Preliminary Report

The Effect of the Public or Private Status of Health Care Facility in Acute Coronary Syndrome: Data from Thai ACS Registry

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Background: *Few data showed the differences between public and private hospitals in management practices and outcomes of patients with acute coronary syndrome. Furthermore, no data is available in Thailand.*
Objective: *To determine the patients' characteristics, management practices, and in-hospital outcomes differences between public and private hospitals in Thailand for patients with acute coronary syndrome.*
Material and Method: *Data from the Thai Acute Coronary Syndrome Registry (TACSR), which was a prospective observational study on ACS in Thailand from 2003 to 2005, was used. This registry provided clinical characteristics, medical management and outcomes of patients with ACS during hospitalization. All data were then compared based on type of admitting hospitals; public and private hospitals. To determine the relationship between type of hospital and major cardiac outcomes, multivariate logistic regression analysis was performed and represented as odd ratio(OR) and 95% confidence interval (95%CI).*
Results: *Eight thousand one hundred sixty four patients were admitted to public hospitals (n = 13), and 1,209 were admitted to private hospitals (n = 4). Patients in public hospitals were older (65.4 $\pm$ 12.1 vs. 63.4 $\pm$ 13.3 years, $p < 0.001$) and more female gender (41.7% vs. 30.1%, $p < 0.001$). Diagnosis of acute ST-elevation myocardial infarction were lower in public hospitals compared to private hospitals (39.6% vs. 50%, $p < 0.001$). After adjusting for baseline patient characteristics and management, in-hospital outcomes were higher in public hospitals for total mortality (13.6% vs. 5.9%, OR 2.3, 95%CI 1.76-3.12, $p < 0.001$), cardiac mortality (10.6% vs. 4.8%, OR = 2.1, 95%CI 1.55-2.91, $p < 0.001$) and major bleeding (6.3% vs. 3.2%, OR = 2.1, 95%CI 1.48-3.23, $p < 0.001$). Compared with the patients in the public hospital, patients in the private hospitals were more likely to undergo coronary angiography, percutaneous coronary intervention and coronary bypass grafting.*
Conclusion: *In Thailand, management of patients with acute coronary syndrome is influenced by the public or private status of the hospitals. Patients were more likely to undergo coronary angiography and coronary revascularization procedures in private hospitals. The length of hospital stays and in-hospital mortality was higher in public hospitals.*

Keywords: *Acute coronary syndrome, Health care facility, The Thai Acute Coronary Syndrome Registry*

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Acute coronary syndrome (ACS) becomes a common problem in Thailand. Whether patients' characteristics, management practices and in-hospital outcomes of patients with acute coronary syndrome hospitalized to public hospital differ from those of private hospitals for-profit is an essential question in health care debate. Although the costs and patient outcomes in public and private hospitals have been extensively

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debated[1-4], it is generally assumed that the private for-profit health care system was more likely to use expensive, high-tech procedures. Regarding the management of the patients with coronary syndrome, private hospitals use more expensive drugs and technologies and have differences in practice and outcomes from the public hospitals[1,5]. The patients are more likely to undergo coronary angiography and revascularization procedure in private hospitals[6]. However, little is known about the influence of hospital ownership status on the management practice and outcomes of the patients with acute coronary syndrome in Thailand. The authors sought to determine the difference in patients' characteristics, management practices, length of stay and in-hospital outcomes of patients with acute coronary syndrome between public and private for-profit hospitals in Thailand. The authors used data from the Thai Acute Coronary Syndrome Registry (TACSR) to address these issues. The TACSR is established as a multi-center, included both public and private hospitals, prospectively registry that describes the epidemiology, management practices and in-hospital outcomes of the patients with the whole spectrum of ACS in Thailand.

