok, Thailand.

Study protocol

Patients who experienced acute STEMI and who underwent primary PCI at Siriraj Hospital between July 1, 2010, and June 30, 2016, were included in the study. The participants were divided into two age-based groups, those aged 80 years or older as octogenarians, and those younger than 80 years as non-octogenarians. The study's inclusion criteria included patients aged 18 years or older diagnosed with STEMI as defined by the European Society of Cardiology (ESC)[7], and those who underwent primary PCI within 24 hours of symptom onset. The exclusion criteria included patients treated with fibrinolysis agents and those with mechanical complications from STEMI. Clinical follow-up data was obtained for up to one year by reviewing medical records and/or via telephone follow-up.

Definitions

Acute STEMI was defined as chest pain lasting at least 20 minutes, occurring no more than 24 hours from the symptom onset, accompanied by ST-segment elevation in two consecutive precordial or limb leads, as defined by the 2017 ESC Guidelines for the management of acute myocardial infarction (MI) in patients presenting with ST-segment elevation[7].

Cardiogenic shock was defined by a sustained systolic blood pressure (SBP) below 90 mmHg for at least 30 minutes despite adequate fluid resuscitation or the need for vasopressor support to maintain an SBP above 90 mmHg, along with evidence of end-organ damage[18-20]. The TIMI flow grade was used to assess coronary epicardial blood flow as seen during angiography[21]. The Killip-Kimball classification[22] was based on physical examination findings in patients experiencing an acute MI. Angiographic success was defined[23] as achieving a TIMI 2 or 3 flow, without flow-limiting dissection, loss of side branches, or angiographic evidence of thrombus, and with less than 20% residual stenosis in the treated lesions as assessed by quantitative coronary angiography (QCA) or visual inspection. For balloon angiography, a residual stenosis of less than 50% as evaluated by QCA or visually, was considered an acceptable threshold for procedural success. Procedural success was defined by achieving angiographic success without the occurrence of MACE as death, MI, stroke, repeat coronary revascularization of the target lesion, or emergency coronary artery bypass graft surgery (CABG), within 24 hours. Severe bleeding events were collected according to the 2005 criteria set by the International Society on Thrombosis and Hemostasis (ISTH)[24].

Data collection

The present study involved gathering information from patient's medical records, which included a

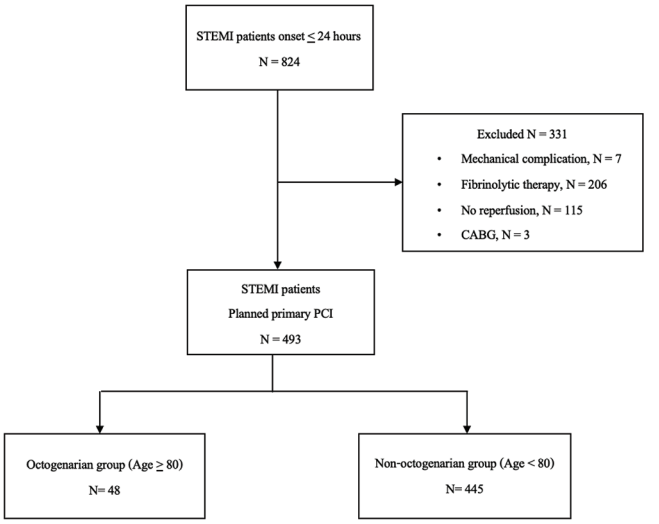

Figure 1. Flow diagram of patient selection.

STEMI, ST-segment elevation myocardial infarction; CABG, coronary artery bypass graft surgery; PCI, percutaneous coronary intervention

range of baseline clinical characteristics such as age, gender, medical history, previous MI, PCI, or CABG, medications, smoking status, vital signs, and laboratory test results including renal function, blood glucose levels, creatinine, and glomerular filtration rate (GFR). Additionally, data on electrocardiographic findings, echocardiographic findings, presenting symptoms such as heart failure, cardiogenic shock, cardiac arrest, or complete heart block, and details of PCI data including culprit artery, total ischemic time, pre- and post-procedure TIMI flow, and type and number of coronary stents used, length of stay, in-hospital adverse events, in-hospital mortality, and 1-year clinical outcomes were collected. A coronary artery stenosis exceeding 70%, as assessed visually, was deemed significant.

