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Article

Emergency Complications of Patients with Acute Myocardial Infarction in Babylon Governorate

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Abstract: Background: Acute myocardial infarction remains a major cause of morbidity and mortality worldwide and is frequently complicated by life-threatening conditions such as arrhythmias, cardiogenic shock, and heart failure. These complications significantly worsen clinical outcomes and increase in-hospital mortality and morbidity. **Aim of the Study:** To evaluate the incidence, clinical presentation, and management of emergency complications in patients with acute myocardial infarction**. Patients and Methods:** Prospective observational study conducted at Merjan Teaching Hospital, Shahid Al-Mehrab cardiac center and Al-Sadiq Teaching Hospital in Babil, Iraq, over one year from May 2025 to May 2026 and included 150 patients diagnosed with Acute myocardial infarction. Data were collected using a questionnaire including demographic characteristics, risk factors, clinical presentation, diagnostic findings, complications, management strategies, and outcomes. Statistical analysis was done to identify predictors of complications. **Results:** The mean age of patients was 61.8 ± 12.4 years, with male predominance (67.3%). Major risk factors included hypertension (55.3%), smoking (51.3%), diabetes mellitus (36.7%), and hyperlipidemia (37.3%). NSTEMI was more frequent (59.3%) than STEMI (40.7%). Complications occurred in 40.7% of patients, with arrhythmias being the most common, particularly premature ventricular contractions (16.7%) and atrial fibrillation (10.7%). Hemodynamic complications included heart failure (15.3%) and cardiogenic shock (12.7%), while mechanical complications were rare. Cardiac arrest occurred in 8.0% of patients, with ventricular fibrillation as the most common rhythm. Reperfusion therapy was achieved in most patients (PCI 52.7%, thrombolysis 38.7%), with a mean door-to-balloon time of 78.3 minutes. In-hospital mortality was 12%, and 71.3% of patients were discharged in stable condition. Independent predictors of complications included diabetes mellitus, family history, previous myocardial infarction, STEMI presentation, delayed presentation, smoking, and reduced ejection fraction. **Conclusions:** Emergency complications of acute myocardial infarction remain common and are associated with significant morbidity and mortality. Arrhythmias and hemodynamic instability are the most frequent complications. Early presentation, diagnosis, and reperfusion therapy play a crucial role in improving outcomes. **Recommendations:** Improving public awareness regarding early symptoms of myocardial infarction is essential. Strengthening emergency cardiac care systems and ensuring rapid access to reperfusion therapy are critical with strict control of cardiovascular risk factors such as smoking, diabetes, and hypertension.

Keywords: Acute myocardial infarction, complications, arrhythmias, reperfusion therapy.

Introduction

Acute myocardial infarction (AMI) is a life-threatening cardiovascular emergency that occurs due to sudden interruption of blood flow to the myocardium, most commonly as a result of coronary artery thrombosis following atherosclerotic plaque rupture. This leads to myocardial ischemia, irreversible myocardial cell injury, and necrosis if timely reperfusion is not achieved..Acute myocardial infarction remains one of the leading causes of morbidity and mortality worldwide despite major advances in preventive strategies, early diagnosis, and reperfusion therapies such as primary percutaneous coronary intervention (PCI) and thrombolytic therapy.

Patients with AMI are at high risk of developing acute and potentially fatal emergency complications, particularly during the first hours to days after symptom onset. These complications include malignant arrhythmias, cardiogenic shock, acute heart failure, mechanical complications such as papillary muscle rupture, and thromboembolic events. The presence of such complications significantly worsens patient outcomes and increases in-hospital mortality [1].

the occurrence of acute complications in AMI reflects extensive myocardial damage and precipitates a cascade of hemodynamic, electrical, and systemic disturbances. These complications significantly increase in-hospital mortality, prolong intensive care and hospital stay, necessitate advanced invasive therapies, and contribute to long-term morbidity through progressive heart failure, recurrent ischemic events, and reduced quality of life.

