Impact of Gender on Treatment and Clinical Outcomes in Acute ST Elevation Myocardial Infarction Patients in Thailand

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Background: *Coronary heart disease is the leading cause of mortality and morbidity in men as well as in women. Women have their first cardiac event 6 to 10 years later than men do. Whereas, the cardiovascular death rates are declining in men, they remain constant in women. In cardiovascular studies with age limits, women are naturally the minority, amounting to < 40%.*
Objective: *Determine the effect of gender on treatment and clinical outcomes in acute ST elevation myocardial infarction (STEMI) patients.*
Material and Method: *This is a multicenter study including 13 government and 4 private institutions. Between August 1, 2002 and October 31, 2005, 3,836 consecutive patients with ST elevation myocardial infarction were enrolled. The patient characteristics, treatment, and hospital outcome were collected and validated. In-hospital management and outcomes were compared between men and women, without adjustment, with adjustment for age alone and with adjustment for age and other covariates by means of multivariate stepwise logistic regression analysis. In each model tested, gender was forced into the model, whereas other predictors were selected in a stepwise manner.*
Results: *Women were 1,223 patients (31.9%) of all patients and were 8 years older than men (67.5 $\pm$ 12.0 vs. 59.7 $\pm$ 12.4 years).Women had a higher incidence of diabetes and hypertension (46.9% vs. 31.0%, $p < 0.001$ and 62.1% vs. 45.3%, $p < 0.001$). Smoking and family risk factor were found in men more than in women (17.5% vs. 52.5%, $p < 0.001$ and 7.4% vs. 11.2%, $p < 0.001$). Women presented more frequently with cardiac dyspnea and shock than men (35.3% vs. 22.2%, $p < 0.001$ and 21.5% vs. 13.8%, $p < 0.001$). There was no difference in time to admission between men and women. Beta blocker, statin, angiotensin converting enzyme inhibitor (ACEI) and angiotensin II receptor inhibitor (ARB) were less frequently used in women. Coronary angiogram was performed less often in women and less abnormal angiogram were found (57.8% vs. 65.0%, $p < 0.001$ and 55.5% vs. 63.9%, $p < 0.001$). A lower percentage of women received thrombolytic therapy (28.1% vs. 31.4%, $p = 0.039$) as well as percutaneous coronary intervention (PCI) (39.0% vs. 48.5%, $p < 0.001$).Unadjusted in-hospital mortality was significantly higher in women than in men (23.6% vs. 13.9%, unadjusted OR (95% CI) 1.90 (1.60-2.26), $p < 0.001$). After adjustment of other covariables (age group > 75 years, hospital group (metropolitan, regional), chest pain, cardiac dyspnea, shock, post cardiac arrest, diabetes, hypertension, family history, smoking, dyslipidemia, refer, time to admission $\leq$ 12 hours (hour), aspirin, beta blocker, calcium antagonist, statin, ACEI, ARB, nitrate, coronary angiogram, thrombolysis, PCI, coronary artery bypass grafting, congestive heart failure, arrhythmia, stroke, bleeding), the gender difference in-hospital mortality no longer existed (adjusted OR (95% CI) 1.03 (0.80-1.33), $p = 0.814$). The incidence of congestive heart failure as a complication was significantly higher in women than in men (55.6% vs. 38.7%, $p < 0.001$, adjusted OR (95% CI) 1.29 (1.08-1.54), $p = 0.005$).*
Conclusion: *Women with acute ST elevation myocardial infarction were older and had a higher incidence of hypertension and diabetes than men. Women were less likely than men to undergo coronary angioplasty. Women in the authors' registry had a higher risk for in-hospital morbidity and mortality than men. Early and aggressive treatment might improve the clinical outcomes in women with STEMI.*

Keywords: *Gender, STEMI, Treatment, Clinical outcomes*

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Coronary heart disease is the leading cause of mortality and morbidity in men as well as in women. Women have their first cardiac event 6 to 10 years later than men do[1]. Whereas, the cardiovascular death rates are declining in men, they remain constant in women. Angina pectoris in women is more frequently uncomplicated (80%), whereas, in men angina tends to evolve out of infarction (66%). In cardiovascular studies with age limits, women are naturally in the minority, amounting to less than 40%. It is well known that distinct gender differences exist in terms of presentation of symptoms, validity of diagnostic tests, drug side effects and complications[2]. With respect to cardiac risk factors, women have higher rates of diabetes and hypertension but are less frequently smokers[3].

