Demographics, Management Practices and In-Hospital Outcomes: Results from the HRH Princess Maha Chakri Sirindhorn Medical Center Acute Coronary Syndrome Registry

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Objective: *To determine the demographics and in-hospital outcomes of patients with acute coronary syndrome. It provides a real-life data to assess treatment strategies for acute coronary syndrome (ACS) patients.*

Material and Method: *The prospective study included patients who were hospitalized with the diagnosis of ACS during January to December, 2013. The data were analyzed in terms of characteristics, clinical presentation, treatment, and in-hospital outcomes.*

Results: *A total of 105 patients were enrolled. Mean age of all patients was 73.8 years and half of the patients were older than 70 years old. Twenty patients were classified as ST-segment elevation myocardial infarction (STEMI) and 85 as unstable angina or non-ST-segment elevation myocardial infarction (UA/NSTEMI). Overall prevalence of diabetes was 52.4%. The STEMI group was predominantly male, with a fewer number of diabetes than in UA/NSTEMI group. Eighty percent of the STEMI patients received reperfusion therapy. Primary percutaneous coronary intervention (PCI) was performed in 70% of STEMI patients. The median door-to-needle and door-to-balloon time were 60 and 74 minutes, respectively. Six of fourteen primary PCI patients received it after 90 minutes. Nearly half of UA/NSTEMI patients went to coronary angiography and about one-third of them received revascularization with either PCI or coronary artery bypass grafting. The total mortality rate was 15% in both the STEMI patients and the UA/NSTEMI patients.*

Conclusion: *This registry provided a detail of demographics, management practices, and in hospital outcomes of ACS patients. Door-to-needle time and door-to-balloon time were considered as suboptimal. In-hospital mortality was higher than the latest national average. Patient delay should be improved by giving more education to the general public and concerted effort to improve in-hospital time delay is warranted. These data have an impact on our patient care system and alert our team to improve patient care.*

Keywords: *Acute coronary syndrome, ST-segment elevation myocardial infarction, Non-ST-segment elevation myocardial infarction, Unstable angina, Registry*

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Acute coronary syndrome (ACS) is a serious medical condition associated with high morbidity and mortality. Outcomes may reflect the quality of patient care system. The first Thai Acute Coronary Syndrome (TACS) registry, which was conducted between 2002 and 2004[1], demonstrated two times higher in-hospital mortality when compared with the GRACE registry[2]. However, some baseline characteristics were different particularly the severity of patients and much higher prevalence of diabetes. The door-to-balloon time in the first registry was longer than standard recommendation. The second Thai ACS registry was started five years after the first registry. There were some differences in participant hospitals and demographic data. Between 2007 and 2008, a total of 2,007 patients were consecutively enrolled. Average mean age had slightly decreased and males seemed to be more predominant in second registry. Severity at presentation using Killip classification showed that patients in the second registry had less cardiogenic shock particularly in STEMI patients and less cardiac

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arrest than the first registry. In-hospital mortality in the second registry was significantly reduced in all categories of ACS patients when compared with the first registry. Mortality rate in the STEMI group markedly reduced from 17.0% to 5.3%. As well as for the NSTEMI group, the mortality rate decreased from 13.1% to 5.1%[3].

A significant number of new drugs and new techniques have been introduced into clinical practice, resulting in important heterogeneity of approach and treatment of ACS patients. The current study attempts to determine the contemporary demographics and in-hospital outcomes of ACS patients. It provides a real-life data to assess treatment strategies and adherence to the current guidelines. Given the pressures of practicing evidence-based medicine, the results will allow new opportunities to improve patient care. It also aims to facilitate research using this database.