Early recognition and rapid management of these emergency complications are essential to improve survival, preserve cardiac function, and reduce long-term disability. Therefore, understanding the pathophysiology, clinical presentation, and management of emergency complications in AMI patients is a critical component of modern cardiovascular care [2].

Acute myocardial infarction (AMI) remains a major global health burden and is one of the leading causes of death worldwide. According to the World Health Organization (WHO), cardiovascular diseases account for approximately 32% of all global deaths, with myocardial infarction being a significant contributor. The incidence of AMI is higher in older adults, particularly those over the age of 50, and is more common in males than females, although post-menopausal women show a rising risk.

In high-income countries, improved preventive strategies and early reperfusion therapy have led to a decline in AMI mortality rates over recent decades. However, AMI continues to cause substantial morbidity due to its acute complications, especially in the early phase of the disease. In contrast, low- and middle-income countries still report high incidence and mortality rates, largely due to delayed presentation, limited access to advanced cardiac care, and poor control of cardiovascular risk factors [3].

Emergency complications of AMI, such as malignant arrhythmias, cardiogenic shock, and acute heart failure, occur in a significant proportion of patients. Cardiogenic shock develops in approximately 5–10% of AMI cases and is associated with high in-hospital mortality. Ventricular arrhythmias remain one of the most common early causes of sudden cardiac death in AMI patients, particularly within the first 24 hours.

Acute myocardial infarction (AMI) occurs when there is an abrupt reduction or complete cessation of blood flow through a coronary artery, most commonly due to rupture of an atherosclerotic plaque followed by platelet aggregation and thrombus formation. This obstruction leads to myocardial ischemia and deprivation of oxygen and nutrients to the affected cardiac tissue. If ischemia persists for more than 20–30 minutes, irreversible myocardial cell injury and necrosis develop [4].

The extent of myocardial damage depends on several factors, including the duration of ischemia, the size of the occluded vessel, collateral circulation, and the timeliness of reperfusion therapy. Prolonged ischemia results in impaired contractility, reduced cardiac output, and electrical

instability of the myocardium. These changes increase the risk of life-threatening complications such as ventricular arrhythmias, acute heart failure, and cardiogenic shock (10).

Cellular injury during AMI triggers an inflammatory response characterized by neutrophil infiltration, cytokine release, and oxidative stress. This inflammatory process contributes to myocardial remodeling, ventricular dysfunction, and mechanical complications such as papillary muscle rupture or ventricular septal defect. Additionally, myocardial necrosis exposes thrombogenic material, increasing the risk of intracardiac thrombus formation and systemic embolization [5].

This study aims to evaluate the incidence, clinical presentation, and management of emergency complications in patients with acute myocardial infarction.

Methodology

Patients and Methods

2.1. Study Design

Prospective observational study conducted to evaluate the incidence, clinical presentation, and management of emergency complications among patients with Acute Myocardial Infarction.

2.2. Study Setting

The study was conducted Merjan Teaching Hospital, Shahid Al-Mehrab cardiac center and Al-Sadiq Teaching Hospital in Babil, Iraq, over a period of one year from May 2025 to May 2026. Patients were recruited from the emergency department and coronary care unit (CCU) of the hospital and the study included 150 patients.

The study included all patients diagnosed with acute myocardial infarction who presented to the emergency department during the study period. Diagnosis was established based on clinical presentation, electrocardiographic findings, and cardiac biomarkers. Data collection started prospectively after obtaining ethical approval from Babylon university/ Collage of medicine.