Material and Method

Study population

The Thai Acute Coronary Syndrome Registry (TACSR) enrolled 9,373 admitted patients with presenting symptoms of acute coronary syndrome (ACS) and the discharge diagnosis of acute coronary syndrome from 17 hospitals in Thailand from 2003 to 2005. These hospitals included 13 public hospitals and 4 private hospitals. The diagnosis of ACS was based on ACC/AHA guidelines[7,8]. In brief, patients required to have chest pain or other suggestive ischemic symptoms within the previous 14 days and ST segment deviation or T-wave changes on electrocardiogram (EKG). Cardiac biomarkers for acute myocardial injury were also determined. Patients were then classified into three groups, ST-elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (NSTEMI) and unstable angina (UA).

Data collection

The cardiologists in admitting hospitals clinically examined each patient. Clinical data were then obtained and, later, sent to a central registry office for data collection. These data included patients' demography, date and time of symptoms and any given medical procedures, in-hospital pharmacological treatment, utilization of coronary angiogram (CAG) and specific type of reperfusion therapy. According to the registry protocol, a central committee carefully monitored all recorded data in regular interval for its completeness and accuracy.

Clinical outcomes

The authors used in-hospital clinical events as the outcomes of medical management in the present study. All patients had been followed until endpoint was reached, i.e. hospital discharge or in-hospital death. The outcomes were death from any cause, cardiac death, presence of heart failure, cardiac arrhythmia (heart block, ventricular arrhythmia or both), acute stroke (ischemic or hemorrhagic stroke), length of hospital stay (LOS) and major bleedings (overt clinical bleeding requiring a blood, documented intracranial or retroperitoneal hemorrhage).

Statistical analysis

Patient characteristics, in-hospital medical therapy, reperfusion therapy and in-hospital outcomes were compared between the two hospital systems. The patient characteristics for nominal variables are expressed in number and percentage. The continuous variables are shown as mean $\pm$ SD and median with interquartile range (IQR). The z-test statistic or Chi-square test was used for categorical variables; the nonparametric test (Mann-Whitney U test) was used for continuous variables and the multiple logistic regression for multivariable analysis. A p-value of less than 0.05 was considered statistical significant. The STATA version 8.0 was used for data analysis.

Results

The Thai ACS registry (TACSR) program started to register patients from August 2002 to October 2005 involving 17 medical centers. After three years of enrollment, the study cohort included 9,373 patients with 10,342 episodes of coronary syndromes. There were 8,164 patients (87%) hospitalized in public hospitals and 1,209 patients (13%) hospitalized in private hospitals. Of the 8,164 patients who were hospitalized in the public hospitals, 6,058 patients (64.6%) were hospitalized at metropolitan public hospitals in Bangkok and 2,106 patients (22.5%) were hospitalized at regional public hospitals. For the 1,209 patients hospitalized at private hospitals, 1,154 patients (12.3%) were admitted to the metropolitan private hospitals and only 55 patients (0.6%) were hospitalized at regional private hospitals.

Hospital characteristics

There were 13 public hospitals and four private hospitals. Of the participant public hospitals, there were 10 hospitals located in Bangkok and the other three were regional hospitals. Three of the participant private hospitals were located in Bangkok and another one was a regional hospital. The characteristics of participant hospitals are shown in Table 1. Most

Table 1. Characteristics of participant hospitals

	Public hospital	Private hospital
Number of hospitals	13	4
Location		
- Metropolitan, n	10	3
- Regional public, n	3	1
Number of hospital beds, median (IQR)	796 (700-1343)	275 (213-450)
Number of CCU beds, median (IQR)	6 (4-7)	12 (7-17)
Number of ACS admission/year, (IQR)	232 (156-310)	104 (55-226)
Cardiac catheterization facility, n (%)	12 (92.3)	4 (100.0)
Emergency on call for primary PCI, n (%)	7 (53.8)	4 (100.0)
Open-heart surgery, n (%)	12 (92.3)	4 (100.00)

IQR = Inter quartile range

Table 2. Baseline demographic and clinical characteristics of the patients according to type of the the hospital

