

# First 24 h' Outcomes of Acute Coronary Syndrome in Iraq

Ameen Mosa Mohammad, Bahaadin Hassan Abdulhaleem, Qayser S. Habeeb<sup>1</sup>

Departments of Medicine and <sup>1</sup>Community Medicine, College of Medicine, University of Duhok, Kurdistan, Iraq

## Abstract

**Background:** In recent years, there has been a noticeable increase in the frequency of acute coronary syndrome (ACS) in Iraq. Despite the need for the data related to the subject in the area, there is a great paucity of such data that mandated the design and conduct of this study. **Methods:** This prospective, cross-sectional analysis was performed in the coronary care unit of tertiary Azadi Teaching Hospital in Duhok, Kurdistan, Iraq. All patients consecutively who were hospitalized for ACSs between 2015 and 2016 were included to determine the clinical presentations, short term in-hospital complications, and the first 24 h outcomes of ACSs in Duhok, Iraq. **Results:** The study comprised 380 (279 men and 101 women) cases with a mean age of  $59.54 \pm 11.50$  years. The final diagnosis was ST-elevation myocardial infarction in 67.4%, non-ST-elevation myocardial infarction in 24.7%, and unstable angina in 7.9%. At least 50% of patients arrived beyond 6 h of symptoms' onset. Participants within the age group 45–74 years constituted the main bulk of the sample (79%). Typical ischemic chest pain accounted for most of the presentations (80.3%). The most common complications were arrhythmias 44.8%, followed by heart failure 15.5%, cardiogenic shock 5.5%, and mechanical complications 3.4%. Uneventful recovery and recovery with complications constituted 74.5% and 19.7%, respectively. The first 24 h in-hospital death was 5.8%. **Conclusions:** Our patients presented at a relatively young age. In terms of disease presentations, we observed significant gender differences. In-hospital short-term mortality rate was comparable to neighboring nations. Older age rather than gender impact the outcomes.

**Keywords:** 1<sup>st</sup> 24 h outcome, acute coronary syndrome, in-hospital mortality, Iraqi Kurds

## INTRODUCTION

In recent years, there has been a noticeable increase in the frequency of acute coronary syndrome (ACS) in Iraqi Kurdistan. Despite the need for the data related to the subject in the area, there is a great paucity of such data that mandated the design and conduct of this study to furnishing data concerning presentation and short term in-hospital complications and outcomes in Duhok, Iraq.<sup>[1]</sup>

The prevalence of cardiovascular risk factors tends to increase in developing countries compared to the developed world, mostly because of the deficiency of institutions that deal with controlling these risk factors. The community-based health education is not well established that conflicting the problem in all its aspects. Due to weakness in the medical learning system and development of cardiac interventional services in the area, a proper plan for the management of ACS is deficient, which in turn, magnifies the consequences of the disease in the society.<sup>[2,3]</sup>

The outcome of ACS is either uneventful recovery, recovery with complications, or death. To the best of the researchers'

knowledge, this study is the first to assess the clinical presentation and the first 24 h outcome of patients admitted to the coronary care unit (CCU) with a diagnosis of ACS in Iraq.

## METHODS

A single-center, cross-sectional study of patients with ACSs conducted at the CCU of Azadi Teaching Hospital, Duhok, Iraq. Azadi Teaching Hospital is the only tertiary referral center for the Duhok governorate. Kurds comprised >98% of its population. All patients who enrolled were provided written informed consent. The study was approved by the ethical committee at the School of Medicine, Faculty of Medical Sciences, University of Duhok, Kurdistan Region, Iraq.