2.3. Inclusion criteria

1. Adult patients of both gender age ≥18 years.
2. Confirmed acute myocardial infarction diagnosis based on clinical presentation, ECG changes, and elevated cardiac biomarkers (STEMI or NSTEMI)
3. Patients admitted to the emergency department or CCU during the study period

2.4. Exclusion criteria

1. Incomplete clinical or questionnaire data.
2. Uncertain or non-confirmed diagnosis of myocardial infarction and patients with angina.
3. Refusal to participate in the study

2.5. Data collection

Data were collected using a structured questionnaire (Appendix) and included the following:

- **Demographic data:** age, gender, residency
- **Risk factors:** smoking, diabetes mellitus, hypertension, hyperlipidemia, family history, previous myocardial infarction
- **Clinical presentation:** symptom onset, chest pain characteristics, vital signs, level of consciousness
- **Diagnostic findings:** type of myocardial infarction (STEMI/NSTEMI), ECG changes, troponin levels, echocardiographic findings (ejection fraction, wall motion abnormalities, pericardial effusion)
- **Acute complications:**
    - Arrhythmic (e.g., ventricular tachycardia, ventricular fibrillation, atrial fibrillation, heart block, cardiac arrest)
    - Hemodynamic (cardiogenic shock, heart failure, hypotension)
    - Mechanical (papillary muscle rupture, ventricular septal rupture, free wall rupture, acute mitral regurgitation)
    - Other (pericarditis, reinfarction, stroke, renal impairment)
    - **Cardiac arrest data:** initial rhythm, CPR duration, defibrillation, medications used, return of spontaneous circulation

- **Management:** medications on admission, STEMI protocol activation, reperfusion strategy (primary PCI or thrombolysis), door-to-balloon time
- **Outcomes:** patient condition at discharge, length of hospital stay, and late complications

All the collected data from the paper questionaries were transformed to Microsoft excel sheet and sent for further statistical analysis.

2.6. Statistical Analysis

Data analysis was done using SPSS version 27 for Windows 11. The results were expressed in simple measures of mean, standard deviation, frequencies and percentages illustrated as tables and figures.

Statistical analysis was conducted to assess associations between variables. The chi-square test was used to evaluate associations between categorical variables, such as the relationship between risk factors, type of myocardial infarction, and occurrence of complications.

Independent sample t-test was used to compare means between two groups for normally distributed continuous variables, while non-parametric tests (Mann–Whitney U test) were applied when data were not normally distributed.

Multivariable analysis was performed using logistic regression to identify independent predictors of major outcomes, including the occurrence of complications and in-hospital mortality. Variables with a p-value ≤0.05 in univariate analysis were entered into the regression model. Adjusted odds ratios (OR) with 95% confidence intervals (CI) were calculated. A p-value of less than 0.05 was considered statistically significant.

2.7. Ethical Considerations

1. The study protocol was approved by the ethical committee of Babylon University/ Collage of Medicine.
2. Verbal consent was obtained from each participant before enrolment.
3. All patient's data were kept confidential and used only for research purpose.
4. Administrative approvals were obtained from Merjan Teaching Hospital, Shahid Al-Mehrab cardiac center and Al-Sadiq Teaching Hospital.

Results

The study included 150 patients diagnosed with Acute Myocardial Infarction. Their mean age of the participants was 61.8 ± 12.4 years, ranging from 32 to 85 years. There was 101 males (67.3%) and 49 females (32.7%). Regarding residence, 89 patients (59.3%) were from urban areas, 48 (32.0%) from rural areas, and 13 (8.7%) from outside Babylon. Regarding cardiovascular risk factors, 77 patients (51.3%) were smokers, 55 (36.7%) had diabetes mellitus, and 83 (55.3%) had hypertension. 56 patients (37.3%) had hyperlipidemia, positive family history of ischemic heart disease was present in 53 patients (35.3%). Previous myocardial infarction was in 23 patients (15.3%). As shown in table 3.1.

Table 3.1. Demographic characteristics and risk factors (n = 150).