Risk factors	Public hospital (n = 8164)	Private hospital (n = 1209)	p-value[†]
Demographics			
Age (year)			
Mean ± SD	65.4 ± 12.1	63.4 ± 13.3	<0.001[a]
Median (min, max)	66.7 (23.9, 105.5)	63.8 (22.8, 100.2)	
Interquartile Range	17.2	20.3	
Age group (year)			
< 65	44.7	52.8	<0.001
≥ 65	55.3	47.2	<0.001
Male (%)	58.3	69.9	<0.001
Time from onset to admission (hr) (n = 8668)			
Median (min, max)	6.7 (0.1, 344.6)	14.0 (0.1, 344)	<0.001[a]
Interquartile Range	26.9	48.4	
Medical History (%)			
Diabetes Mellitus	44.5	42.3	0.163
Hypertension	64.6	59.3	<0.001
Family history	10.8	15.9	<0.001
Smoking	31.3	37.2	<0.001
Dyslipidemia	76.7	66.0	<0.001
Hospital Presentation (%)			
Typical chest pain	79.5	73.5	<0.001
Dyspnea	31.6	25.4	<0.001
Syncope	5.3	5.4	0.974
Cardiogenic shock	9.6	7.4	0.017
Postcardiac arrest	4.2	4.2	0.987
Congestive heart failure at present or within 48 hrs	43.7	33.4	<0.001
Final Diagnosis (%)			
ST elevation MI	39.6	50.0	<0.001
Non Q wave MI	39.1	29.4	<0.001
Unstable angina	21.3	20.6	0.573

[†] = Z-test

[a] = Mann-Whitney test

of the hospitals recruited in TACSR have a cardiac catheterization facility. Seven of the recruited public hospitals and 4 of the recruited private hospitals have a 24-hour on call service for primary percutaneous coronary intervention (PCI). All of the participant hospitals have a coronary bypass surgery facility. All of the participant public hospitals are university hospitals.

Patient characteristics

The baseline characteristics of the patients are shown in Table 2. Patients hospitalized in public hospitals were significantly three years older and more female gender. Hypertension and dyslipidemia were common cardiovascular risk factors in both sectors; however, they were more common in those hospitalized in public hospitals. Smoking and a family history of coronary heart disease were more common in patients hospitalized in the private hospitals. There was no significant difference in the overall incidence of diabetes mellitus. However, the prevalence of newly diagnosis of diabetes and dyslipidemia were significantly higher in those hospitalized to the public hospitals. The incidence of newly diagnosis of diabetes mellitus was 3.0% for public hospitals vs. 0.9% for private hospitals ($p < 0.001$). The incidence of newly diagnosis of dyslipidemia was 16.1% for public hospitals vs. 5.1% for private hospitals ($p < 0.001$).

The presenting symptoms were somewhat varied in each group (Table 2). The typical angina pain, cardiac dyspnea, congestive heart failure and cardiogenic shock at presentation were significantly more common in the public group. The time from onset of symptoms to admission to the hospital was significantly lower for the patients hospitalized to the public hospitals.

For the type of coronary syndrome, a STEMI was more common in the private sector while a NSTEMI was more common in the public sector. There was no difference in the incidence of unstable angina between the two sectors.

Reperfusion therapy in the patients presented with a ST-segment elevation acute coronary syndrome

For the patients who presented with a ST-segment elevation acute coronary syndrome, the patients of the private hospitals presented to the

Table 3. In hospital use of reperfusion in therapy in patients with ST elevation ACS (STEMI)* (n = 3836)