Women with acute coronary syndrome call for professional help and present more frequently with atypical symptoms, such as abdominal pain locations, nausea, vomiting, fatigue and dyspnea. The authors can only speculate on the reasons for these differences, but they could be related to different pain reception, older age, or other comorbidities. ECG as the first line diagnostic tool in acute coronary syndrome (ACS) is also unreliable in females presenting to emergency rooms. There are less frequent ST elevations and higher rates of ST depressions and T wave inversions as well as non-specific alterations.

The objective of the present study was to determine the effect of gender on treatment and clinical outcomes in acute ST elevation myocardial infarction patients.

Operational definition

ST elevation Myocardial infraction (STEMI) is diagnosed according to WHO criteria (ST elevation $\geq$ 1 mm in the two consecutive leads or new or presumed new left bundle branch block (LBBB) and the symptom of chest pain compatible with ACS for more than 20 minutes and elevated biochemical markers of myocardial necrosis either CK-MB or troponin).

Treatments consisted of medical treatment for STEMI for more than 24 hours (except GP IIb/ IIIa inhibitor or death before 24 hours) including home medication or revascularization: thrombolysis, percutaneous coronary intervention (PCI) or, coronary artery bypass grafting (CABG).

Clinical outcomes include in-hospital mortality (cardiac death, non-cardiac death), complications (congestive heart failure, arrhythmia, stroke, bleeding) and length of stay.

Bleeding complication is defined as only major bleeding or loss of hemoglobin $\geq$ 5 gm%.

Material and Method

The data used in this present sub-study was from Thai acute coronary syndrome (ACS) registry, a multicenter observational study (13 government and 4 private institutions). The study protocol and case record form were approved by the Ethical Committee in all of the participating institutes. Informed consent was obtained from each patient before the data collection. The management was dependent on usual practice in each institute. The enrollment of the patients started in August 2002. Data was collected by trained critical nurses who are trained to extract the data from medical records countersigned by principal investigators at each site. Double data entries via the web site of Thai ACS registry were used to prevent data error. Internal and external audits at all sites were regularly performed every 3-6 months. Data was entered into the data management center at the Heart Association of Thailand. Then the data was verified and analyzed.

Statistical analysis

The baseline characteristics for categorical variables were expressed in number and percentage. The continuous variables were expressed as mean $\pm$ standard deviation (SD) or median (IQR: Inter Quartile Range: Q3-Q1). Chi-square test and or Two-sample Z test of proportion and Two-sample t-test with equal variances were used to compare between genders. Two-sample using Mann-Whitney U tests were compared the data between men and women. In -hospital management and outcomes were compared between men and women, first, without adjustment, then with adjustment for age alone and finally with adjustment for age and other covariates by means of multivariate stepwise logistic regression analysis. In each model tested, gender was forced into the model, whereas other predictors were selected in a stepwise manner, adjusted for other variables that were statistically significant, p value < 0.2. For Stepwise Multiple Logistic regression, p-remove was $\geq$ 0.2 and p-enter was < 0.1. p-value of less than 0.05 was considered statistically significant. STATA version 8 (Stata Corp, College Station, Texas) was used for data analysis.

