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Incidence of Acute Coronary Syndrome (ACS) in Northern Saudi Arabia

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Abstract:

Objective: *the aim of this study was to determine the incidence of acute coronary syndrome (ACS) in Hail area.* ***Methodology:*** *Data regarding 156 patients with ACS were retrieved from the coronary care unit (CCU) at King Khalid Hospital-cardiac centre- Saudi Arabia included all patients with a diagnosis of acute coronary syndrome admitted to the intensive care unit (ICU) in 2013.* ***Results:*** *The incidence of ACS was 8.2%. The most frequent diagnosis at the time of admission was unstable angina, followed by non-ST-segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction (STEMI), representing 19.2%, 27.6%, and 53.2% of the patients, respectively.* ***Conclusions:*** *ACS was prevalent in Hail area and more control measures are urgently recommended.*

Key words: Acute coronary syndrome, unstable angina, NSTEMI, STEMI.

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INTRODUCTION

Acute coronary syndrome (ACS) denotes a group of clinical symptoms compatible with acute myocardial ischemia and comprises unstable angina (UA), non-ST-segment elevation myocardial infarction (NSTEMI), and ST-segment elevation myocardial infarction (STEMI). These high-risk manifestations of coronary atherosclerosis are important causes of the use of emergency medical care and hospitalization in many countries [1,2].

As, ACS refers to the range of clinical signs and symptoms produced by acute myocardial ischemia, including UA, NSTEMI, and STEMI [4], each condition shares common pathophysiologic origins related to the instability and rupture of atherosclerotic vulnerable plaques [5]. AU and NSTEMI are differentiated one from the other primarily by their severity, whether the ischemia is persistent enough to lead to structural myocardial damage and to the release of detectable markers of myocardial injury, most commonly troponin I, troponin T, or creatine kinase MB [6,7].

A rapid but in-depth assessment of the patient's history and findings on physical examination, electrocardiography, radiologic studies, and cardiac biomarker investigations permit precise diagnosis and help in early risk stratification, which is important for guiding treatment. High-risk patients with UA/NSTEMI are often treated with an early invasive strategy involving cardiac catheterization and quick revascularization of viable myocardium at risk. Clinical outcomes can be improved by revascularization coupled with aggressive medical therapy that includes anti-ischemic, antiplatelet, anticoagulant, and lipid-lowering drugs. Evidence-based guidelines offer recommendations for the management of ACS; however, therapeutic approaches to the management of ACS continue to develop at a rapid step driven by a multitude of large-scale

randomized controlled trials. Thus, clinicians are frequently faced with the problem of determining which drug or therapeutic strategy will achieve the best results [1].

ACS is a rising public health problem in the Middle East and has a big economic burden [8,9]. Similar to various Arab gulf countries, Kingdom of Saudi Arabia has a great number of non-Saudi worker represent the main work force I the country. In the last Saudi national census in 2010, the expatriate population comprised at least 30% of the general population of Saudi Arabia [10]. The non-Saudi population has distinct racial, socioeconomic, and demographic characteristics; accordingly, the conventional health care, response to therapy, and clinical outcomes may differ in this population compared to the Saudi civilians. However, the lack of literature regarding ACS from northern Saudi, particularly Hail Area, therefore, the objective of this study was to find out the incidence of acute coronary syndrome (ACS) in Hail area.

MATERIALS AND METHODS:

This is a retrospective study carried out in coronary care unit (CCU) at King Khalid Hospital-cardiac Centre, Hail, Kingdom of Saudi Arabia (KSA). One thousand and nine hundred patients were admitted to cardiac Centre during one year time (the period from 1st of January to 30 of December 2013), with different cardiac diseases. Out of 1900 admitted patients, 156 were diagnosed as having acute coronary syndrome (ACS). All records regarding patients with ACS were retrieved from CCU. Data regarding the underlying risk factors such as a positive family history, diabetes mellitus, smoking, hypertension, hyperlipidemia and demographical characteristics, complications and outcome were also reviewed.

Statistical analysis:
Data management was done using Statistical Package for Social Sciences (SPSS version 16). SPSS was used for analysis and to perform Pearson Chi-square test for statistical significant (P value P<0.5). The 95% confidence level and confidence intervals were used.

Ethical consent:
The study was approved by College of Medicine, University of Hail, KSA.

Results:
This study investigated 156 patients with ACS their ages ranging from 27 to 90 years with a mean age of 59 years old. Of the 156 patients, 130/156 (83.3%) were males and 26/156(16.7%) were females, giving males' females' ratio of 5.00:1.00. The majority of patients were in age ranges 56-65 and 46-55 years, as indicated in Table 1.

Table. Distribution of the study subjects by age and sex.

