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Acute Coronary Syndrome Patients Admitted to Coronary Care Unit: An In-Hospital Outcome at King Abdulaziz University Hospital

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Abstract. The primary objective of this observational study is to compare clinical data and short-term outcome of patients admitted with acute coronary syndromes to coronary care unit in King Abdulaziz University Hospital over 1 year period, with patients enrolled in a multinational registry. The study cohort consisted of 399 patients hospitalized in King Abdulaziz University Hospital and 4,445 patients from the Global Registry of Acute Coronary Events. Average age of patients in King Abdulaziz University Hospital was nearly a decade younger (56 *vs.* 66 years), with male predominance (75% *vs.* 69%). Clinical presentation and management strategies were nearly the same, but in patients with ST elevation myocardial infarction, thrombolysis rather than primary percutaneous intervention was the main strategy in our group. In-hospital mortality rates were less in King Abdulaziz University Hospital patients (3% *vs.* 3.8%). This difference is probably related to smaller sample size, and late presentation. Future studies with larger sample size should explore the effects of differences in patient characteristics and treatment practices with long-term prognosis.

Keywords: Acute coronary syndromes, Clinical presentation, Management strategies, Mortality rates.

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Introduction

In a rapidly developing field, management of patients assessments admitted with acute coronary syndromes (ACS) is required. This context plans and compares short term outcome of patients admitted to coronary care unit (CCU) in King Abdulaziz University Hospital (KAUH) to a large multi-national registry.

The primary objectives of this observational study are to compare the clinical data from our patients cohort; to assess the presence of significant difference in short-term outcomes compared to the Global Registry of Acute Coronary Events (GRACE registry)[1,2], and whether this would alter our practice in management of ACS.

Methods

This retrospective study included all patients admitted with ACS to CCU in KAUH over one year starting from 1st of June 2008 to 31st of May 2009. GRACE is the largest multinational prospective registry designed to reflect an unselected population of patients hospitalized with ACS. In total, 123 hospitals located in 14 countries in North and South America, Europe, Australia, and New Zealand contributed data to this registry from 1999 through 2007. For the present analyses, contemporaneous individual patient data of patients with ACS[1,3] was used.

All patients with a clinical history of ACS with $\geq$ 1 of the following were included in the retrospective study samples: Electrocardiographic changes consistent with ACS, serial increases in cardiac biomarkers of necrosis, or documented coronary artery disease. Patients were diagnosed with ST-segment elevation myocardial infarction (STEMI), non-ST-segment elevation myocardial infarction (NSTEMI), or unstable angina pectoris using standardized criteria based on clinical presentation, electrocardiographic findings, and cardiac biomarkers[4,5].

The diagnosis of ACS and definitions of key study variables and clinical complications were similar and based on the American College of Cardiology key data elements[6].

In the GRACE registry, patients with STEMI and patients with left bundle branch block were combined in 1 category (STEMI), and patients with NSTEMI and those with unstable angina pectoris were combined in another category (NSTE-ACS).

Analysis of data was done using STATISTICA software package.

Results

Our group consisted of 399 patients with confirmed diagnosis of ACS. Mean age was 56 years (Fig. 1) with 50% < 55 yr. and 10% > 75 yr. 75% of patients were males (Fig. 2). 36% of our patients presented with STEMI and 64% presented with NSTEACS (Fig. 3).

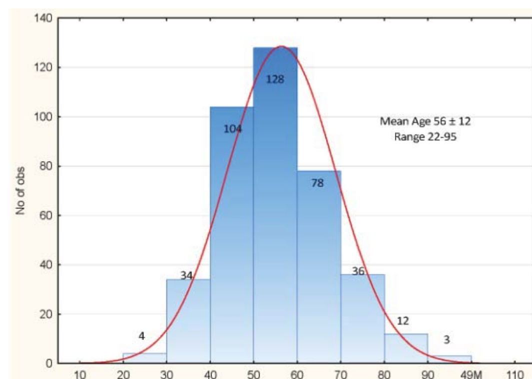

Fig. 1. Age distribution.