Risk Factors	Public hospital (n = 3231)	Private hospital (n = 605)	p-value†
*Time from onset of symptom to admission (hr)			
Median (min, max)	6.5 (0.1, 344.6)	12.5 (0.2, 344)	<0.001[a]
Interquartile Range	25.8	44.3	
Any initial reperfusion therapy (Thrombolysis or primary PCI) (%)	63.7	72.6	<0.001
Thrombolysis (%)			
Streptokinase	29.3	25.1	0.026
TPA**	2.0	0.5	<0.001
*Door to needle time (min)			
Median (min, max)	88 (10, 845)	78.5 (10,593)	0.970[a]
Interquartile Range	90	127	
*Time from onset to initiation of thrombolysis (min)			
Median (min, max)	245 (10, 1380)	217.5 (10, 1256)	0.068[a]
Interquartile Range	205	217	
Primary PCI (n = 853)			
*Door to balloon time (min)			
Median (min, max)	126 (7, 1328)	105.5 (7, 905)	0.029[a]
Interquartile Range	136	96	
*Time from onset to initiation of balloon angioplasty (min)			
Median (min, max)	359 (65, 1436)	363.5 (85, 1380)	0.585[a]
Interquartile Range	363	364.5	

† = Z-test

[a] = Mann-Whitney test

* Analysis only non-refer patient and those who had time from onset of symptom to time of reperfusion Therapy (time from onset of symptom to balloon or time from onset of symptom to thrombolysis) less than or equal to 24 hour

** TPA = Tissue plasminogen activator

hospitals later than the patients of the public hospitals (Table 3). In the first 24 hours after presentation to the hospital, the patients hospitalized to private hospitals received more reperfusion therapy, either thrombolytic or primary (PCI), than those of the public hospitals (72.6% vs. 63.7%, $p < 0.001$).

For thrombolytic therapy, Streptokinase was used in most cases who received thrombolytic treatment in both sectors. However, the use of tissue plasmogen activator (TPA) was significantly higher in the public sector. Regarding the time of initiation of thrombolytic therapy, there was neither difference in the door-to-needle time (the median was 88 minutes for public hospitals and 78 minutes for private hospitals, $p = 0.97$) nor time form onset of the symptom to initiation of thrombolytic treatment between both sectors. Regarding the primary PCI, the time from arrival to initiation of balloon angioplasty of PCI was longer than time for initiation of thrombolytic treatment. There was significantly less door to balloon time in the private sectors (median 105.5 minutes vs. 126 minutes, $p = 0.029$), however, there was no difference in the time from the onset of symptoms to initiation of PCI treatment.

For the patients with a STEMI who presented to the hospital within 6 hours from the onset of symptoms, the medical thrombolytic treatment was used more commonly in the public sector (34.9% vs. 18.9%, $p < 0.001$) whereas the rate of primary PCI was more common in the private sector (65.8% vs. 43.9%, $p < 0.001$) (Table 4). The percentage of patients with STEMI who presented within 6 hours from onset of symptoms receiving reperfusion therapy (either thrombolytic treatment or primary PCI) was higher in the private sector (77.5% vs. 70.2%, $p = 0.025$). For the patients with STEMI who presented to the hospital after 6 hours to 12 hours from the onset of symptom, there was neither difference in the rate of patients received reperfusion treatment nor modes of reperfusion treatment.

The in-hospital use of the invasive diagnosis and therapeutic techniques are presented in Table 5. Private hospitals had a significantly higher rate of coronary angiography (69.9% vs. 49.5%, $p < 0.001$), total PCI (43.6% vs. 28.2%, $p < 0.001$), primary PCI (13.3% vs. 8.5%, $p < 0.001$), elective PCI (18.6% vs. 11.4%, $p < 0.001$)) and coronary bypass surgery (10.8% vs. 6.1%, $p < 0.001$).