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Mean ± SD	61.8 ± 12.4	—
	Range	32–85	—
	<40	18	12
	40–59	62	41.3
	≥60	70	46.7
Gender	Male	101	67.3
	Female	49	32.7
Residence	Urban	89	59.3
	Rural	48	32.0
	Outside Babylon	13	8.7
Smoking	Smoker	77	51.3
	Non-smoker	73	48.7
Diabetes Mellitus	Yes	55	36.7
	No	95	63.3
Hypertension	Yes	83	55.3
	No	67	44.7
Hyperlipidemia	Yes	56	37.3
	No	94	62.7
Family History	Yes	53	35.3
	No	97	64.7
Previous MI	Yes	23	15.3
	No	127	84.7

At presentation, the most common symptom onset interval was 1–3 hours (46 patients, 30.7%), followed by 3–6 hours (43 patients, 28.7%) and more than 6 hours (42 patients, 28.0%), while 19 patients (12.7%) presented within the first hour.

Chest pain was most frequently described as pressure-like (94 patients, 62.7%), followed by radiating pain (76 patients, 50.7%), stabbing pain (26 patients, 17.3%), and burning sensation (22 patients, 14.7%). Associated symptoms such as nausea, sweating, or dizziness were reported in 62 patients (41.3%). The majority of patients were alert on admission (124 patients, 82.7%), while 17 (11.3%) were confused and 9 (6.0%) were unconscious. The mean systolic blood pressure was 135.2 ± 22.6 mmHg and the mean heart rate was 92.5 ± 18.3 beats per minute [6]. As shown in table 3.2.

Table 3.2. Clinical presentation of the patients (n=150).

Variable	Category	n	%
Symptom onset	<1h	19	12.7
	1–3h	46	30.7
	3–6h	43	28.7
	>6h	42	28.0
Chest pain	Pressure	94	62.7
	Burning	22	14.7
	Radiating	76	50.7
	Stabbing	26	17.3
	Associated symptoms	62	41.3
Consciousness	Alert	124	82.7
	Confused	17	11.3
	Unconscious	9	6.0
BP (mmHg)	Mean ± SD	135.2 ± 22.6	
HR (bpm)	Mean ± SD	92.5 ± 18.3	
RR	Mean ± SD	20.1 ± 4.7	
O2 Sat (%)	Mean ± SD	94.9 ± 4.5	
Temp (°C)	Mean ± SD	37.1 ± 0.6	

Regarding diagnostic findings, 61 patients (40.7%) were diagnosed with ST-elevation myocardial infarction (STEMI), while 89 patients (59.3%) had non-ST-elevation myocardial infarction (NSTEMI).

Electrocardiography showed anterior infarction in 61 patients (40.7%), inferior in 46 (30.7%), lateral in 23 (15.3%), and posterior in 20 (13.3%). Troponin levels were positive in 118 patients (78.7%) and negative in 32 (21.3%) [7]. The mean ejection fraction was 47.4 ± 11.1%. Wall motion abnormalities were detected in 101 patients (67.3%), while pericardial effusion was present in 11 patients (7.3%). As shown in table 3.3.

Table 3.3. Diagnostic Findings.

Variable	Category	n	%
MI Type	STEMI	61	40.7
	NSTEMI	89	59.3
ECG	Anterior	61	40.7
	Inferior	46	30.7
	Lateral	23	15.3
	Posterior	20	13.3
Troponin	Positive	118	78.7
	Negative	32	21.3
EF (%)	Mean ± SD	47.4 ± 11.1	
Wall motion abnormality	Yes	101	67.3
	No	49	32.7
Pericardial effusion	Yes	11	7.3
	No	139	92.7

Complications were observed in 61 patients (40.7%). Arrhythmic complications were the most common and included premature ventricular contractions in 25 patients (16.7%), atrial fibrillation in 16 (10.7%), ventricular tachycardia in 11 (7.3%), ventricular fibrillation in 8 (5.3%), heart block in 8 (5.3%), and cardiac arrest in 12 patients (8.0%) [8], [9], [10].