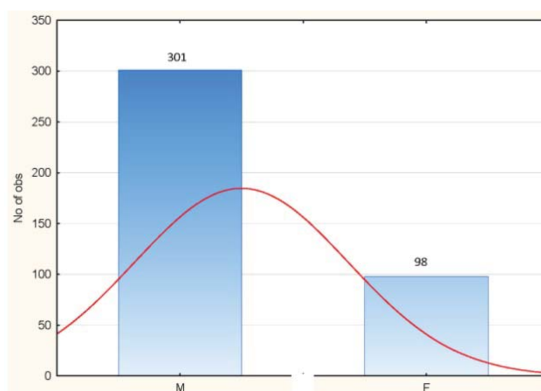

Fig. 2. Histogram of gender.

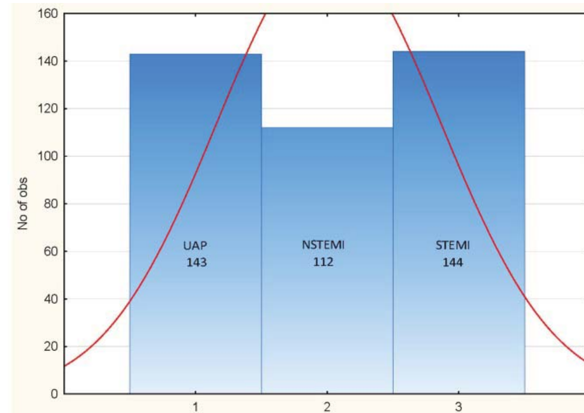

Fig. 3. Discharge diagnosis.

Presentation with NSTEACS occurred more frequently in females than in males (74% *vs.* 61%, Fig. 4).

236 patients underwent coronary angiography (59%). Of those 22% continued on medical treatment, 52% underwent percutaneous intervention (PCI), while 26% were referred for coronary artery bypass grafting (CABG, Fig. 5).

Angiography was done more frequently in males than in females (61.4% *vs.* 52.6%, Fig. 6).

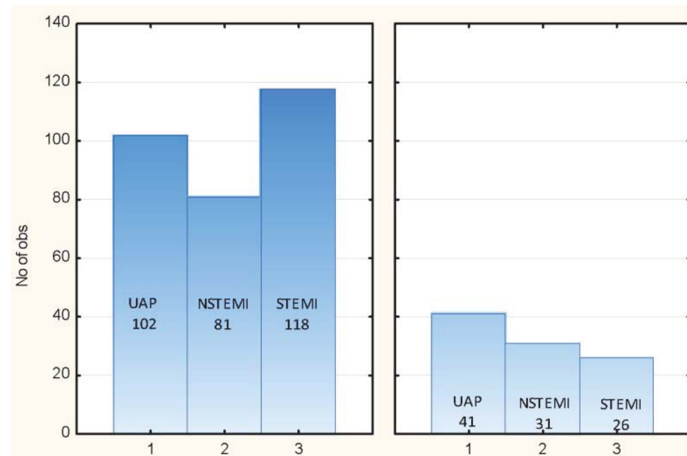

Fig. 4. Discharge diagnosis categorized by gender.

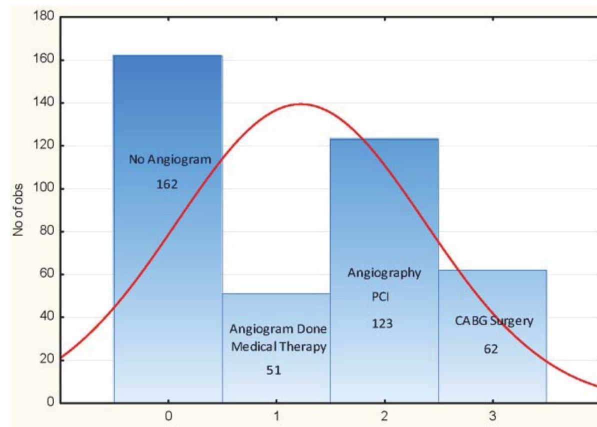

Fig. 5. Histogram of coronary angiography.