The primary endpoint of the study was a comparison of 1-year mortality in patients aged 80 years or older in the octogenarian group and those younger than 80 years, in the non-octogenarian group.

The secondary endpoints were focused on evaluating the composite clinical outcomes of MACE, which included all-cause death, recurrent MI, repeat PCI as target lesion revascularization, and CABG at 1-year follow-up in the octogenarian group compared to the non-octogenarian group. Additionally, the study aimed to identify independent predictors of all-cause mortality and MACE at the 1-year follow-up mark.

The study adhered to the principles outlined in the Declaration of Helsinki and the protocol was approved by the Siriraj Institutional Review Board (SIRB), Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand (074/2563).

Statistical analysis

Categorical variables were reported as frequency and percentage. Continuous variables were expressed as either mean ± standard deviation for normally distributed data or as median (interquartile range, IQR) for non-normally distributed data. Categorical variables were compared using the chi-square test or Fisher's exact test. Continuous variables were compared using Mann-Whitney U test or Student's t-test according to data distribution. Cox regression analysis was used to identify independent predictors of 1-year mortality and MACE. Factors with a p-value less than 0.2 in the univariate model were included in the multivariable Cox proportional hazards regression model by using the enter methods. A p-value of less than 0.05 was accepted as statistically significant. All statistical analyses were conducted using PASW Statistics, version 18.0 (SPSS Inc., Chicago, IL, USA).

Results

Baseline characteristics

Between July 1, 2010, and June 30, 2016, 824 STEMI patients presenting within 24 hours of symptom onset were retrospectively identified. Of these, 331 patients (40.2%) were excluded due to fibrinolysis administration in 206 (62.2%), absence of reperfusion therapy given to 115 (34.7%), mechanical complications in seven (2.1%), and emergency CABG

Table 1. Baseline clinical characteristics

Variables	Octogenarians (n=48)	Non-octogenarians (n=445)	p-value
Age (years); mean±SD	83.6±3.6	59.3±11.2	<0.001
Female; n (%)	24 (50.0)	105 (23.6)	<0.001
Body mass index (kg/m^2); mean±SD	23.6±4.0	24.6±3.7	0.068
Diabetes; n (%)	21 (43.8)	156 (35.1)	0.233
Hypertension; n (%)	34 (70.8)	270 (60.7)	0.169
Dyslipidemia; n (%)	28 (58.3)	263 (59.1)	0.918
Current smoker; n (%)	7 (14.6)	191 (42.9)	<0.001
Previous MI; n (%)	9 (18.8)	49 (11.0)	0.114
Previous PCI; n (%)	6 (12.5)	41 (9.2)	0.439
Previous CABG; n (%)	2 (4.2)	4 (0.9)	0.108
Typical angina; n (%)	27 (56.3)	300 (67.4)	0.120
Cardiac arrest on arrival; n (%)	5 (10.4)	42 (9.4)	0.796
Complete heart block; n (%)	3 (6.3)	33 (7.4)	1.000
Cardiogenic shock; n (%)	11 (22.9)	52 (11.7)	0.027
Killip class (>II); n (%)	19 (39.6)	104 (23.4)	0.014
GRACE risk score; mean±SD	200.4±35.5	155.5±42.0	<0.001
Systolic blood pressure (mmHg); mean±SD	130.0±35.4	132.1±37.5	0.716
Diastolic blood pressure (mmHg); mean±SD	74.9±21.1	81.4±23.7	0.069
Heart rate (bpm); mean±SD	77.0±24.6	78.7±25.8	0.675
Onset of angina to ER arrival time (minutes); median (IQR)	220 (100.0, 320.0)	149.0 (79.0, 281.7)	0.149
ER arrival to open artery time (minutes); median (IQR)	99.5 (65.0, 130.3)	88.0 (66.0, 127)	0.657
Total ischemic time (minutes); median (IQR)	334 (203, 446)	293.5 (191, 455)	0.778
Anterior wall infarction by ECG; n (%)	28 (58.3)	229 (51.5)	0.365
Initial glucose (mg/dL); median (IQR)	256 (138, 400)	169 (133.5, 241.3)	0.059
Creatinine (mg/dL); median (IQR)	1.3 (0.9, 1.7)	0.0 (0.8, 1.2)	0.002
Creatinine ≥1.5 mg/dL; n (%)	16 (33.3)	72 (16.2)	0.003
GFR (mL/minute/1.73 m^2); median (IQR)	46.7 (32.5, 69.1)	80.9 (55.3, 94.9)	<0.001
GFR <60 mL/minute/1.73 m^2; n (%)	32 (66.7)	122 (27.4)	<0.001
LVEF (%); mean±SD	44.3±11.8	50.0±13.5	0.006
LVEF <40%; n (%)	16 (33.3)	100 (22.5)	0.092