**Address for correspondence:** Dr. Ameen Mosa Mohammad, Department of Medicine, College of Medicine, University of Duhok, 9 Azadi Hospital Rd., Duhok 1014AM, Iraq. E-mail: doctoramb@yahoo.com

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## Patients

All patients, both men and women presenting to the Emergency Department of Azadi Hospital with clinical features of ACS, were enrolled consecutively and thereafter admitted to the CCU for suspicion of ACS. Patients with other medical problems that confound the results like (advanced heart failure, stroke, cor pulmonale and/or respiratory failure or end-stage kidney disease) were excluded from the study. The final sample comprised 380 patients (279 men and 101 women). For the first 24 h stay in the CCU, all patients underwent close clinical and electronic monitoring. The diagnosis of the different types of ACS (ST-elevation myocardial infarction [STEMI], non-ST-elevation myocardial infarction [NSTEMI] and/or unstable angina [UA]) was based on the definitions of the American College of Cardiology clinical data standard.<sup>[4]</sup> Drug therapies and reperfusion strategies were recorded. The three outcomes of interest were uneventful recovery, recovery with complications and death, and all of them were recorded from the clinical and electronic database of cases.

## Baseline characteristics

The following data of cases were collected: patients' demographic variables, major cardiovascular risk factors (smoking, hypertension, diabetes mellitus, hyperlipidemia, and family history of coronary artery disease), type and duration of the presenting symptoms. The main investigations were electrocardiography, echocardiography, cardiac troponins, blood sugar, serum creatinine, and lipids. The diagnosis of ACS was categorized into: STEMI, NSTEMI, and UA depend on predefined criteria. The outcomes were categorized as uneventful recovery, recovery with complications, cardiac death.

## Statistical analysis

Data were analyzed using commercially available statistical software (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp). Differences between groups were assessed using Chi-square or Fisher's exact tests for categorical variables and Student's *t*-test for continuous variables. Data are presented as means  $\pm$  standard deviation or *n* (%). The level of statistical significance was set at a *P* < 0.05.

## RESULTS

The total sample comprised 380 ACS patients (279 males, 101 females) with a mean age of  $59.54 \pm 11.50$  years and a male/female ratio of 2.75. The duration of symptoms before admission ranged from 1 to 72 h with a mean of  $15.46 \pm 19.78$  h, as shown in Table 1.

**Table 1: Age of cases and duration of symptoms**

|                          | Minimum | Maximum | Mean $\pm$ SD     |
|--------------------------|---------|---------|-------------------|
| Age (years)              | 25      | 90      | $59.54 \pm 11.50$ |
| Duration of symptoms (h) | 1       | 72      | $15.46 \pm 19.78$ |

SD: Standard deviation

The typical ischemic chest pain accounted for most of the presentations (80.3%). Only around half of the patients arrived within 6 h of symptoms' onset. The final diagnosis was ST-elevation myocardial infarction in 67.4%, non-ST-elevation myocardial infarction in 24.7%, and UA in 7.9%. The commonest complications were arrhythmias 44.8%, followed by heart failure 15.5%, cardiogenic shock 5.5% [Table 2].

In Table 3, the uneventful recovery constituted 74.5%, recovery with complications was 19.7%, and the in-hospital mortality was 5.8%. Besides, the mortality was significantly associated with older ages (*P* < 0.001), but not influenced by gender (*P* > 0.05). The outcomes of categories of ACS in relation to gender showed no significant differences in males as well as in females, as shown in Table 4.

## DISCUSSION

The study was designed to provide essential data on Kurdish ACS patient's characteristics, presentations, management strategies, and a reflection of the first 24 h outcomes in real practice. It is expected to highlight points of differences compared to other inside and outside the country.

Our patients with ACS presented at a relatively young age, about a decade younger than the presentation age in developed countries.<sup>[5]</sup> The age of ACS presentation for Iraq Kurds was comparable to the Al-Motarreb from Yemen and is much younger than the mean age for Japanese with ACS.<sup>[6,7]</sup> The higher prevalence of cardiovascular risk factors among our patients may reflect the higher incidence of ACS at a younger age. In agreement with Al-Habib *et al.* from Saudi Arabia, there was a significantly higher rate of STEMI in young men compared to young women who presented more with UA and NSTEMI.<sup>[8]</sup>