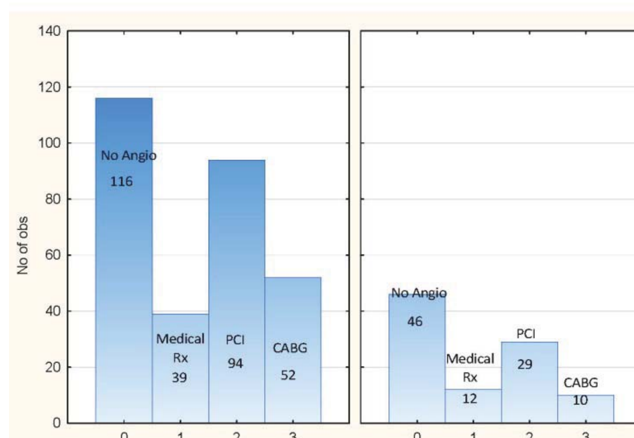

Fig. 6. Coronary angiography categorized by gender.

In patients with STEMI cardiac catheterization was performed in 63% of patients. While patients admitted with NSTE-ACS, 57% had coronary angiography (Fig. 7).

387 patients were discharged home, 4 were transferred to other centers, 3 were discharged against medical advice and 5 died (4 females, and 1 male) (Fig. 8, 9). During the same period of study, 36 patients with ACS were admitted to ICU, 8 of them died in-hospital, giving mortality rate of 3% (Fig 10).

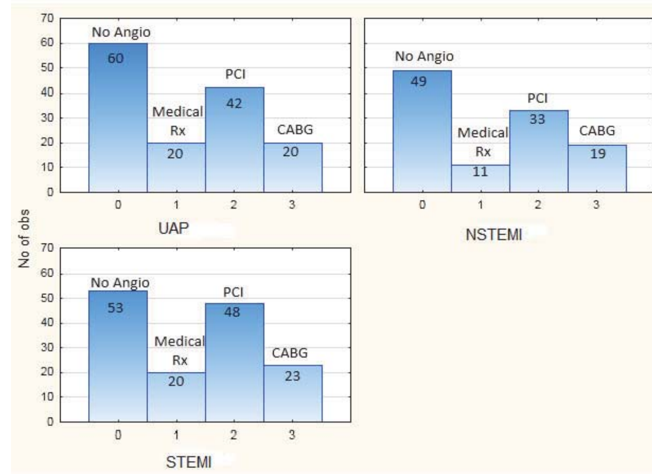

Fig. 7. Coronary angiography categorized by discharge diagnosis.

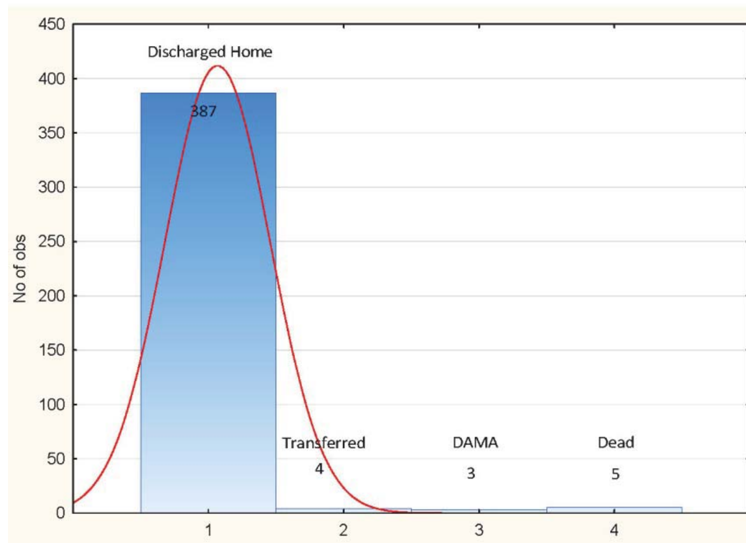

Fig. 8. Final status of 339 patients.