Material and Method

The prospective study included patients who were hospitalized with the discharge diagnosis of ACS between January 2013 and December 2013. The index acute coronary symptoms, chest pain or angina equivalents had to occur within 14 days before enrollment and accompanied by electrocardiographic ST-segment deviations or T wave changes. At discharge, the patients were classified into one of the following categories: ST-segment elevation myocardial infarction (STEMI), non-STEMI or unstable angina (UA/NSTEMI). The authors excluded the patients who had to be re-admitted with the previous diagnosis of ACS. Death was recorded if the patients died during hospitalization and was classified as cardiac death or non-cardiac death. Congestive heart failure during hospitalization was defined as none, within the first 48 hours or after 48 hours. Major bleeding was defined as overt clinical bleeding (or documented intracranial or retroperitoneal hemorrhage) requiring blood transfusion or being associated with a drop in hemoglobin of greater than 5 g/dl or hematocrit of greater than 15%. Serious cardiac arrhythmia was classified as heart block (at least 2nd degree AV block) or ventricular arrhythmia.

Consecutive patients were enrolled prospectively. A trained resident in medicine collected in-hospital data regarding patient characteristics, clinical presentation, diagnosis, treatment, and outcomes from the medical record. Case record forms were completed in the presence of a blinded cardiologist directly assessed the patient to determine the outcomes. The study protocol was approved by the Ethics Committee of Faculty of Medicine, Srinakharinwirot University and informed consent had to be obtained before the enrollment. Categorical data were summarized as frequencies and percentages. Continuous variables were reported as mean $\pm$ SD or median. Differences between patient groups were examined using Chi-square tests for categorical variables. Differences in continuous variables between groups were analyzed using either analysis of variance or t-tests. All tests were two-sided and considered statistically significant at $p<0.05$. All analyses were performed with SPSS version 17.

Results

One hundred and five patients were consecutively enrolled, twenty patients had STEMI and 85 had UA/NSTEMI. The baseline characteristics of the patients are shown in Table 1. Mean age of all patients was 73.8 years and half of the patients were older than 70 years old. Males were significantly more predominant in STEMI than in UA/NSTEMI group. There was a high prevalence of diabetes (52.4%), hypertension (85.7%), dyslipidemia (81.9%). The proportion of diabetes, hypertension and dyslipidemia were significantly higher in UA/NSTEMI group compared to STEMI group. The typical angina was a less common presentation in UA/NSTEMI patients, who presented more commonly with dyspnea.

Eighty percent of STEMI patients received reperfusion therapy, either thrombolysis or primary percutaneous coronary intervention (PCI) (Table 2). Two patients received thrombolysis with door-to-needle time of 60 minutes. Fourteen patients received primary PCI. Median door-to-balloon time for those receiving primary PCI was 74 minutes, eight patients receiving it within 90 minutes. One patient underwent coronary artery bypass grafting (CABG) surgery within 24 hours of myocardial infarction. She presented with anterior wall STEMI and the angiography revealed severe calcification and stenosis in proximal segment of the left anterior descending artery and in the circumflex artery. There was normal antegrade flow in the left coronary arteries. CABG surgery was considered due to severe coronary calcification. Forty-five percent of UA/NSTEMI patients received invasive strategy within 48 hours. Thirty-two percent of UA/NSTEMI patients received revascularization, the ratio of PCI to CABG was 8 to 1. With regard to pharmacological treatments during hospitalization (Table 3), the majority of the patients received aspirin and statin, particularly