Age group	Sex			
	Males	Females	Total	Percentage
<45 years	28	1	29	18.6
46-55	27	7	34	21.8
56-65	39	9	48	30.8
66-75	23	6	29	18.6
75+	13	3	16	10.3
Total	130	26	156	100

As the patients with ACS were selected from a total number of 1900 admitted patients, the incidence of ACS was 8.2%. Of the 156 patients, 30/156 (19.2%) were identified with unstable angina, 43/156 (27.6%) with NSTEMI and 83/156(53.2%) were with STEMI, as shown in Fig1. The risk associated with STEMI as a major type of ACS and the 95% confidence level was found to be statistically significant, P <0.001.

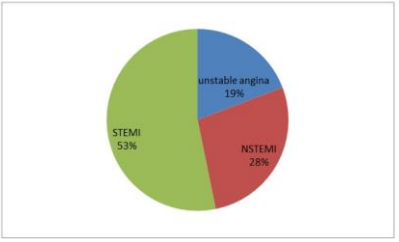

Figure 1. Description of patients according to the type of ACS.

Table 2. Summarizes the distribution of the patients by type of ACS and Sex and Age. The great majority of the males were found with STEMI followed by NSTEMI and unstable angina, constituting 69, 38 and 23 patients respectively. For females most patients were found with STEMI followed by unstable angina and NSTEMI, representing 14, 7, and 5, respectively as indicated in Fig2.

Table 2. Distribution of type of ACS by Sex and Age.

Variable	Category	ACS			
Sex		**Unstable angina**	**NSTEMI**	**STEMI**	**Total**
	Males	23	38	69	130
	Females	7	5	14	26
	Total	30	43	83	156
Age range					
	<45 years	3	8	18	29
	46-55	11	9	14	34
	56-65	8	13	27	48
	66-75	4	11	14	29
	76+	4	2	10	16
	Total	30	43	83	156

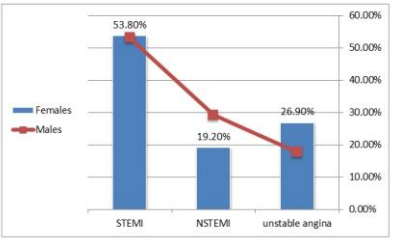

Figure 2 showing types of ACS by Sex

In regard to the relationship between age and type of ACS. For the age range < 45 years, there were 29 patients, of whom 18/29(62%) were with STEMI, 8/29(27.6%) were with NSTEMI and 3/29(10.2%) were with unstable angina. For age group 46-55 years, there were 34 patients of whom 14/34(41.2%) were with STEMI, 11/34(32.3%) were with unstable angina and 9/34(26.5%) were with NSTEMI. For the age range < 45 years, there were 29 patients, of whom 18/29(62%) were with STEMI, 8/29(27.6%) were with NSTEMI and 3/29(10.2%) were with unstable angina. For the age range 56-65 years, there were 48 patients, of whom 27/48(56.3%) were with STEMI, 13/48(27%) were with NSTEMI and 8/48(16.7%) were with unstable angina. For the age range 66-75 years, there were 29 patients, of whom 14/29(41.2%) were with STEMI, 11/29(38%) were with NSTEMI and 4/29(13.8%) were with unstable angina. For age group 76+ years, there were 16 patients of whom 10/16(62.5%) were with STEMI, 4/16(25%) were with unstable angina and 2/16(12.5%) were with NSTEMI, as indicated in Table2, Fig3.

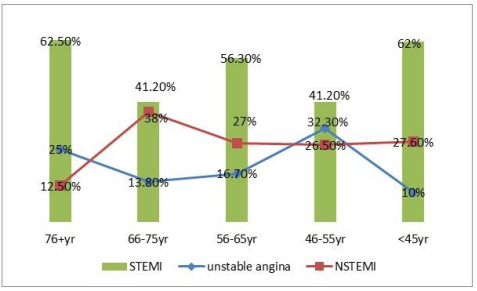

Figure 3. Types of ACS by age

In regard to the nationality, there were 137/156(87.8%) Saudi civilian and 19/156(12.2%) were non-Saudi. Of the 137 Saudi, 113/137(82.5%) were males and 24/137 (17.5%) were females. Of the 19 non-Saudi, 17/19 (89.5%) were males and 2/19(10.5%) were females. Of the 137 Saudi patients, unstable angina,

NSTEMI, STEMI were identified in 24, 39, and 74 patients respectively. Of the 19 Non-Saudi patients, unstable angina, NSTEMI, STEMI were identified in 6, 4, and 9 patients respectively. Moreover, the distribution of age among Saudi and Non-Saudi is relatively proportional, as indicated in Table 3, Fig 4.

Table 3. Distribution of nationality by ACS, sex and age.