Results

Between August 1, 2002 and October 31, 2005, 3,836 consecutive patients with STEMI were admitted to 17 participant hospitals. Table 1 summarizes the

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Table 1. Baseline characteristics

	Women (n = 1,223), %	Men (n = 2,613), %	Unadjusted OR	95% CI	p-value
Age (yr)					
Mean ± SD	67.5 ± 12.0	59.7 ± 12.4	-	-	<0.001[t]
Median (IQR)	69.0 (58.9, 72.8)	59.7 (50.6, 69.1)			<0.001*
Age group > 65	63.9	35.9	3.15	2.73-3.63	<0.001
Age group > 75	27.6	10.6	3.22	2.70-3.84	<0.001
Hospital group					
Regional (compared Metropolitan)	36.6	26.4	1.61	1.39-1.86	<0.001
Chief complaint (%)					
Chest pain	88.2	93.2	0.55	0.43-0.69	<0.001
Cardiac dyspnea	35.3	22.2	1.91	1.65-2.22	<0.001
Shock	21.5	13.8	1.71	1.43-2.04	<0.001
Post cardiac arrest	8.0	7.0	1.16	0.90-1.50	0.2
Risk factor (%)					
DM	46.9	31.0	2.02	1.76-2.33	<0.001
HT	62.1	45.3	2.02	1.76-2.33	<0.001
Family history	7.4	11.2	0.60	0.47-0.77	<0.001
Smoking	17.5	52.5	0.19	0.16-0.22	<0.001
Dyslipidemia	66.1	66.4	1.06	0.91-1.25	0.5
Refer (%)	50.5	53.0	0.94	0.82-1.08	0.4
Time to admission (hr)					
Mean ± SD	32.6 ± 56.8	30.2 ± 53.0	-	-	0.4*
Median (IQR)	7.0 (2.9, 31.0)	7.0 (2.6, 30.3)			
Time to admission					
≤ 12 hr (%)	55.1	56.6	0.94	0.82-1.08	0.4

[t] Two-sample t test with equal variances
* Two-sample Mann-Whitney U tests

patient characteristics. Women were 31.9% of all patients. They were 8 years older than men (median age 67.52 vs. 59.68 years). The incidence of women was greater than men in regional hospitals compared with the hospitals in the metropolitan area (Bangkok). Women had a higher incidence of diabetes and hypertension. Smoking and family risk factors were found in men more often than in women (both $p < 0.001$). Women presented more frequently with cardiac dyspnea and shock than men. There was no difference in time to admission between men and women.

Table 2 summarizes the hospital management. ADP inhibitor, GP IIb/IIIa inhibitor, Beta-blocker, statin, and ACEI or ARB were more frequently used in men. Table 3 summarizes the hospital management. Coronary angiogram was performed less often in women and fewer abnormal angiograms were found ($p < 0.001$). A lower percentage of women receives thrombolytic therapy (Table 3). PCI was performed less often in women than men ($p < 0.001$). The differences persisted after adjustment for age and other covariables: diabetes (DM), hypertension (HT), dyslipidemia, smoking and congestive heart failure (CHF). The adjusted Odds ratio (OR) for age and other covariables was 0.662, 95% CI 0.529-0.830. There was no difference in the incidence of coronary artery bypass grafting between women and men. Door to needle time and door to balloon time were the same for women and men (Table 3).

Table 4 gives the in-hospital outcome. In-hospital mortality was significantly higher in women than in men ($p < 0.001$). Concerning complications, CHF, cardiac arrhythmia and bleeding complications were significantly higher in women than in men. The length of stay was longer for women than men (10.76 ± 11.02 in women and 9.26 ± 12.53 in men, $p < 0.001$). Table 5 summarizes the result of multiple logistic regression. There was no difference in death between women and men after adjustment for other covariables. The adjusted factors were the following: age group > 75,

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Table 2. In-hospital medications

	Women (n = 1,223), %	Men (n = 2,613), %	Unadjusted OR	95% CI	p-value
ASA	94.4	95.6	0.78	0.57-1.06	0.1
ADP inhibitor	52.5	64.1	0.62	0.54-0.71	<0.001
GP IIb/IIIa inhibitor	17.0	20.7	0.79	0.66-0.94	0.008
Beta-blocker	54.3	60.2	0.79	0.68-0.90	0.001
Calcium antagonist	9.8	10.4	0.94	0.75-1.17	0.6
Statin	72.0	80.0	0.64	0.55-0.75	<0.001
ACEI or ARB	58.6	64.2	0.79	0.69-0.91	0.001
Nitrate	74.9	77.6	0.86	0.74-1.01	0.068