MI=myocardial infarction; PCI=percutaneous coronary intervention; CABG=coronary artery bypass graft surgery; GRACE=Global Registry of Acute Coronary Events; ER=emergency room; ECG=electrocardiogram; GFR=glomerular filtration rate; LVEF=left ventricular ejection fraction; SD=standard deviation; IQR=interquartile range

A p<0.05 indicates statistical significance

without primary PCI in three (0.9%). Consequently, 493 STEMI patients who underwent primary PCI were eligible for this study (Figure 1).

There were 48 octogenarian patients and 445 non-octogenarian patients. The baseline characteristics of both groups are presented in Table 1. The mean age of the octogenarian group was 83.6±3.6 years, while that of non-octogenarians was 59.3±11.2 years. Females constituted a significantly higher proportion in the octogenarian group at 50% versus 23.6% (p<0.001). The prevalence of hypertension, diabetes, dyslipidemia did not differ significantly statistically between the two groups, but the prevalence of current smoking was significantly higher in the non-octogenarian group at 42.9% versus 14.6% (p<0.001). Approximately two-thirds of the octogenarians had chronic kidney disease with a GFR of less than 60 mL/minute/1.73 m², which was higher than the non-octogenarian group at 66.7% versus 27.4% (p<0.001). The median GFR in octogenarians was significantly lower than in the non-octogenarians at 46.7 versus 80.9 (p<0.001). Non-octogenarians were more likely to present typical angina than octogenarians at 67.4% versus 56.3% (p=0.120). The clinical presentation was more severe in the octogenarian group with a higher percentage of cardiogenic shock at 22.9% versus 11.7% (p=0.027), higher Killip class II or higher at 39.6% versus 23.4% (p=0.014) and higher GRACE risk score at 200.4±35.5 versus 155.5±42.0 (p<0.001), however,