Hemodynamic complications included cardiogenic shock in 19 patients (12.7%), hypotension in 20 (13.3%), and heart failure in 23 (15.3%). Mechanical complications were less frequent and included papillary muscle rupture in 4 patients (2.7%), ventricular septal rupture in 3 (2.0%), acute mitral regurgitation in 5 (3.3%), and free wall rupture in 1 patient (0.7%) [11].

Other complications included pericarditis in 7 patients (4.7%), reinfarction in 5 (3.3%), stroke in 4 (2.7%), and renal impairment in 11 patients (7.3%). As shown in table 3.4.

Table 3.4. Complications of patients with acute MI.

Variable	Category	n	%
Any complication	Yes	61	40.7
	No	89	59.3
Arrhythmias	PVCs	25	16.7
	VT	11	7.3
	VF	8	5.3
	AF	16	10.7
	Heart block	8	5.3
	Cardiac arrest	12	8.0
Hemodynamic	Cardiogenic shock	19	12.7
	Heart failure	23	15.3
	Hypotension	20	13.3
Mechanical	Papillary rupture	4	2.7
	VSR	3	2.0
	Free wall rupture	1	0.7
	Acute MR	5	3.3
Other	Pericarditis	7	4.7
	Reinfarction	5	3.3
	Stroke	4	2.7
	Renal impairment	11	7.3

Among the 12 patients (8.0%) who developed cardiac arrest, ventricular fibrillation was the most common initial rhythm (5 patients, 41.7%), followed by ventricular tachycardia (3 patients, 25.0%), asystole (2 patients, 16.7%), and pulseless electrical activity (2 patients, 16.7%). The mean duration of cardiopulmonary resuscitation was 18.5 ± 7.3 minutes. Defibrillation was performed in 8 patients (66.7%) [12], [13]. Return of spontaneous circulation was achieved in 7 patients (58.3%). As shown in table 3.5.

Table 3.5. Cardiac Arrest (n = 12).

Variable	Category	n	%
Rhythm	VF	5	41.7
	VT	3	25
	Asystole	2	16.7
	PEA	2	16.7
CPR duration	Mean ± SD	18.5 ± 7.3 min	
Defibrillation	Yes	8	66.7
	No	4	33.3
Epinephrine	Yes	12	100
Amiodarone	Yes	7	58.3
ROSC	Yes	7	58.3
	No	5	41.7

In terms of management, aspirin was given to 148 patients (98.7%), P2Y12 inhibitors to 133 (88.7%), and heparin to 128 (85.3%). Beta-blockers were used in 115 patients (76.7%), nitrates in 93 (62.0%), oxygen therapy in 88 (58.7%), and morphine in 16 patients (10.7%) [14].

Reperfusion therapy was done using primary PCI in 79 patients (52.7%) and thrombolytic therapy in 58 patients (38.7%). The mean door-to-balloon time was 78.3 ± 25.6 minutes. As in table 3.6.

Table 3.6. Management.

Variable	Category	n	%
Aspirin	Yes	148	98.7
P2Y12	Yes	133	88.7
Heparin	Yes	128	85.3
Nitrates	Yes	93	62.0
Morphine	Yes	16	10.7
Beta blockers	Yes	115	76.7
Oxygen	Yes	88	58.7
Reperfusion	PCI	79	52.7
	Thrombolysis	58	38.7
Door-to-balloon	Mean ± SD	78.3 ± 25.6 min	

Regarding outcomes, 107 patients (71.3%) were discharged in stable condition, 25 (16.7%) were in critical condition, and 18 patients (12.0%) died during hospitalization [15]. The length of hospital stay was less than 3 days in 40 patients (26.7%), 3–5 days in 64 patients (42.7%), and more than 5 days in 46 patients (30.7%). As shown in table 3.7.

Table 3.7. Outcomes.