Table 4. Reperfusion therapy in patients with STEMI according to time from onset of symptom to admission to the hospitals

Time from onset to admission to hospital	Reperfusion therapy	Public hospital (n = 1613)	Private hospital (n = 222)	p-value†
6 hours or less	Thrombolytic (%)	34.9	18.9	<0.001
	Primary PCI (%)	43.9	65.8	<0.001
	Thrombolysis or primary PCI (%)	70.2	77.5	0.025
More than 6 hours to less than12 hours	Thrombolytic (%)	31.7	33.8	0.715
	Primary PCI (%)	52.0	56.3	0.484
	Thrombolysis or primary PCI (%)	72.0	75.0	0.585

† = Z-test

Table 5. The in-hospital use of invasive diagnosis and therapeutic technique

Risk factors	Public hospital (n = 8164)	Private hospital (n = 1209)	p-value†
Angiography (%)	49.5	69.9	<0.001
PCI (%)	28.2	43.6	<0.001
Primary PCI	8.5	13.3	<0.001
Rescue PCI	1.4	1.1	0.351
Elective PCI	11.4	18.6	<0.001
CABG (%)	6.1	10.8	<0.001

† = Z-test

In-hospital pharmacological treatment

With regard to the pharmacological treatments during hospitalization (Table 6), the patients hospitalized to public hospitals were treated more often with aspirin (95.2% vs. 91.5%, $p < 0.001$), beta-blockers (64.5% vs. 48.7%, $p < 0.001$), angiotensin-converting enzyme (ACE) inhibitors (61.2% vs. 34.9%, $p < 0.001$), and HMG CoA reductase inhibitors (Statin) (80.9% vs. 72.9%, $p < 0.001$). But those of the private sector were treated more often with angiotensin receptor blockers (ARB) (6.0% vs. 20.3%, $p < 0.001$), ADP inhibitors (ticlopidine or clopidrogrel) (54.6% vs. 82.6%, $p < 0.001$), calcium channel blockers (18.9% vs. 29.9%, $p < 0.001$), other lipid lowering agents (those were not statin) (3.6% vs. 5.4%, $p = 0.002$) and glycoprotein IIb/IIIa inhibitors (9.8% vs. 16.4%, $p < 0.01$).

In-hospital outcomes

The hospital outcomes are shown in Table 7. The length of hospital stay was significantly longer in the public sector (median 7 days vs. 4.9 days, $p < 0.001$). The in-hospital mortality rate was higher among the patients admitted to the public hospitals. For the cause of death, both cardiac death and non-cardiac death were significantly higher in a public hospital group. Congestive heart failure and major bleeding were also more common in the public sector. Regarding congestive heart failure, the incidence of congestive heart failure at presentation or within 48 hours was higher in the public sector but there was no difference in incidence of congestive heart failure that occurred after 48 hours of admission. There was no difference in the incidence of cardiac arrhythmia and cerebrovascular events between both sectors.

The authors performed multivariate analysis to adjust the in-hospital outcomes according to age, gender, diabetes mellitus, hypertension, dyslipidemia and heart failure at presentation. The in-hospital mortality and other unfavorable outcomes remained significantly higher among the patients admitted to the public hospitals.

Discussion

The present study explored the process of care and outcomes of 9,373 patients treated for acute coronary syndromes in public hospitals and private hospitals of Thailand. It provides the first comparison in care of patients with acute coronary syndrome with respect to the type of health care system in Thailand. Most of the participant hospitals were in the Bangkok metropolitans. There was difference in the characters of the patients between the two groups. The patients hospitalized to the public hospitals were 3 years older and more female population than those of private hospitals. There was also a difference in coronary risk factors between the two sectors. The patients of the

Table 6. Pharmacological treatment during hospitalization (n = 9373)

Drugs	Public hospital (n = 8164) (%)	Private hospital (n = 1209) (%)	p-value†
Aspirin	95.2	91.5	<0.001
Heparin	23.4	21.2	0.091
Beta blocker	64.5	48.7	<0.001
LMWH*	60.9	63.7	0.062
ACEI* or ARB*	64.8	51.2	<0.001
ACE inhibitors	61.2	34.9	<0.001
ARB*	6.0	20.3	<0.001
Clopidrogrel/ticlopidine (ADP-I)*	54.6	82.6	<0.001
Calcium blockers	18.9	29.9	<0.001
Statin	80.9	72.9	<0.001
Other lipid lowering agents	3.6	5.4	0.002
Glycoprotein IIb/IIIa inhibitors	9.8	16.4	<0.001