Table 2. Procedural characteristics

Variables	Octogenarians (n=48)	Non-octogenarians (n=445)	p-value
In-hospital CABG; n (%)	4 (8.3)	16 (3.6)	0.119
Multivessel CAD; n (%)	36 (75.0)	257 (57.8)	0.021
Culprit lesion; n (%)			
Left anterior descending artery	24 (50.0)	234 (52.6)	0.733
Right coronary artery	21 (43.8)	173 (38.9)	0.511
Left circumflex artery	2 (4.2)	37 (8.3)	0.409
Multivessel PCI; n (%)	8 (16.7)	47 (10.6)	0.202
Manual thrombectomy; n (%)	31 (64.6)	301 (67.6)	0.668
Drug eluting stent; n (%)	24 (50.0)	238 (53.5)	0.646
Total number of stents; median (IQR)	1 (1, 2)	1 (1, 2)	0.082
Pre-procedural TIMI 2-3 flow; n (%)	5 (10.4)	100 (22.5)	0.053
Post-procedural TIMI 3 flow; n (%)	44 (91.7)	375 (84.3)	0.173
Post PCI stenosis ≤30%; n (%)	42 (87.5)	406 (91.9)	0.283
Glycoprotein IIb/IIIa inhibitor use; n (%)	9 (19.6)	126 (28.4)	0.200
Femoral access; n (%)	46 (95.8)	381 (85.6)	0.048
IABP use; n (%)	16 (33.3)	84 (19.0)	0.019
Angiographic success; n (%)	44 (91.7)	410 (92.1)	0.783
Procedural success; n (%)	42 (87.5)	395 (88.8)	0.793
Hospital length of stay (days); median (IQR)	5.5 (3.3, 11.0)	4.0 (3.0, 6.0)	0.002

CABG=coronary artery bypass graft surgery; CAD=coronary artery disease; PCI=percutaneous coronary intervention; TIMI=thrombolysis in myocardial infarction; IABP=intra-aortic balloon pump; IQR=interquartile range

A $p<0.05$ indicates statistical significance

there was no statistical difference in cardiac arrest on arrival between both groups at 10.4% versus 9.4% (p=0.796). The median total ischemic time in the octogenarian group was non-significantly longer than in the non-octogenarian group at 334.0 minutes versus 293.5 minutes (p=0.778). Approximately half of the patients in both groups had anterior wall infarction by electrocardiogram. The mean LVEF in the octogenarian group was significantly lower than in the non-octogenarian group at 44.3±11.8% versus 50.0±13.5% (p=0.006).

Procedural data

The procedural characteristics are shown in Table 2. Multivessel coronary artery disease was more prevalent in the octogenarian group at 75.0% versus 57.8% (p=0.021), with approximately 17% of octogenarians who underwent multivessel PCI. There was no significant difference in the culprit vessel between the groups, with the left anterior descending coronary artery being the most common culprit lesion in 50% of the octogenarian group versus 52.6% of the non-octogenarian group (p=0.733). The use of femoral access was significantly higher in the octogenarian group at 95.8% versus 85.6% (p=0.048). There were no statistical differences in the proportion of patients who received a drug-eluting stent at 50% versus 53.5% respectively (p=0.646), and the use of glycoprotein IIb/IIIa inhibitors between the two groups at 19.6% versus 28.4%, respectively (p=0.200). The octogenarian group had a significantly higher rate of intra-aortic balloon pump (IABP) insertion than the non-octogenarian group at 33.3% versus 19.0% (p=0.019). The percentage of patients undergoing in-hospital CABG was not statistically different between the two groups at 8.3% versus 3.6%, respectively (p=0.119). However, the median length of hospital stay was slightly but significantly longer in the octogenarian group at 5.5 days versus 4.0 days (p=0.002).

In-hospital outcomes

The in-hospital outcomes are described in Table 3. In-hospital mortality was 20.8% in the octogenarian group. There were no significant differences in rates of in-hospital MI, urgent revascularization, CABG, and stroke among the groups (Table 3). Major bleeding from a non-vascular entry site was significantly higher in the octogenarian group at 20.8% versus 6.7% (p=0.003) but there was no statistically significant difference in vascular entry site major bleeding between the octogenarian and non-octogenarian groups at 4.2% versus 1.8% (p=0.253).