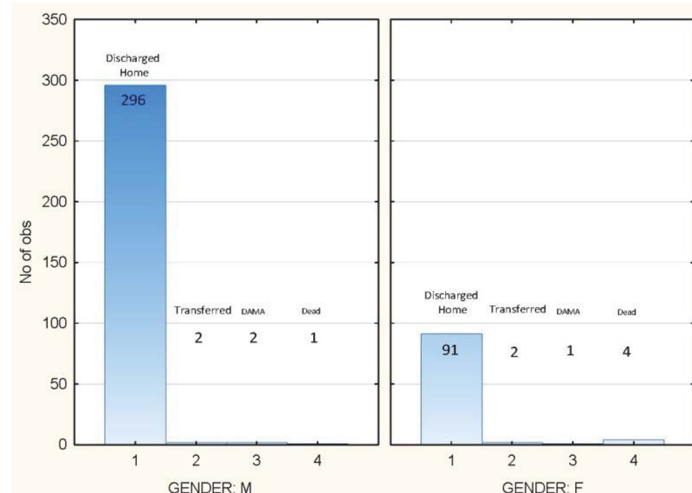

Fig. 9. Final status categorized by gender.

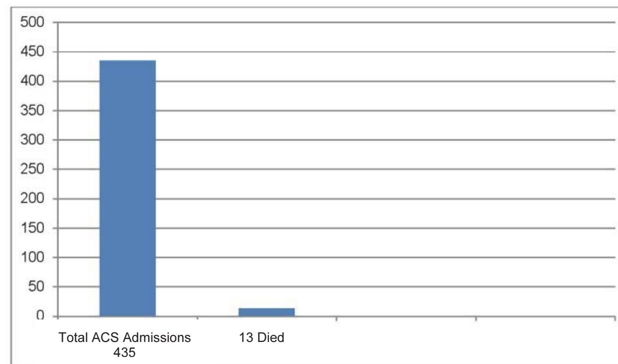

Fig. 10. Total mortality of ACS admissions.

Discussion

The present study is intended to compare the characteristics, management practices, and hospital outcomes of patients with ACS admitted to CCU in KAUH to a large multinational and predominantly western population hospitalized with ACS.

Our study shows that average age of patients in KAUH was nearly a decade younger than in GRACE (56 *vs.* 66 years). The proportion of patients < 55 years old was approximately 2 times

of that in GRACE, whereas the proportion of patients > 75 years old in KAUH was < 1/2 that of GRACE (Table 1). Patients in KAUH were more likely to be men (75% *vs*. 69% (Table 1)).

Table 1. Baseline characteristics of patients hospitalized with acute coronary syndrome.

Characteristic	All ACS		
	GRACE N = 4445	KAUH N = 399	*p* Value
Age (years), mean ± SD	65 ± 13	56 ± 12	< 0.01
Age (years)			< 0.01
< 55	1039 (23%)	200 (50%)	
> 75	1209 (27%)	40 (10%)	
Men	3072 (69%)	301 (75%)	< 0.01

Previous work has suggested that patients with ACS in the Gulf region are more likely to develop ACS at a younger age[2,7,8]; similar findings were observed in the present study. This striking difference might have resulted from differences in the coronary risk factor profile between the 2 cohorts leading to earlier development of ACS, or acceleration of underlying coronary atherosclerosis in subjects in Saudi Arabia, with more than 50% having diabetes, dyslipidemia, or being smokers.

The distribution of patients between STEMI and NSTEACS is nearly the same in both KAUH and GRACE (Table 2). The degree of intervention in NSTEACS is comparable (Table 2). In patients with STEMI, although primary PCI was the main reperfusion therapy in GRACE, the overall percentage of patients who underwent coronary angiography was nearly the same in both GRACE and KAUH (Table 2).