Although ischemic chest pain was the most common symptom in both men and women, several differences between symptoms at presentation were also noted. In all types of ACS, women tend to present more with atypical symptoms. They had significantly more epigastric pain, vomiting, and dizziness than men. Similar trends were reported by others.<sup>[9,10]</sup>

In addition to others, the interesting observation in the current study was the delay of arrivals of our patients with ACS to hospital. More than half of the patients in this study arrived beyond 6 h of the initial complaint. Even in developed countries, the arrivals of STEMI patients might be beyond the golden time but usually present to the emergency department much earlier compared to our patients.<sup>[11]</sup> The reasons for delayed presentation are multi-factorial, like the underestimation of the significance of symptoms by patients, infrequent use of ambulance services, and delay in the emergency department.

In regard to cardiovascular risk factors, smokers in the current study had more STEMI presentations with a higher rate of complications. This finding is in agreement with Euro heart survey ACS.<sup>[12]</sup> Our hypertensive patients, in agreement with

**Table 2: Presentations, types and complications of acute coronary syndrome by gender**

| Presenting features               | Men (n=279), n (%) | Women (n=101), n (%) | Total (n=380), n (%) | P       |
|-----------------------------------|--------------------|----------------------|----------------------|---------|
| Chest pain                        | 232 (83.2)         | 73 (72.3)            | 305 (80.3)           | 0.019*  |
| SOB                               | 25 (9.0)           | 13 (12.9)            | 38 (10.0)            | 0.262*  |
| Epigastric pain                   | 15 (5.4)           | 9 (8.9)              | 24 (6.3)             | 0.211*  |
| Vomiting                          | 3 (1.1)            | 7 (6.9)              | 10 (2.6)             | 0.002** |
| Dizziness                         | 5 (1.8)            | 5 (5.0)              | 10 (2.6)             | 0.39**  |
| Duration of symptoms (h)          |                    |                      |                      |         |
| ≤6                                | 150 (53.8)         | 41 (40.6)            | 191 (50.3)           | 0.057*  |
| 7-12                              | 45 (16.1)          | 24 (23.8)            | 69 (18.2)            |         |
| 13-24                             | 46 (16.5)          | 15 (14.9)            | 61 (16.1)            |         |
| 25-72                             | 38 (13.6)          | 21 (20.8)            | 59 (15.5)            |         |
| Types of ACS                      |                    |                      |                      |         |
| STEMI                             | 199 (71.3)         | (56.4) 57            | (67.4) 256           | 0.001   |
| NSTEMI                            | 66 (23.7)          | 28 (27.7)            | 94 (24.7)            |         |
| UA                                | 14 (5.0)           | 16 (15.8)            | 30 (7.9)             |         |
| Total number                      | 279 (100)          | 101 (100)            | 380 (100)            |         |
| Complications                     |                    |                      |                      |         |
| A. Arrhythmia                     | 18 (6.5)           | 5 (5.0)              | 23 (6.1)             | 0.140*  |
| V. Arrhythmia                     | 106 (38)           | 30 (29.7)            | 136 (35.8)           |         |
| Atrial and Ventricular Arrhythmia | 10 (3.6)           | 1(1.0)               | 11 (2.9)             |         |
| Heart failure                     | 44 (15.8)          | 15 (14.9)            | 59 (15.5)            | 0.827*  |
| Cardiogenic shock                 | 13 (4.7)           | 8 (7.9)              | 21 (5.5)             | 0.219*  |
| Mechanical complications          |                    |                      |                      |         |
| VSR                               | 2 (0.7)            | 1 (1.0)              | 3 (0.8)              | 0.489** |
| MR                                | 9 (3.2)            | 1 (1.0)              | 10 (2.6)             |         |
| Total                             | 279 (100)          | 101 (100)            | 380 (100)            |         |