† = Z-test

* LMWH = Low molecular weight heparin
ACEI = Angiotensin converting enzyme inhibitors
ARB = Angiotensin II receptor blockers
ADP-I = Adenosine diphosphate inhibitors

Table 7. Hospital outcomes with multivariable-adjusted risk of the selected hospital outcomes

Outcome	Public hospital n = 8164 number (%)	Private hospital n = 1209 number (%)	p-value†	OR 95%CI (univariate)	p-value	OR 95%CI (multivariate)*	p-value
*Length of stay (day)							
Median (min, max)	7 (0.03, 185.1)	4.9 (0.06, 182.5)	<0.001[a]	-	-	-	-
Death (total death)	1107 (13.6%)	71 (5.9%)	<0.001	2.5 (1.96-3.22)	<0.001	2.3 (1.76-3.12)	<0.001
Cardiac death	862 (10.6%)	58 (4.8%)	<0.001	2.3 (1.78-3.07)	<0.001	2.1 (1.55-2.91)	<0.001
Non-cardiac death	245 (3.0%)	13 (1.1%)	<0.001	2.8 (1.62-4.98)	<0.001	2.7 (1.47-5.05)	0.001
Congestive heart failure							
Total	3797 (46.5%)	431 (35.6%)	<0.001	1.5 (1.38-1.77)	<0.001	1.5 (1.34-1.77)**	<0.001
At present or within 48 hours	3570 (43.7%)	404 (33.4%)	<0.001	1.5 (1.36-1.75)	<0.001	1.5 (1.33-1.77)**	<0.001
CHF*** after 48 hours	227 (2.8%)	27 (2.2%)	0.274	1.2 (0.83-1.87)	0.275	1.1 (0.75-1.73)**	0.530
Cardiac arrhythmia							
Total	1365 (16.7%)	192 (15.9%)	0.465	1.0 (0.90-1.25)	0.465	1.0 (0.91-1.31)	0.328
Heart block	523 (6.4%)	57 (4.7%)	0.023	11.3 (1.04-1.83)	0.023	1.3 (0.97-1.79)	0.700
Ventricular arrhythmia	923 (11.3%)	144 (11.9%)	0.537	0.9 (0.78-1.13)	0.537	0.9 (0.80-1.23)	0.961
CVA*** complication	(1.9%)	(2.4%)	0.255	0.7 (0.53-1.18)	0.256	0.759 (0.48-1.18)	0.224
Major bleeding	518 (6.3%)	39 (3.2%)	<0.001	2.0 (1.45-2.83)	<0.001	2.1 (1.48-3.23)	<0.001

† = Chi-square test
[a] = Mann-Whitney test
* Adjusted by age, gender, diabetes mellitus, hypertension, dyslipidemia, congestive heart failure at presentation or within 48 hours of presentation
** Adjusted by age, gender, diabetes mellitus, hypertension and dyslipidemia
*** CHF = Congestive heart failure
CVA = Cerebrovascular accident

public hospitals had a higher incidence of hypertension and hyperlipidemia but less smoking and less family history of coronary artery disease. There was no difference in the overall incidence of diabetes mellitus. An interesting observation was the higher incidence of the newly diagnosis of diabetes and dyslipidemia in the patients of public hospitals. This may reflect that the patients in the public sector have had lower awareness in their health problems or lower opportunity to have a health check up for screening of the common cardiovascular risk factors. The incidence of cardiac dyspnea, congestive heart failure and cardiogenic shock at presentation to hospital were higher among patients hospitalized to public hospitals despite lower time to seek health care service and lower incidence of STEMI. These may be suggestive of difference in severity of the acute coronary syndrome patients. Imbalances in baseline characteristics were possibly to explain the difference of mortality and major outcomes[9-12].