Table 3. In-hospital treatment

	Women (n = 1,223), %	Men (n = 2,613), %	Unadjusted OR	95% CI	p-value
Coronary angiogram	57.8	65.0	0.74	0.64-0.85	<0.001
Normal	2.3	1.1			0.011[p]
Abnormal	55.5	63.9			<0.001[p]
Not done	42.2	35.0			<0.001[p]
Thrombolysis	28.1	31.4	0.85	0.74-0.99	0.039
PCI	39.0	48.5	0.68	0.59-0.78	<0.001
Primary	19.5	23.5			0.006[p]
Rescue	2.9	3.5			0.351[p]
Elective	16.5	21.4			<0.001[p]
Early invasive strategy	0.0	0.1			NA
CABG	6.1	5.9	1.04	0.78-1.38	0.807
Emergency	2.9	2.3			0.263[p]
Elective	3.3	3.7			0.532[p]
Door to needle time					
n	221	443			
Mean ± SD (min)	114.0 ± 107.4	114.0 ± 89.4	-	-	0.259*
Median (IQR)	80 (52, 142)	90 (55, 147)	-	-	
Door to balloon time					
n	233	596			
Mean ± SD (min)	187.4 ±183.3	165.59 ±179.6	-	-	0.052*
Median (IQR)	129 (78, 228)	120 (70, 186)	-	-	

* Two-sample Mann-Whitney U tests
[p] Two-sample Z test of proportion
IQR = Inter Quartile Range

Hospital group (Regional and Metropolitan), chest pain, dyspnea + congestive heart failure, shock, post cardiac arrest, diabetes, hypertension, family history, smoking, dyslipidemia, referral, time to admission ≤ 12 hr, ASA, ADP inhibitor, GP IIb/IIIa inhibitor, beta-blocker, calcium antagonist, statin, (ACEI or ARB), Nitrate, coronary angiogram, thrombolysis, PCI, CABG and complications (congestive heart failure, arrhythmia, CVA and bleeding complication). Cardiac death and non-cardiac death was the same between men and women. Congestive heart failure complication was more common in women even after adjustment for the differences.

Discussion

The treatment of ST segment elevation myocardial infarction (STEMI) is prompt coronary reperfusion with thrombolysis or percutaneous coronary

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Table 4. In-hospital outcomes

	Women (n = 1,223), %	Men (n = 2,613), %	Unadjusted OR	95% CI	p-value
Total death	23.6	13.9	1.90	1.60-2.26	<0.001
Cardiac death vs Non-cardiac death	20.0	12.3	0.76	0.49-1.20	0.244
Complications					
Congestive heart failure	55.6	38.7	1.99	1.73-2.28	<0.001
At presentation or within 48 h	51.5	35.7	-	-	<0.001[p]
Arrhythmia	32.5	27.6	1.26	1.09-1.46	0.002
Stroke	2.5	2.5	0.97	0.63-1.50	0.9
Bleeding complication	11.2	6.4	1.86	1.47-2.36	<0.001
Length of stay (Day)					
(No refer only), n = 1,690	n = 545	n = 1,145			
Mean $\pm$ SD	10.7 $\pm$ 11.02	9.3 $\pm$ 12.53	-	-	<0.001*
Median (IQR)	6.9 (3.9, 12.3)	5.4 (3.2, 8.8)	-	-	<0.001

* Two-sample (Mann-Whitney) U test
[p] Two-sample Z test of proportion
IQR = Inter quartile range

Table 5. Summary of clinical outcomes (Multiple logistic regression)

Clinical outcomes	Women vs Men		
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	p-value
Total death	1.90 (1.60-2.26)	1.03 (0.80-1.33)	0.837
Cardiac death vs Non-cardiac death	0.76 (0.49-1.20)	0.78 (0.45-1.35)	0.377
Cardiac death vs [Non-cardiac death + Survive]	1.80 (1.50-2.16)	0.95 (0.73-1.24)	0.721
Congestive heart failure	1.99 (1.73-2.28)	1.29 (1.08-1.54)	0.005
Arrhythmia	1.26 (1.09-1.46)	1.04 (0.87-1.25)	0.655
Stroke	0.97 (0.63-1.50)	0.69 (0.44-1.09)	0.109
Bleeding	1.86 (1.47-2.36)	1.28 (0.99-1.67)	0.062

Adjusted for other variables that were significantly p-value < 0.2 Stepwise Multiple Logistic regression p-remove $\geq$ 0.2 and p-enter < 0.1

intervention. The present study demonstrated that women carried a higher risk than men in management of STEMI. Management should be considered earlier and be more aggressive.