\*Chi-square test, \*\*Fisher's exact test. ACS: Acute coronary syndrome, UA: Unstable angina, STEMI: ST elevation myocardial infarction, NSTEMI: Non-STEMI, VSR: Ventricular septal rupture, MR: Mitral regurgitation, SOB: Shortness of breath

**Table 3: First 24 h outcome categories by acute coronary syndrome types, age and gender of patients**

| Type of ACS    | Uneventful recovery, n (%) | Recovery with complications, n (%) | Death, n (%) | Total, n | P*     |
|----------------|----------------------------|------------------------------------|--------------|----------|--------|
| STEMI          | 185 (72.3)                 | 55 (21.5)                          | 16 (6.3)     | 256      | 0.645  |
| NSTEMI         | 75 (79.8)                  | 14 (14.9)                          | 5 (5.3)      | 94       |        |
| UA             | 23 (76.7)                  | 6 (20.0)                           | 1 (3.3)      | 30       |        |
| Total          | 283 (74.5)                 | 75 (19.7)                          | 22 (5.8)     | 380      |        |
| Age and gender |                            |                                    |              |          |        |
| Age (years)    |                            |                                    |              |          |        |
| 25-44          | 32 (86.5)                  | 4 (10.8)                           | 1 (2.7)      | 37       | 0.004* |
| 45-64          | 173 (79.4)                 | 36 (16.5)                          | 9 (4.1)      | 218      |        |
| ≥65            | 78 (62.4)                  | 35 (28.0)                          | 12 (9.6)     | 125      |        |
| Gender         |                            |                                    |              |          |        |
| Men            | 208 (74.6)                 | 56 (20.1)                          | 15 (5.4)     | 279      | 0.831* |
| Women          | 75 (74.3)                  | 19 (18.8)                          | 7 (6.9)      | 101      |        |

\* Based on Chi-square test. ACS: Acute coronary syndrome, UA: Unstable angina, STEMI: ST elevation myocardial infarction, NSTEMI: Non-STEMI

Aursnes and Landmark, had significantly higher frequencies of NSTEMI/UA.<sup>[13]</sup>

The reperfusion therapies for STEMI were suboptimal in this study. Although the primary percutaneous coronary intervention in our center was limited (2.1%); thrombolytic therapy was not frequently used too. Only a small percent of the STEMI patients (17.4%) had received it. The lower rates of giving either reperfusion therapies in the current study were related to several causes, mainly late presentation, and to some

extent misdiagnosis of cases at an early stage, contraindications and sometimes unavailability of reperfusion therapies at all requested time, patient and family refusal to receive either therapy. The rate of reperfusion therapies in our study is similar again to Al-Moterrab from Yemen and unsurprisingly too much lower than in Japan and western countries.<sup>[6,7,11,14]</sup>

The recorded complications of ACS in the current study showed that the incidence of observed arrhythmias was comparable to Zubaid *et al.* studies from Kuwait and other Gulf countries.<sup>[15]</sup>

**Table 4: Gender difference of first 24 h outcome categories by acute coronary syndrome types**

| Type of ACS | Uneventful recovery, <i>n</i> (%) | Recovery with complications, <i>n</i> (%) | Death, <i>n</i> (%) | Total, <i>n</i> | <i>P</i> * |
|-------------|-----------------------------------|-------------------------------------------|---------------------|-----------------|------------|
| Men         |                                   |                                           |                     |                 |            |
| STEMI       | 147 (73.9)                        | 42 (21.1)                                 | 10 (5)              | 199             | 0.597      |
| NSTEMI      | 52 (78.8)                         | 10 (15.2)                                 | 4 (6.1)             | 66              |            |
| UA          | 9 (64.3)                          | 4 (28.6)                                  | 1 (7.1)             | 14              |            |
| Total       | 208 (74.6)                        | 56 (20.1)                                 | 15 (5.4)            | 279             |            |
| Women       |                                   |                                           |                     |                 |            |
| STEMI       | 38 (66.7)                         | 13 (22.8)                                 | 6 (10.5)            | 57              | 0.445      |
| NSTEMI      | 23 (82.1)                         | 4 (14.3)                                  | 1 (3.6)             | 28              |            |
| UA          | 14 (87.5)                         | 2 (12.5)                                  | 0 (0.0)             | 16              |            |
| Total       | 75 (74.3)                         | 19 (18.8)                                 | 7 (6.9)             | 101             |            |