Table 1. Baseline characteristics of the patients

	UA/NSTEMI n = 85	STEMI n = 20	Total n = 105	*p*-value
Age (years)				
<40, n (%)	1 (1.2)	0	1 (1.0)	
41-70, n (%)	37 (43.5)	14 (70.0)	51 (48.6)	
>70, n (%)	47 (55.3)	6 (30.0)	53 (50.4)	
Age (mean ± SD, years)	72.1±5.7	65.4±6.8	73.8±7.2	0.430*
Male, n (%)	31 (36.5)	14 (70.0)	45 (42.9)	0.001**
Presenting symptom				
Typical angina, n (%)	46 (54.1)	17 (85.0)	63 (60.0)	0.034**
Atypical angina, n (%)	7 (8.2)	2 (10.0)	9 (8.6)	0.354**
Palpitation, n (%)	9 (10.6)	0	9 (8.6)	0.128**
Dyspnea, n (%)	17 (20.0)	1 (5.0)	18 (17.1)	0.014**
Sudden cardiac arrest, n (%)	6 (7.1)	0	6 (5.7)	0.221**
Killip classification				0.045**
Killip I, n (%)	51 (60.0)	17 (85.0)	68 (64.8)	0.304**
Killip II, n (%)	10 (11.8)	2 (10.0)	12 (11.4)	0.123**
Killip III, n (%)	18 (21.2)	1 (5.0)	19 (18.1)	0.113**
Killip IV, n (%)	6 (7.0)	0	6 (5.7)	0.126**
Risk factors				
Diabetes, n (%)	50 (58.8)	5 (25.0)	55 (52.4)	0.006**
Hypertension, n (%)	78 (91.8)	12 (60.0)	90 (85.7)	0.001**
Dyslipidemia, n (%)	74 (87.1)	12 (60.0)	86 (81.9)	0.005**
Smoking, n (%)	12 (14.1)	7 (35.0)	19 (18.1)	0.113**
Stroke, n (%)	8 (9.4)	0	8 (7.6)	0.153**

* Independent t-test, ** Chi-square test

Table 2. Reperfusion treatment in STEMI

	STEMI n = 20	%
Reperfusion treatment	16	80
Thrombolytic	2	10
Door-to-needle time		
median, minutes	60.0	
Primary PCI	14	70
Door-to-balloon time		
median, minutes (inter-quartile range)	74 (59.25, 134.75)	
CAG	18	90
Abnormal	18	100

PCI = percutaneous coronary intervention; CAG = coronary angiography

all STEMI patients. The ADP inhibitor and ACE inhibitor were prescribed more often in STEMI than in UA/NSTEMI patients. The rate of use of beta-blocker was low in both the STEMI patients and the UA/NSTEMI patients.

In-hospital case fatality rate was about 15% in both the STEMI and the UA/NSTEMI group. Congestive heart failure, cardiogenic shock, serious cardiac arrhythmia and major bleeding were not also significantly different in the both groups. UA/NSTEMI patients had significantly longer hospital stay than STEMI patients (Table 4).

Table 3. Pharmacological treatment during hospitalization

	UA/NSTEMI n = 85	STEMI n = 20	*p*-value*
Aspirin, n (%)	80 (94.1)	20 (100.0)	0.266
ADP inhibitor, n (%)	55 (64.7)	20 (100.0)	0.002
LMWH, n (%)	34 (40.0)	6 (30.0)	0.407
Beta-blocker, n (%)	41 (48.2)	9 (45.0)	0.794
ACE inhibitor, n (%)	31 (36.5)	17 (85.0)	0.001
ARB, n (%)	11 (12.9)	0	0.089
Statin, n (%)	84 (98.8)	20 (100.0)	0.626

* Chi-square test
ADP = adenosine di-phosphate; LMWH = low molecular weight heparin; ACE = angiotensin converting enzyme; ARB = angiotensin receptor blocker

Table 4. Hospital outcomes in patients with acute coronary syndrome

Outcomes	UA/NSTEMI n = 85	STEMI n = 20	*p*-value
Death, n (%)	13 (15.3)	3 (15.0)	0.974*
Type of death, n (%)			0.161*
Cardiac	5 (5.9)	3 (15.0)	
Non-cardiac	8 (9.4)	0	
Serious cardiac arrhythmia, n (%)			0.463*
Heart block	8 (9.4)	3 (15.0)	
Ventricular arrhythmia	0	0	
Stroke, n (%)	3 (3.5)	0	0.394*
Major bleeding, n (%)	4 (4.7)	0	0.323*
Length of stay			
Mean (day $\pm$ SD)	11.4$\pm$9.9	5.6$\pm$4.8	0.012**