Table 3. In-hospital outcomes

Variables	Octogenarians (n=48); n (%)	Non-octogenarians (n=445); n (%)	p-value
Death	10 (20.8)	50 (11.2)	0.053
Myocardial infarction	2 (4.2)	5 (1.1)	0.142
Urgent revascularization	2 (4.2)	12 (2.7)	0.637
CABG	4 (8.3)	16 (3.6)	0.119
Stroke	2 (4.2)	6 (1.3)	0.178
Major bleeding vascular entry site	2 (4.2)	8 (1.8)	0.253
Major bleeding non-vascular entry site	10 (20.8)	30 (6.7)	0.003

CABG=coronary artery bypass graft surgery

Table 4. Clinical outcomes at 1-year

Outcome	Octogenarians; n (%)	Non-octogenarians; n (%)	Unadjusted HR (95% CI)	p-value	Adjusted HR (95% CI)	p-value
All-cause death	14 (29.8)	64 (14.7)	2.13 (1.19 to 3.81)	0.010	2.18 (1.19 to 3.97)	0.011
Recurrent MI	4 (8.9)	19 (4.6)	2.17 (0.74 to 6.39)	0.159	1.50 (0.49 to 4.54)	0.469
PCI	6 (13.3)	39 (9.4)	1.61 (0.68 to 3.81)	0.277	1.42 (0.59 to 3.39)	0.429
CABG	6 (13.3)	28 (6.7)	2.21 (0.91 to 5.34)	0.078	2.32 (0.96 to 5.65)	0.063
MACE	25 (55.6)	132 (31.5)	2.02 (1.32 to 3.09)	0.001	2.00 (1.29 to 3.09)	0.002

HR=hazard ratio; CI=confidence interval; MI=myocardial infarction; PCI=percutaneous coronary intervention; CABG=coronary artery bypass graft surgery; MACE=major adverse cardiac events

Table 5. Predictors of all-cause mortality and MACE at 1 year

Variables	All cause death				MACE			
	Unadjusted HR (95% CI)	p-value	Adjusted HR (95% CI)	p-value	Unadjusted HR (95% CI)	p-value	Adjusted HR (95% CI)	p-value
Age ≥80 years	2.13 (1.19 to 3.81)	0.010	2.18 (1.19 to 3.97)	0.011	2.02 (1.32 to 3.09)	0.001	2.00 (1.29 to 3.09)	0.002
Diabetes	2.07 (1.33 to 3.23)	0.001	1.97 (1.26 to 3.08)	0.003	1.74 (1.27 to 2.38)	<0.001	1.64 (1.20 to 2.25)	0.002
Cardiac arrest on arrival	5.75 (3.54 to 9.32)	<0.001	4.85 (2.89 to 8.15)	<0.001	3.77 (2.55 to 5.58)	<0.001	3.06 (2.03 to 4.62)	<0.001
Multivessel PCI	2.24 (1.29 to 3.87)	0.004	1.29 (0.71 to 2.35)	0.403	2.01 (1.34 to 3.03)	<0.001	1.39 (0.91 to 2.16)	0.129
Post-procedural TIMI 3 flow	0.34 (0.21 to 0.55)	<0.001	0.37 (0.23 to 0.61)	<0.001	0.35 (0.25 to 0.49)	<0.001	0.38 (0.27 to 0.54)	<0.001

HR=hazard ratio; CI=confidence interval; MACE=major adverse cardiac events; TIMI=thrombolysis in myocardial infarction; PCI=percutaneous coronary intervention

Cox regression analysis, enter method

Clinical outcomes at 1-year

At 1-year follow-up, 10 patients were lost to follow-up and could not be reached by telephone or mail contact. The 1-year all-cause mortality rate (unadjusted HR 2.13, 95% CI 1.19 to 3.81, p=0.010) and 1-year MACE were significantly higher in the octogenarian group (unadjusted HR 2.02, 95% CI 1.32 to 3.09, p=0.001). After adjusting for differences in baseline characteristics, there remained significant differences in 1-year all-cause mortality (adjusted HR 2.18, 95% CI 1.19 to 3.97, p=0.011) and MACE between both groups (adjusted HR 2.00, 95% CI 1.29 to 3.09, p=0.002) (Table 4). There were no statistically significant differences in the rates of recurrent MI, PCI, and CABG between the octogenarian and non-octogenarian groups at 1-year (Table 4).