The incidence of STEMI was higher in the private sector while the non-STEMI was more common in the public sector. In the first 24 hours after admission to the hospital, the patients presented with STEMI hospitalized to private hospitals received more reperfusion therapy than those of public hospitals. This was related to a higher rate of reperfusion treatment in the first 6 hours in the patients who presented within 6 hours after onset of symptoms. Both sectors preferred primary PCI than thrombolytic therapy in the patients with STEMI who presented early especially within 6 hours after the onset of symptoms, however, "the ratio of primary PCI to thrombolytic treatment" was significantly higher in the private sector. Considering the longer time from onset of symptom to time of admission of the patients hospitalized to the private hospital may explain less common use of the medical thrombolytic treatment. From the rate of overall in-hospital reperfusion therapy, the authors observed different treatment strategies between the two systems. Patients treated in private hospitals were managed more invasively than in public hospitals. The patients hospitalized to private hospitals were more likely to receive angiography and coronary revascularization. The incidence of bypass surgery was also higher in the private sector. This was likely related to a greater availability of catheterization laboratories and surgical facilities at private hospitals.

However, the use of cardiac medications differed between public hospitals and private hospitals. Evidence-based treatments such as aspirin, beta-blocker, ACEI and HMGcoA reductase inhibitors were used more often in public hospitals during hospitalization. The use of drugs active in renin-angiotensin-aldosterone system, ACE-inhibitor and ARB, was higher in the public sector. This was likely explained by the higher incidence of congestive heart failure in the public sector. When considered in detail, the ratio of ACE-inhibitor use to ARB use was higher in the public sector. While the private sector had more use of the costly ARB. For antiplatelets, the private sector had less use of aspirin but more use of ADP inhibitors and glycoprotein IIb/IIIa inhibitors that are more expensive. These were likely related to a higher rate of percutaneous coronary intervention. Regarding lipid lowering agents, the public hospitals had more use of statin.

For the in-hospital outcome, patients admitted to the public hospitals had a longer length of stay and more unfavorable outcomes. If considering the higher risk of patients in the public sector, the lower rate of coronary angiography and less coronary revascularization suggested that the less effectiveness of the reperfusion therapy given to the high-risk patients. This might be considered as causes of longer length of stay and more unfavorable outcomes. The lower mortality rate in the private sectors was not affected by the difference of age, gender, hypertension, dyslipidemia and heart failure at presentation. The in-hospital mortality rate was higher in the public sector despite multivariable analysis being performed. Regarding the cause of death, both cardiac and non-cardiac death were predominant causes of death in the public hospitals. This reflected the problem of the in-hospital care in the public sector and needs attention for improvement. The higher incidence of congestive heart failure, especially during the first 48 hours in the public sectors suggested the higher risk of the patients and affect to the higher use of drugs active in renin-angiotensin-aldosterone system.

Limitations

There were some limitations in the present study. First, the study design was not a randomized control trial. Second, the participating public hospitals in the present study were university and teaching hospitals. The admission to a teaching hospital was associated with better quality of care[13]. The participating private hospitals were among large hospitals in Bangkok that have facilities of cardiac catheterization and bypass graft surgery. The participating hospitals in the present study were not likely to be representative of all public hospitals and private hospitals in

Thailand. Third, most (75%) of the patients in the registry were treated in the participant hospitals in Bangkok. Given this fact, the authors could speculate that differences in outcomes and resource use may be even greater in actual practice and in regional hospitals[14-17]. Fourth, the number of patients from private hospitals was relatively small. Fifth, the registry has not recorded the type of stents used in PCI and the use of drug-eluting stent. From these limitations, the authors did not intend to provide definitive conclusions but to generate hypotheses and raise important public health care issues.