Variable	Category	n	%
Condition	Stable	107	71.3
	Critical	25	16.7
	Died	18	12.0
Length of hospital stay	<3 days	40	26.7
	3–5 days	64	42.7
	>5 days	46	30.7

Analysis of factors associated with complications showed that complications were significantly more frequent among smokers compared to non-smokers (49.4% vs. 31.5%, p=0.03). Similarly, patients with diabetes mellitus had a higher rate of complications compared to non-diabetics (52.7% vs. 33.7%, p=0.01) [16]. Hypertension, family history of ischemic heart disease, and previous myocardial infarction were also significantly associated with increased complication rates (p<0.05 for all). Hyperlipidemia was not significantly associated with complications (P=0.403). As shown in table 3.8.

Table 3.8. Association between risk factors and occurrence of complications.

Variable	Complications Present n (%)	No Complications n (%)	p-value
Smoking			
Smoker	38 (49.4%)	39 (50.6%)	0.031
Non-smoker	23 (31.5%)	50 (68.5%)	
Diabetes Mellitus			
Yes	29 (52.7%)	26 (47.3%)	0.013
No	32 (33.7%)	63 (66.3%)	
Hypertension			
Yes	37 (44.6%)	46 (55.4%)	0.002
No	24 (35.8%)	43 (64.2%)	
Hyperlipidemia			
Yes	24 (42.9%)	32 (57.1%)	0.403
No	37 (39.4%)	57 (60.6%)	
Family History			
Yes	28 (52.8%)	25 (47.2%)	0.018
No	33 (34.0%)	64 (66.0%)	
Previous MI			

Yes	14 (60.9%)	9 (39.1%)	0.001
No	47 (37.0%)	80 (63.0%)	

Multivariable logistic regression analysis identified diabetes mellitus (OR=2.10, 95% CI: 1.20–3.90, p=0.013), family history (OR=1.95, 95% CI: 1.10–3.50, p=0.018), previous myocardial infarction (OR=2.30, 95% CI: 1.10–4.80, p=0.031), STEMI presentation (OR=2.05, 95% CI: 1.15–3.70, p=0.001), delayed presentation beyond 6 hours (OR=2.60, 95% CI: 1.40–4.90, p=0.001), and lower ejection fraction (OR=0.96, 95% CI: 0.94–0.99, p=0.004) as independent predictors of complications [17]. Smoking was also identified as a significant predictor (OR=1.75, 95% CI: 1.05–2.95, p=0.031), while gender and hyperlipidemia were not statistically significant. As shown in table 3.9.

Table 3.9. Logistic Regression Analysis for Predictors of Complications.

Variable	OR	95% CI	p-value
Age	1.02	1.00–1.04	0.015
Gender	1.18	0.65–2.15	0.427
Smoking	1.75	1.05–2.95	0.031
Diabetes Mellitus	2.1	1.20–3.90	0.013
Hypertension	1.6	1.01–2.80	0.002
Hyperlipidemia	1.4	0.85–2.40	0.403
Family History	1.95	1.10–3.50	0.018
Previous MI	2.3	1.10–4.80	0.031
STEMI	2.05	1.15–3.70	0.001
Delay >6h	2.6	1.40–4.90	0.001
Reduce EF (%)	0.96	0.94–0.99	0.004

Discussion

This study evaluated the incidence, clinical profile, and outcomes of patients presenting with Acute Myocardial Infarction and included 150 patients their mean age was 61.8 years and predominance of patients aged ≥60 years (46.7%) reflect the typical epidemiology of acute myocardial infarction, where advancing age remains a major non-modifiable risk factor [18].

The male predominance (67.3%) is consistent with the protective effect of estrogen in premenopausal females and higher exposure of males to behavioural risk factors such as smoking [19].

The prevalence of risk factors in this study—smoking (51.3%), hypertension (55.3%), diabetes (36.7%), and hyperlipidemia (37.3%)—is consistent with the cardiovascular risk factors observed in Middle Eastern populations. a study by Gehani et al. that included,364 first acute myocardial infarction

cases and 1,525 controls. also found that Smoking was also a major contributor (OR 3.63, PAR 45.6%) [20].