* Chi-square test, ** Independent t-test
CHF = congestive heart failure; Major bleeding = intracranial hemorrhage or bleeding requiring blood transfusion

Discussion

This is the first registry of our institute, which enrolled all patients who had any symptoms suggestive of acute coronary syndrome. There was no exclusion of patients with co-morbidities. The data of the present study demonstrated the difference between real-life practices and those recommended in clinical practice guidelines[4-7]. The main objective of the present study is to show the demographics, management practice and in-hospital clinical outcomes among patients diagnosed with ACS. The data also had some differences from the national registries[1,3]. This registry had more elderly patients with the mean age of 73.8 years and females were predominant in UA/NSTEMI group. The proportion of diabetic and hypertensive patients in this registry was higher. The UA/NSTEMI patients had fewer proportion of presenting with typical angina. This is important since the present study showed that the presence of diabetes and elderly might cause more atypical presentation, and probably caused more complications, and higher mortality.

The door-to-needle time, an indicator of health care quality, remained unexpectedly 60-minute-long. The door-to-balloon time was still longer than that recommended in the guideline. In six out of 14 STEMI patients underwent primary PCI with a door-to-balloon time of more than 90 minutes. This suboptimal time to reperfusion may contribute to the high mortality in the present study. The utilization of catheterization and revascularization in UA/NSTEMI patients were not much different from that in the national registries or the GRACE registry[1-3]. Because of the strongly beneficial

evidence of the use of statin treatment in coronary artery disease, almost all patients received statin. The rate of use of beta-blocker was low perhaps because of heart failure or low blood pressure. The lower use of ADP inhibitor and ACE inhibitor in the UA/NSTEMI group might be partly due to more co-morbidities and limitations, such as bleeding risk or renal insufficiency. In-hospital mortality was higher in this study than in the latest national registry[3] (15% versus 5%), and not significantly different in the both groups. The late presentation of some patients and in-hospital time delay were major problems. Although rate of revascularization in UA/NSTEMI patients was similar to that reported in the national registry or GRACE registry[1-3], the mortality was still high. However, non-cardiac death constituted up to 9.4% out of the total death rate of 15.3%, probably because UA/NSTEMI patients had more proportion of the elderly and multiple co-morbidities.

This study contained small sample size and the data collected were observational, which limited the ability to evaluate causation. However, these data provide a key opportunity to develop and evaluate an ACS quality improvement.

Conclusion

This registry, when compared with the national registries, had more elderly patients and had higher prevalence of cardiovascular risk factors. The utilization of catheterization and revascularization in UA/NSTEMI patients were not much different from that in the national registries. Door-to-needle time and door-to-balloon time were considered as suboptimal. In-hospital mortality was higher than the national average. Patient delay should be improved by giving more education to the general public and concerted effort to improve in-hospital time delay is warranted. These data have an impact on our patient care system and alert our team to improve patient care. The continuous improvement of the outcomes can be predicted if routine practice with quality assessment process is monitored.

What is already known on this topic ?

Well-designed and well-performed patient registries can provide a real-world view of clinical practice

What this study adds ?

This study, when compared with the national registries, had more elderly patients and had higher prevalence of cardiovascular risk factors. The utilization of catheterization and revascularization in UA/NSTEMI patients were comparable to the national registries. Door-to-needle time and door-to-balloon time were considered as suboptimal. In-hospital mortality was higher than the national average.

Potential conflicts of interest

None.