Conclusion

The authors reported substantial differences in the patient characteristics, management practice and in-hospital outcomes of patients treated for acute coronary syndromes in public hospitals and private hospitals. Public hospitals had higher risk patients including more incidences of congestive heart failure and STEMI. Private hospital patients treated for acute coronary syndromes received more invasive treatment, higher revascularization rate, shorter length of hospital stay, and less in-hospital mortality. The mortality difference was not explained by an imbalance in baseline risk. Multiple factors related to the process of care could have caused these outcome differences. The overall findings of the present study have meaningful public health care implications and deserve further investigation.

Contributors

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การรักษาโรคกล้ามเนื้อหัวใจขาดเลือดเฉียบพลันในโรงพยาบาลของรัฐและเอกชน: ข้อมูลจากโครงการลงทะเบียนผู้ป่วยกล้ามเนื้อหัวใจขาดเลือดเฉียบพลันแห่งประเทศไทย

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ภูมิหลัง: *มีการศึกษาแสดงความแตกต่างในการรักษากล้ามเนื้อหัวใจขาดเลือดเฉียบพลันระหว่างโรงพยาบาลของรัฐและโรงพยาบาลเอกชน แต่ยังไม่มีข้อมูลในประเทศไทย*

วัสดุและวิธีการ: *โครงการลงทะเบียนผู้ป่วยกล้ามเนื้อหัวใจขาดเลือดเฉียบพลันแห่งประเทศไทย*

ผลการศึกษา: *เป็นการศึกษารวบรวม ลงทะเบียนผู้ป่วยกลุ่มอาการกล้ามเนื้อหัวใจขาดเลือดเฉียบพลันจำนวน 9,373 ราย ในช่วง 3 ปีของการศึกษา โดยได้เข้ารับการรักษาในโรงพยาบาล 17 แห่งในภูมิภาคต่าง ๆ ในประเทศไทย เป็นโรงพยาบาลของรัฐ 13 แห่ง และโรงพยาบาลเอกชน 4 แห่ง ผู้ป่วยที่เข้ารับการรักษาในโรงพยาบาลของรัฐมีอายุมากกว่า มักเป็นผู้หญิง มีความดันโลหิตสูง ไขมันในเลือดสูง และมีภาวะหัวใจล้มเหลว ณ เวลาที่เข้าพักโรงพยาบาลสูงกว่ากลุ่มที่เข้ารักษาในโรงพยาบาลเอกชน ผู้ป่วยกล้ามเนื้อหัวใจตายเฉียบพลันที่เข้ารักษาในโรงพยาบาลของรัฐมีระยะเวลาในการอยู่โรงพยาบาลนานกว่า มีอัตราเสี่ยงสูงต่อภาวะหัวใจวายและการเสียชีวิต ซึ่งอัตราเสี่ยงนี้ยังคงสูงอยู่ แม้ว่าจะปรับค่าด้วยปัจจัยร่วมต่าง ๆ ผู้ป่วยกล้ามเนื้อหัวใจขาดเลือดที่เข้ารับการรักษาในโรงพยาบาลเอกชนได้รับการทำการฉีดสารทึบรังสีดูหลอดเลือดหัวใจ การขยายหลอดเลือดหัวใจ และการทำการผ่าตัดบายพาสหลอดเลือดหัวใจสูงกว่า*

สรุป: *ลักษณะของผู้ป่วยกล้ามเนื้อหัวใจขาดเลือดเฉียบพลันและวิธีการรักษามีความแตกต่างกันระหว่างโรงพยาบาลของรัฐ และโรงพยาบาลเอกชน ผู้ป่วยกล้ามเนื้อหัวใจขาดเลือดที่เข้ารับการรักษาในโรงพยาบาลเอกชนได้รับการทำการแก้ไขการตีบตันของหลอดเลือดมากกว่า มีระยะเวลาในการอยู่โรงพยาบาลสั้นกว่า และมีภาวะหัวใจวายและการเสียชีวิตที่ต่ำกว่าผู้ป่วยที่เข้ารับการรักษาในโรงพยาบาลของรัฐ*