The predictors of mortality were older age, high Killip class, high heart rate, delayed presentation, early evidence of hemodynamic instability, intraventricular conduction abnormality on the initial electrocardiogram[4,5].

Women were about one third of the total population. In previous studies, the population of women varied from 30-50%. The present study shows that women and men are different in their risk profiles: women were older by an average of 8 years, had a higher incidence of systemic hypertension and diabetes. Interestingly, the second most common presenting symptom was cardiac dyspnea (35.3% compared with 22.2% in men, p < 0.001). Paul et al, in 1995 found that women presenting with acute myocardial infraction were older, had systemic hypertension, diabetes and a non-Q-wave AMI more frequently than men[6]. Kudenchuk P et al in 1996 compared 851 men and 246 women from the Myocardial Infarction Triage and Intervention (MITI) Project Registry[5]. Women were also older than men and had a higher prevalence of known cardiovascular risk factors, including systemic

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hypertension and congestive heart failure. Cardiogenic shock was more frequent in women with STEMI with multivessel disease[7].

The authors found statistical differences in the use of the established treatment for myocardial infarction, such as ADP inhibitor, GP IIb/IIIa inhibitor, statin, beta-blocker and ACEI or ARB. From the randomized trial of intravenous atenolol among 16,027 cases of suspected acute MI, atenolol demonstrated reduced vascular mortality significantly compared with the control group[8]. Atenolol patients were more likely than controls to be discharged on beta-blockers, which can account for much of the additional difference in vascular mortality after day 7. One month of oral captopril (6.25 mg initial dose titrated up to 50 mg twice daily) resulted in significant reduction in 5-week mortality after acute MI and benefits appeared to be larger in high risk groups such as those presenting with a history of previous MI or with heart failure[9]. Mononitrate did not reduce 5-week mortality in this group. GP IIb/IIIa inhibitor in primary coronary stenting of STEMI had shown to improve mortality rate and re-infarction in the European meta-analysis[10]. Women were less likely to undergo coronary angiogram in the present study. With regard to reperfusion treatment, the present results agree with a large number of studies, that women were less likely than men to undergo coronary angioplasty[4,5,11,12]. After adjustment for age and clinical variables with significant influence, this difference remained statistically significant. Kostis JB et al analyzed data from Myocardial Infarction Data Acquisition System for the years 1986 and 1987[13]. They found that women had less cardiac catheterization than men and cardiac catheterization was associated with low mortality. Thrombolytic therapy, which is known to improve survival after acute MI[14-17], was also lower in women. Primary angioplasty had been proven to have short-term and long-term clinical advantage over thrombolytic therapy with t-PA[18,19]. Cumulative incidence of composite endpoint (death from any cause or recurrent infarction or stroke or revascularization) at 5-year follow up was 53% in the Thrombolysis group compared with the primary PCI group (within 12 hrs of symptom onset).

For types of revascularization, primary PCI was performed on women less often than on men. About timing for revascularization, door to needle time and door to balloon time were the same for both genders and duration was borderline in the golden period for both types of revascularization. Amit et al 2006 demonstrated the benefit of direct ambulance to coronary care unit admission. This significantly decreased the door-to-balloon time from 94 min to 70 min, compared with 187 and 166 min in women and men in the authors' Thai ACS registry, respectively[20]. It has been shown that reducing the door-to-needle and door-to-balloon time improves early and late survival[21-24]. The target of door-to-needle time and door-to-balloon time are 30 min and 90 min, respectively according to the American College of Cardiology/American Heart Association guidelines[25]. The factors that influenced the delay were co-morbidity conditions, absence of chest pain, delayed presentation after symptom onset, less specific EKG findings and hospital presentation during off-hours[26]. The hot-line acute chest pain, general practitioners, community hospitals/public education, pre-hospital diagnostic EKG, tele-transmission of EKG and bypass ER policy would speed up both processes.