\*Fisher's exact test. ACS: Acute coronary syndrome, UA: Unstable angina, STEMI: ST elevation myocardial infarction, NSTEMI: Non-STEMI

Similar to Zubaid *et al.*, cardiogenic shock was observed in 5.5% of the cases, and it was the main cause of death in the present study.<sup>[16]</sup> However, the mortality rate from cardiogenic shock in the present study was higher (77.3%) compared to the mortality rate of it in studies elsewhere (50%–70%).<sup>[17]</sup>

The in-hospital mortality rate was higher than the rates seen in developed countries as expected. However, its comparable to some Arabian Gulf countries, but it was lower than that reported in Yemen and poor communities in India.<sup>[6,18–20]</sup> Nevertheless, restricting the mortality rates of ACS in our study to the first 24 h will confound certainly the real rates of mortality of complete in-hospital stay of patients. In line with Assiri report from Saudi Arabia the older age rather than gender impact the mortality trend among cases in the present study.<sup>[21]</sup>

### Study limitations

The principal limitations of this study relate to the possible underestimation of ACS related deaths occurring prior to admission to CCU and the lack of longer follow-up to determine the intermediate and long-term outcomes of patients with ACS.

### CONCLUSIONS

Iraqi Kurds were present with ACS relatively at a younger age. They presented to the hospital lately. The cardiovascular risk factors were clustered among cases. The short term in-hospital outcomes of cases were comparable to neighboring developing countries. A further revision of the currently adopted educational, therapeutic, and preventive strategies in the country is indicated to improve the outcome of ACS in Iraq.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

### REFERENCES

- Mohammad AM, Jehangeer HI, Shaikhow SK. Prevalence and risk factors of premature coronary artery disease in patients undergoing coronary angiography in Kurdistan, Iraq. *BMC Cardiovasc Disord* 2015;15:155.
- Mohammad AM, Sheikhow SK, Tayib JM. Relation of cardiovascular risk factors with coronary angiographic findings in Iraqi patients with ischemic heart disease. *Am J Cardiovasc Dis Res* 2013;1.1:25-9.
- Pajak A, Kozela M. Cardio vascular disease in Central and East Europ. *Public Health Rev* 2012;33:416-35.
- Cannon CP, Battler A, Brindis RG, Cox JL, Ellis SG, Every NR, *et al.* American College of Cardiology key data elements and definitions for measuring the clinical management and outcomes of patients with acute coronary syndromes. A report of the American College of Cardiology Task Force on Clinical Data Standards (Acute Coronary Syndromes Writing Committee). *J Am Coll Cardiol* 2001;38:2114-30.
- Goodman SG, Huang W, Yan AT, Budaj A, Kennelly BM, Gore JM, *et al.* The expanded global registry of acute coronary events: Baseline characteristics, management practices, and hospital outcomes of patients with acute coronary syndromes. *Am Heart J* 2009;158:193-2010.
- Ahmed AM, Abdulwahab AM, Hesham AF, Nawar W. Clinical presentation, management and outcome of acute coronary syndrome in Yemen: Data from gulf race – 2 registry. *Heart Views* 2013;14:159-64.
- Nakamura M, Yamashita T, Yajima J, Oikawa Y, Ogasawara K, Sagara K, *et al.* Clinical outcome after acute coronary syndrome in Japanese patients: An observational cohort study. *J Cardiol* 2010;55:69-76.
- Al-Habib KF, Hersi A, Al-Faleh H, Al-Nemer K, Al-Saif S, Taraben A, *et al.* Base characteristics, management practices, and in-hospital of patients with acute coronary syndromes: Results of the Saudi project for assessment of coronary events (SPACE) registry. *J Saudi H Assoc* 2011;23:233-9.
- McSweeney JC, Cody M, O'Sullivan P, Elberson K, Moser DK, Garvin BJ. Women's early warning symptoms of acute myocardial infarction. *Circulation* 2003;108:2619-23.
- Dey S, Flather MD, Devlin G, Brieger D, Gurfinkel EP, Steg PG, *et al.* Sex-related differences in the presentation, treatment and outcomes among patients with acute coronary syndromes: The global registry of acute coronary events. *Heart* 2009;95:20-6.
- Mandelzweig L, Battler A, Boyko V, Bueno H, Danchin N, Filippatos G, *et al.* The second Euro Heart Survey on acute coronary syndromes: Characteristics, treatment, and outcome of patients with ACS in Europe and the Mediterranean basin in 2004. *Eur Heart J* 2006;27:2285-93.
- Rosengren A, Wallentin L, Simoons M, Gitt AK, Behar S, Battler A, *et al.* Cardiovascular risk factors and clinical presentation in acute coronary syndromes. *Heart* 2005;91:1141-7.
- Aursnes I, Landmark K. More non-Q-wave myocardial infarctions but similar infarct sizes in patients with hypertension. *Blood Press* 2000;9:98-103.
- Anderson JL, Adams CD, Antman EM, Bridges CR, Califf RM, Casey DE Jr., *et al.* ACC/AHA 2007 guidelines for the management of patients with unstable angina/non ST-elevation myocardial infarction: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines for the Management of Patients With Unstable Angina/Non ST-Elevation Myocardial Infarction): Developed in collaboration with the American College of Emergency Physicians,