Predictors of 1-year all-cause mortality and MACE

The independent predictors for increased 1-year all-cause mortality included age 80 years or older (adjusted HR 2.18, 95% CI 1.19 to 3.97, p=0.011), diabetes (adjusted HR 1.97, 95% CI 1.26 to 3.08, p=0.003), and cardiac arrest on arrival (adjusted HR 4.85, 95% CI 2.89 to 8.15, p<0.001) (Table 5).

Independent predictors for increased 1-year MACE included age 80 years or older (adjusted HR 2.00, 95% CI 1.29 to 3.09, p=0.002), diabetes (adjusted HR 1.64, 95% CI 1.20 to 2.25, p=0.002), and cardiac arrest on arrival (adjusted HR 3.06, 95% CI 2.03 to 4.62, p<0.001) (Table 5).

Independent predictors for a decreased 1-year all-cause mortality and MACE were post-procedural TIMI 3 flow (adjusted HR 0.37, 95% CI 0.23 to 0.61, p<0.001 and adjusted HR 0.38, 95% CI 0.27 to 0.54, p<0.001, respectively) (Table 5).

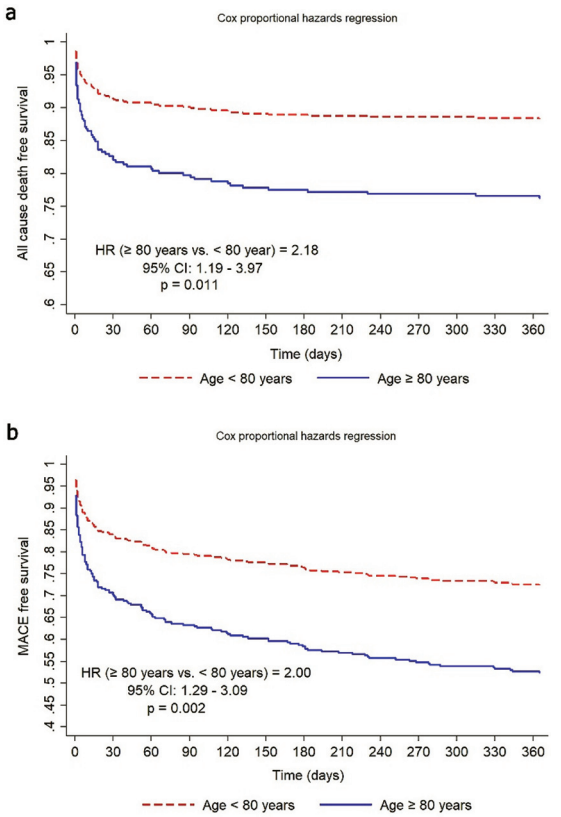

Figure 2. Cox proportional hazards regression model survival curve of STEMI patients who underwent primary PCI. (a) All cause death free survival according to age, (b) MACE free survival according to age.

MACE, major adverse cardiac events; HR, hazard ratio

Cox proportional hazards regression model survival curve of STEMI patients who underwent primary PCI are shown in Figure 2. Factors brought into the Cox proportional hazards regression model included age, diabetes, cardiac arrest on arrival, multivessel PCI, and post-procedural TIMI 3 flow.

Discussion

In the present study of STEMI patients underwent primary PCI, 9.7% of the cohort were octogenarians, with a mean age of 83.6±3.6 years. Both octogenarians and non-octogenarians demonstrated high rates of angiographic success and procedural success at 91.7% versus 92.1% and 87.5% versus 88.8%, respectively. The 1-year all-cause mortality rate was 2-fold higher in octogenarians compared to non-octogenarians at 29.8% versus 14.7% (unadjusted HR 2.13, 95% CI 1.19 to 3.81, p=0.010), and similarly, the 1-year MACE rate was elevated in octogenarians at 55.6% versus 31.5% (unadjusted HR 2.02, 95% CI 1.32 to 3.09, p=0.001). After adjusting for differences in baseline characteristics, there remained significant differences in 1-year all-cause mortality (adjusted HR 2.18, 95% CI 1.19 to 3.97, p=0.011) and MACE between both groups (adjusted HR 2.00, 95% CI 1.29 to 3.09, p=0.002).