Consistent with the previous investigations, women in the authors' registry had a higher risk for in-hospital mortality than men. The total in-hospital mortality was 24% in women and 14% in men. In some studies, female gender was found to be a significant predictor of mortality[5,27,28]. The age-adjusted in-hospital mortality was 23.1% in 1,223 women and 15.7% in 2,613 men ($p < 0.0005$). Relative odds of mortality, covariate-adjusted for major prognostic factors that included age, prior MI, congestive heart failure and infarct location, indicated that female gender was independently and significant associated with increased mortality both during hospitalization and at 1 year after discharge[27,29]. In contrast, Fiebach et al studied 332 women and 790 men diagnosed MI and found that cumulative 3-year mortality and in-hospital mortality rates were significantly higher in women than men. However, after multivariate adjustment for the baseline differences, mortality rates were not significantly different between women and men for in-hospital deaths and mortality at 3 years among hospital survivors tended to be lower among women[30]. In the present study, gender differences were not statistically significant after being adjusted for age and other covariables (DM, HT, family history of CAD, smoking risk factor). This is the same finding as the others[31-33]. Concerning complications, congestive heart failure, and arrhythmia were found more in women. Interestingly, doubling bleeding complication was found in women more than men significantly. However, there was no significance between women and men in terms of arrhythmia and bleeding complications using multiple logistic regression.

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Limitation

1. There were some cases that were transferred to other hospitals, therefore clinical outcomes could not be evaluated.

2. The observation period in the present study was limited to confirm the impact of gender on clinical outcomes of STEMI in the long term period.

3. The present study was limited to only acute STEMI patients.

4. The treatment decisions were not randomized.

5. The study multicenter included university hospitals more than community hospitals and the treatment decisions were limited only in cardiologists at tertiary cardiac referral centers.

Contributors

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อิทธิพลของเพศที่มีต่อการรักษาและผลลัพธ์ทางคลินิกในผู้ป่วยโรคกล้ามเนื้อหัวใจตายเฉียบพลันชนิด ST elevation ในประเทศไทย

บุญชู ศรีชัยเวทย์, เพิ่มยศ เรืองสกุลราช, กิติพันธ์ วิสุทธารมณ์, โสภณ สงวนวงษ์, วิวรรณ ทังสุบุตร, พัฒนพงษ์ อินเสมียน

ภูมิหลัง: *โรคหลอดเลือดหัวใจเป็นสาเหตุสำคัญของการเจ็บป่วยและการตายทั้งในเพศหญิงและเพศชาย โดยในเพศหญิงจะมีอาการของโรคหัวใจช้ากว่าเพศชาย 6-10 ปี ในขณะที่อัตราการตายจากโรคหัวใจในเพศชายลดลง แต่ในเพศหญิงกลับคงเดิม จากการศึกษาวิจัยทางโรคหัวใจที่ผ่านมาโดยมีการจำกัดอายุ พบว่ามีประชากรเพศหญิงเป็นส่วนน้อย (น้อยกว่าร้อยละ 40)*

วัตถุประสงค์: *เพื่อประเมินผลของเพศที่มีต่อการรักษาและผลลัพธ์ทางคลินิกในผู้ป่วยโรคกล้ามเนื้อหัวใจตายเฉียบพลันชนิด ST elevation ในประเทศไทย*

วัสดุและวิธีการ: *การศึกษาวิจัยนี้เป็นชนิด multicenter โดยมีโรงพยาบาลของรัฐ 13 แห่ง และโรงพยาบาลเอกชน 4 แห่ง ในช่วงเวลาตั้งแต่ 1 สิงหาคม พ.ศ. 2545 ถึง 31 ตุลาคม พ.ศ. 2548 มีผู้ป่วยโรคกล้ามเนื้อหัวใจตายเฉียบพลันชนิด ST elevation จำนวน 3,836 ราย ที่ได้รับการศึกษาวิจัย โดยบันทึกรายละเอียดเกี่ยวกับลักษณะของผู้ป่วย, การรักษา และผลลัพธ์ทางคลินิก โดยมีการเปรียบเทียบระหว่างเพศหญิงและเพศชาย ทั้งในแบบที่มี และไม่มีการปรับผลจากอายุและปัจจัยทางคลินิกอื่น ๆ โดยวิธีวิเคราะห์ชนิด multivariate stepwise logistic regression*