- the Society for Cardiovascular Angiography and Interventions, and the Society of Thoracic Surgeons; Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation and the Society for Academic Emergency Medicine. *Circulation* 2007;116:e148-304.
15. Zubaid M, Rashed WA, Saad H, Attiya A, Al-Banat BA, Ridha M, *et al.* Kuwait acute coronary syndromes registry: Baseline characteristics, management practices and in-hospital outcomes of patients hospitalized with acute coronary syndromes in Kuwait. *Med Princ Pract* 2007;16:407-12.
  16. Zubaid M, Rashed WA, Al-Khaja N, Almahmeed W, Al-Lawati J, Sulaiman K, *et al.* Clinical presentation and outcomes of acute coronary syndromes in the gulf registry of acute coronary events (Gulf RACE). *Saudi Med J* 2008;29:251-5.
  17. Barron HV, Every NR, Parsons LS, Angeja B, Goldberg RG, Gore JM, *et al.* The use of intra-aortic balloon counter-pulsation in patients with cardiogenic shock complicating acute myocardial infarction: Data from the National Registry of myocardial infarction 2. *Am Heart J* 2001;141:933-9.
  18. Xavier D, Pais P, Devereaux PJ, Xie C, Prabhakaran D, Reddy KS, *et al.* Treatment and outcomes of acute coronary syndromes in India (CREATE): A prospective analysis of registry data. *Lancet* 2008;371:1435-42.
  19. Zubaid M, Rashed WA, Almahmeed W, Al-Lawati J, Sulaiman K, Al-Motarreb A, *et al.* Management and outcomes of Middle Eastern patients admitted with acute coronary syndromes in the Gulf Registry of Acute Coronary Events (Gulf RACE). *Acta Cardiol* 2009;64:439-46.
  20. Rosengren A, Wallentin L, Simoons M, Gitt AK, Behar S, Battler A, *et al.* Age, clinical presentation, and outcome of acute coronary syndromes in the Euro heart acute coronary syndrome survey. *Eur Heart J* 2006;27:789-95.
  21. Assiri AS. Gender differences in clinical presentation and management of patients with acute coronary syndrome in Southwest of Saudi Arabia. *J Saudi Heart Assoc* 2011;23:135-41.