Table 2. Presentation of patients and degree of intervention.

	STEMI		NSTEACS		*p* Value
	GRACE	KAUH	GRACE	KAUH	
No. of Patients	1504 (34%)	144 (36 %)	2941 (66 %)	255 (64 %)	<0.01
No. of Angiography	932 (62%)	91 (63 %)	1747 (59.4 %)	145 (57 %)	<0.01

In-hospital mortality rates were less in KAUH than those in GRACE (3% compared to 3.8% in GRACE, *P* value < 0.01). This difference is probably related to smaller sample size in KAUH

patients, and late presentation due to relative deficiency of pre-hospital care.

Previously published studies have shown that women were more likely to have higher rates of co-morbidities were less likely to receive evidence-based procedures and medications, and had higher rates of adverse outcomes compared to men[7,14]. Women in our study were less likely to have coronary angiography than men (Fig. 6) and had a significantly higher adjusted mortality risk (Fig. 9).

Regional variations in ACS management practices throughout the world have been previously reported[9-11] and have been partly explained by differences in health care models and rapidity of adopting evidence-based medicine guidelines. Furthermore, regional and inter-country differences in short-term clinical outcomes of patients hospitalized with ACS have been previously observed[10-13].

In conclusion, despite difference in age profile of our patients and GRACE population, percentage of modes of presentation and management strategies were comparable apart from percentage of patients with STEMI undergoing primary PCI. This highlights the importance of overcoming logistic difficulties in performing primary PCI in our hospital.

Further study is needed to compare Arab *vs.* non-Arab populations, relative prevalence of different risk factors and their impact on outcome.

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النتائج الإكلينيكية لعلاج مرضى متلازمة نقص التروية القلبية الحاد أثناء التنويم بالعناية المركزة بمستشفى جامعة الملك عبدالعزيز – جدة

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المستخلص. إن الهدف الأساسي من هذه الدراسة الرصدية هو مقارنة البيانات السريرية ونتائجها على المدى القصير من المرضى الذين يتم إدخالهم بمتلازمة الشريان التاجي الحادة إلى العناية القلبية المركزة في مستشفى جامعة الملك عبد العزيز على مدى سنة واحدة ، بالإضافة إلى المرضى المسجلين في سجل متلازمة الشريان التاجي الحادة من الجنسيات غير العربية المختلفة(جريس). تكونت مجموعة الدراسة من ٣٩٩ مريضا أدخلوا إلى مستشفى جامعة الملك عبدالعزيز بمتلازمة الشريان التاجي الحادة بالإضافة إلى ٤٤٤٥ مريضا من السجل العالمي لأحداث الشريان التاجي الحادة(جريس). وكان متوسط عمر المرضى في مستشفى جامعة الملك عبد العزيز ما يقرب من عقد من الزمان أصغر من المسجلين في (جريس) (٥٦ سنة مقابل ٦٦ سنة). كان هناك غالبية من الذكور أكثر في المرضى الذين في مستشفى جامعة الملك عبدالعزيز مقابل (جريس) (٧٥٪ مقابل ٦٩٪). كانت الصورة السريرية والاستراتيجيات العلاجية تقريبا نفسها ولكن في المرضى الذين يعانون من احتشاء كامل، كان التدخل بالقثطرة القلبية العلاجية الأولية هي الاستراتيجية الأساسية في (جريس)، بينما كان

إعطاء الأدوية الحالة للخثرة هي الاستراتيجة الأساسية في مستشفى جامعة الملك عبد العزيز. وكانت معدلات وفيات الحالات في المستشفى أقل من تلك التي في (جريس) (٣٪ مقابل ٣،٨٪). هذا الاختلاف ربما يرتبط بسبب صغر حجم العينة في مرضى جامعة الملك عبدالعزيز، ووصول المرضى في وقت متأخر. الدراسات المستقبلية مع حجم عينة أكبر يفترض أن تستكشف آثار الاختلافات في خصائص المرضى والممارسات العلاجية على المدى الطويل.