ผลการศึกษา: *พบว่ามีผู้ป่วยเพศหญิงเป็นจำนวน 31.9 % (1,223 คน) และมีอายุมากกว่าเพศชาย (2,613 คน) 8 ปี ในผู้ป่วยเพศหญิงมีอุบัติการณ์ของโรคเบาหวานและความดันโลหิตสูงมากกว่าเพศชาย (46.9% เปรียบเทียบกับ 31.0%, $p < 0.001$ และ 62.1% เปรียบเทียบกับ 45.3%, $p < 0.001$) ผู้ป่วยเพศหญิงมักมาด้วยอาการเหนื่อย และความดันโลหิตต่ำมากกว่าเพศชาย (35.3% เปรียบเทียบกับ 22.2%, $p < 0.001$ และ 21.5% เปรียบเทียบกับ 13.8%, $p < 0.001$) การสวนตรวจหลอดเลือดหัวใจในผู้ป่วยเพศหญิง จะน้อยกว่าและพบความผิดปกติน้อยกว่าเพศชาย (57.8% เปรียบเทียบกับ 65.0%, $p < 0.001$ และ 55.5% เปรียบเทียบกับ 63.9%, $p < 0.01$) ผู้ป่วยเพศหญิงจะได้รับยาละลายลิ่มเลือดน้อยกว่าเพศชาย (28.1% เปรียบเทียบกับ 31.4%, $p = 0.039$) การขยายหลอดเลือดหัวใจด้วยบอลลูนในผู้ป่วยเพศหญิงจะน้อยกว่าเพศชาย (39.0% เปรียบเทียบกับ 48.5%, $p < 0.001$) อัตราการตายจากโรคหัวใจในเพศหญิงสูงกว่าในเพศชาย (23.6% เปรียบเทียบกับ 13.9%, unadjusted OR (95% CI) 1.90 (1.60-2.26), $p < 0.001$) แต่เมื่อทำการปรับผลจากอายุและปัจจัยทางคลินิกอื่น ๆ พบว่าไม่มีความแตกต่างของอัตราการตายภายในโรงพยาบาลระหว่างเพศหญิงและเพศชาย (adjusted OR (95% CI) 1.03 (0.80-1.33), $p = 0.814$) อุบัติการณ์ของภาวะแทรกซ้อนชนิดหัวใจล้มเหลวในผู้ป่วยเพศหญิงมีมากกว่าเพศชายอย่างมีนัยสำคัญทางสถิติ (55.6% เปรียบเทียบกับ 38.7%, $p < 0.001$, adjusted OR (95% CI) 1.29 (1.08-1.54), $p = 0.005$)*

สรุป: *ผู้ป่วยโรคกล้ามเนื้อหัวใจตายเฉียบพลันชนิด ST elevation ที่เป็นเพศหญิงจะมีอายุมากกว่าเพศชาย และมีอุบัติการณ์ของโรคเบาหวานและความดันโลหิตสูงมากกว่าเพศชาย ผู้ป่วยเพศหญิงจะได้รับการขยายหลอดเลือดหัวใจด้วยบอลลูนน้อยกว่าเพศชาย จากการศึกษานี้พบว่า ผู้ป่วยเพศหญิงมีอัตราการเจ็บป่วยและการตายสูงกว่าเพศชาย ดังนั้นการรักษาผู้ป่วยเพศหญิงในเชิงรุกมากกว่าเดิม อาจจะทำให้ผลลัพธ์ทางคลินิกในผู้ป่วยเพศหญิงที่มีโรคกล้ามเนื้อหัวใจตายเฉียบพลันชนิด ST elevation ดีขึ้นกว่าในปัจจุบัน*

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