Variable	Category	Saudi	Non-Saudi
ACS	Unstable angina	24	6
	NSTEMI	39	4
	STEMI	74	9
Total		137	19
Sex			
	Males	113	17
	Females	24	2
Total		137	19
Age			
	<45 years	26	3
	46-55	25	9
	56-65	43	5
	66-75	27	2
	76+	16	0
Total		137	19

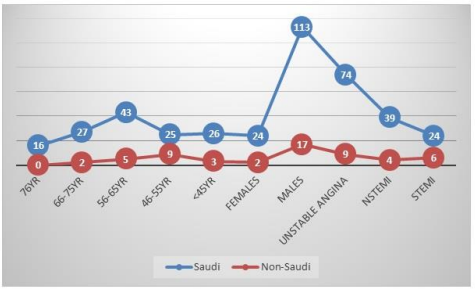

Figure 4. Showing Nationality by ACS, Sex and Age.

DISCUSSION:

Although there are significant advances in managing of patients with ACS, the burden of coronary heart disease has increased as a result of longer life expectancies and the survival rates of individuals with ACS [12]. Therefore, morbidity and mortality caused by ACS are likely to continue in term of costs, as well as, effects on quality of life. The incidence of ACS is relatively not so high in the present study, but what is interestingly, is the high percentage of STEMI (53.2%). According to statistics from the American Heart Association (AHA), approximately 18% of men and 23% of women over the age of 40 will die within 1 year of having an initial recognized MI [13]. The annual incidence of ACS in the Nicosia district, Cyprus, was 160 per 100,000 inhabitants (41 per 100,000 women and 282 per 100,000 men) [14].

The majority of cases of ACS were males and this was well established almost in all studies [15,16]. Gender associations with acute coronary syndrome (ACS), remain inconsistent. Gender-specific data in the Saudi Project for Assessment of Coronary Events registry, launched in December 2005 with 17 participating hospitals, found that of 5061 patients, only 1142 (23%) were women [17].

In the present study most of cases of ACS were Identified with STEMI, representing 53.2%, followed by NSTEMI and AU. Similar findings were previously reported from Saudi Arabia. With regard to the type of ACS presentation, Saudi patients were more likely to present with unstable angina or non-ST elevation myocardial infarction (NSTEMI), while non-Saudis were more likely to present with STEMI. Moreover, non-Saudi patients were more likely to present with symptoms of heart failure (22.8% vs. 17.7%, p = 0.017) [11]. Although, we found that women were also more likely to develop STEMI, some studies found that women were

frequently having NSTEMI. Women were more frequently diagnosed with non ST-segment elevation myocardial infarction (NSTEMI [43%]) than unstable angina (UA [29%]) or ST-segment elevation myocardial infarction (STEMI [29%]). More men had STEMI (42%) than NSTEMI (37%) or UA (22%). Overall, in-hospital mortality was significantly worse for women and, by ACS type, was significantly greater in women for STEMI and NSTEMI. However, after age adjustment there was no difference in mortality between men and women in patients with NSTEMI. The multivariate-adjusted (age, risk factors, treatments, door-to-needle time) STEMI gender mortality difference was not significant (OR=2.0, CI: 0.7-5.5; P=.14) [17].

However, since the number of non-Saudi participants in this study was relatively lower, and due to the different risk factors that associated with each ACS type, it is difficult to find out a precise link for comparison of these ACS types with the nationality. In a study investigated a total of 190 patients confirmed ACS were included; 121 (63.70%) were Saudi, 50 (26.3%) were South Asians, and 19 (10.0%) were other Arab nationalities. The mean age was 53.9 (SD 14.6). Out of the total South Asians 82% had normal body mass index (BMI) (P = 0.000). Saudi patients were the lowest of the three groups who smoked cigarette and/or shisha (26.6%; P = 0.000). 52.9% of Saudi patients were diabetics and 41.3% were hypertensive (P = 0.004). More South Asians were presented with chest pain (94% vs 76%). South Asians had double rate of ACS incidence; they were younger, lower socio-economic status, more cigarette smokers, and less diabetics and hypertensive than other patients [18].

In regard to the age, in the current study most of patients were between 46 to 65 years old. With the ageing of the population in the Western world, an increasing proportion of patients seen in cardiology practice is represented by

the elderly. Although approximately one third of patients admitted with acute coronary syndrome (ACS) are >75 years old and the mortality rate in this age group is doubled compared with younger patients, this population is underrepresented in randomized controlled trials and, consequently, clinical guidelines do not always provide clear indications for the management of elderly patients. Therefore, there is an unmet need for clinical guidance regarding this rapidly growing subset of ACS patients, also considering that decisions about optimal antithrombotic treatment strategies in the elderly are often challenging, mostly due to age-related organ dysfunction, the frequency of comorbidities and concomitant medications and an increased risk of both ischemic and bleeding events [19].

In conclusion: ACS is common in northern KSA, particularly in Hail area with significantly increased proportion of STEMI among males.

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