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ข้อมูลพื้นฐาน การรักษา และผลลัพธ์ในโรงพยาบาล: รายงานผลการศึกษาการลงทะเบียนผู้ป่วยกลุ่มอาการหัวใจขาดเลือดเฉียบพลันในศูนย์การแพทย์สมเด็จพระเทพรัตนราชสุดาฯ สยามบรมราชกุมารี

วรวุฒิ รุ่งแสงมนูญ, กรวัฒน์ สวนคล้าย, ธีรานันท์ อังคณานาฏ

วัตถุประสงค์: *ศึกษาข้อมูลพื้นฐาน ลักษณะประชากร ปัจจัยเสี่ยง การรักษา และผลที่เกิดขึ้นในผู้ป่วยกลุ่มอาการหัวใจขาดเลือดเฉียบพลันที่เข้ารับการรักษาในศูนย์การแพทย์สมเด็จพระเทพรัตนราชสุดาฯ สยามบรมราชกุมารี เพื่อสร้างเป็นระบบฐานข้อมูลผู้ป่วยนำไปปรับปรุงแก้ไข และพัฒนาคุณภาพระบบบริการตติยภูมิของโรงพยาบาล*

วัสดุและวิธีการ: *เป็นการศึกษาข้อมูลผู้ป่วยที่ได้รับการวินิจฉัยกลุ่มอาการหัวใจขาดเลือดเฉียบพลันที่เข้ารับการรักษา ในศูนย์การแพทย์สมเด็จพระเทพรัตนราชสุดาฯ สยามบรมราชกุมารี ตั้งแต่ วันที่ 1 มกราคม พ.ศ. 2556 ถึง 31 ธันวาคม พ.ศ. 2556*

ผลการศึกษา: *ผู้ป่วยทั้งหมดจำนวน 105 ราย แบ่งเป็นผู้ป่วยกลุ่ม UA/NSTEMI 85 ราย และผู้ป่วย STEMI 20 ราย ผู้ป่วยทั้งหมดมีอายุเฉลี่ย 73.8 ปี และประมาณครึ่งหนึ่งมีอายุมากกว่า 70 ปี พบผู้ป่วยเบาหวานสูงถึงร้อยละ 52.4 ในกลุ่มผู้ป่วย STEMI พบผู้ป่วยเพศชายเป็นสัดส่วนมากกว่าแต่มีโรคเบาหวานน้อยกว่ากลุ่ม UA/NSTEMI ผู้ป่วย STEMI จำนวนร้อยละ 80 ได้รับการรักษาเพื่อเปิดหลอดเลือดหัวใจ และจำนวนร้อยละ 70 รักษาโดยวิธีขยายหลอดเลือดหัวใจผ่านสายสวนทันที (primary PCI) ค่ามัธยฐานของเวลา door to needle และ door to balloon เท่ากับ 60 และ 74 นาทีตามลำดับ ผู้ป่วย 6 รายมีเวลา door to balloon เกิน 90 นาที ผู้ป่วย UA/NSTEMI จำนวนครึ่งหนึ่งได้รับการตรวจ coronary angiography และประมาณหนึ่งในสามได้รับการทำ revascularization ด้วยวิธีขยายหลอดเลือดหัวใจผ่านสายสวนหรือผ่าตัดหลอดเลือดหัวใจ อัตราตายของผู้ป่วยทั้งสองกลุ่มเท่ากันที่ร้อยละ 15*

สรุป: *ผู้ป่วยกลุ่มอาการหัวใจขาดเลือดเฉียบพลันทั้งสองกลุ่มพบว่ามีอัตราตายสูงกว่าข้อมูลของประเทศโดยเฉพาะในกลุ่ม STEMI ยังต้องปรับปรุงลดปัญหาความล่าช้าในการรักษาเพื่อเปิดหลอดเลือดหัวใจได้แก่ การออกให้ความรู้ แนะนำอาการต่าง ๆ ของกลุ่มอาการหัวใจขาดเลือดเฉียบพลัน สุขศึกษาในการป้องกันโรคแก่ประชากรในพื้นที่ ทบทวนระบบและอภิปรายสาเหตุของความล่าช้าในการรักษาอย่างสม่ำเสมอ*