The global elderly population is increasing, and cardiovascular disease remains prevalent among this demographic[1,2]. Age is a significant predictor of adverse outcomes in acute STEMI patients[14-16]. However, there is a scarcity of data concerning management strategies and clinical outcomes in very elderly STEMI patients. To the authors' knowledge, this is the first study to assess the one-year clinical outcomes in octogenarians with STEMI underwent primary PCI within the Thai population.

Previous studies[27-29] had reported higher complication rates with PCI in elderly patients. In the present study, no significant differences were observed in in-hospital mortality, MI, urgent revascularization, CABG, and stroke between both groups. However, non-vascular entry site major bleeding was significantly higher in octogenarians at 20.8% versus 6.7% (p=0.003). The transfemoral approach was more frequently employed in octogenarians compared to non-octogenarians with 95.8% versus 85.6% (p=0.048), although there was no statistically significant difference in the use of glycoprotein IIb/IIIa inhibitors or vascular entry site major bleeding.

Lazzeri et al.[25] reported lower in-hospital and 1-year mortality rates among octogenarian patients with acute coronary syndrome undergoing PCI, at 11.3% and 17.1%, respectively, compared to those observed in the current study. The higher mortality rate in the present study may be due to the more high-risk features of the octogenarian group, characterized by a higher incidence of cardiogenic shock, Killip class II or higher, higher GRACE risk score, a higher prevalence of multivessel coronary artery disease, more frequent renal insufficiency, lower, and a higher rate of IABP insertion.

The current study identified factors as independent predictors of 1-year all-cause mortality and 1-year MACE including age 80 years or older, diabetes, and cardiac arrest on arrival. On the contrary, post-procedural TIMI 3 flow was associated with a decreased 1-year all-cause mortality and MACE. These results are consistent with those of Yamanaka et al.[16] who reported that octogenarians with acute MI who underwent PCI, predictors of 1-year all-cause mortality included age of 80 years or older,

STEMI, LVEF of less than 40%, Killip class II or greater, and GFR of less than 60 mL/minute/1.73 m², whereas the independent predictors of 1-year MACE were age of 80 years or older, metabolic syndrome, multivessel disease, LVEF of less than 40% and GFR of less than 60 mL/minute/1.73 m². Sakai et al.[26] also showed that cardiogenic shock, anterior wall MI, and unsuccessful reperfusion were predictors of mortality in elderly patients aged 75 years or older with STEMI undergoing primary PCI.

Limitation

The present study had limitations that warrant consideration when interpreting the results. First, being a non-randomized observational study, essential information may be incomplete or missing. Second, the small size of the study population may limit the statistical power to identify significant differences. Third, as a single-center study, the generalizability of the findings to other regions and centers may be limited.

Conclusion

In a cohort of acute STEMI patients undergoing primary PCI at the authors' institute, 9.7% were octogenarians. The 1-year all-cause mortality rate in octogenarians was 29.8% and the 1-year MACE rate was 55.6%. After adjustment for differences in baseline characteristics, there were statistically significant differences in 1-year all-cause mortality and MACE between octogenarians and non-octogenarians. Managing octogenarian patients with acute STEMI undergoing primary PCI remains a challenge.

What is already known about this topic?

Older age is a significant predictor of adverse outcomes in patients with acute ST-segment elevation MI.

What does this study add?

This study reports in a Thai cohort of STEMI patients underwent primary PCI, 9.7% were octogenarians. At 1-year, one-third of the octogenarians died, and the 1-year MACE rate was 55.6%.

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Conflicts of interest

The authors declare that they have no conflict of interest.

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