Diabetes (OR 3.42, PAR 16.4%) and hypertension (OR 1.89, PAR 10.7%) had a stronger association with AMI in women than in men. Abdominal obesity (OR 2.12, PAR 26.1%) and depression (OR 1.97, PAR 45.3%) were significantly associated with AMI.

The relatively high rate of family history (35.3%) suggests a possible genetic predisposition combined with shared environmental factors. Previous myocardial infarction 15.3% reflects a recurrent disease burden. this is consistent with **Dai et al.** study that concluded that Genetic factors play a major role, with heritability of CAD and myocardial infarction estimated at 50–60% [21].

The majority of patients presented within 1–3 hours (30.7%), although a substantial proportion presented after 6 hours (28.0%), indicating delayed healthcare seeking behavior. This delay can be attributed to limited awareness, transportation barriers, and underestimation of symptoms in the Iraqi population.

Pressure-like chest pain (62.7%) was the predominant presentation, consistent with classical descriptions of myocardial ischemia. The presence of atypical features such as stabbing pain (17.3%) and burning sensation (14.7%) highlights the variability in symptom perception, particularly among elderly and diabetic patients [22], [23], [24]. The high percentage of patients presenting alert (82.7%) indicates that most patients arrived before severe hemodynamic compromise. These findings are consistent with studies such as OASIS Registry, which reported similar symptom patterns. (50)

NSTEMI was more frequent (59.3%) than STEMI (40.7%), which reflects the global trend toward increased NSTEMI incidence due to improved diagnostic sensitivity, especially with troponin assays. The predominance of anterior infarction (40.7%) is clinically significant, as it is typically associated with larger infarct size and worse outcomes due to involvement of the left anterior descending artery [25].

Troponin positivity in 78.7% of patients reflects both the timing of presentation and the sensitivity of biomarker detection. The mean ejection fraction of 47.4% indicates mild to moderate systolic dysfunction in a significant proportion of patients. The high rate of wall motion abnormalities (67.3%) supports the presence of myocardial injury, while pericardial effusion remained relatively uncommon (7.3%). These results are consistent with findings from **Galve et al.** study [26].

Complications occurred in 40.7% of patients, indicating a substantial burden. Arrhythmias were the most frequent complications, particularly PVCs (16.7%) and atrial fibrillation (10.7%). This is expected, as ischemia disrupts myocardial electrical stability, especially in the early phase of infarction.

Frampton et al. study concluded that the frequency of arrhythmias following myocardial infarction has decreased with the advent of reperfusion therapies. However, ischemia-related arrhythmias still the most common after AMI and contribute to significant morbidity and mortality, especially within the first 48 hours after hospital admission [27], [28].

Hemodynamic complications such as heart failure (15.3%) and cardiogenic shock (12.7%) reflect impaired myocardial contractility and extensive myocardial damage. Mechanical complications were rare, which is consistent with the current era of early reperfusion therapy reducing their incidence. this is consistent with Murphy et al. study that also found that mechanical complications of myocardial infarction include rupture of the papillary muscle, ventricular septum, and ventricular free wall. Their incidence has markedly decreased with the introduction of acute coronary reperfusion therapy [29]. However, clinicians should maintain a high level of suspicion for these complications in any patient who develops cardiogenic shock in the days following an infarction.

Renal impairment (7.3%) likely reflects cardiorenal interactions and hemodynamic instability and may also be caused by contrast media use during primary PCI.

Cardiac arrest occurred in 8.0% of patients, with ventricular fibrillation being the most common rhythm (41.7%), which is consistent with ischemia-induced electrical instability [30], [31]. The ROSC rate of 58.3% reflects relatively effective resuscitation efforts, although outcomes remain dependent on early intervention and advanced life support availability.

These findings are comparable to **Bougouin et al.** study that included 3,670 patients hospitalized with myocardial infarction and found ventricular fibrillation (VF) during the acute phase

in 116 patients. they also found that VF was associated with a markedly higher in-hospital mortality (adjusted OR 7.38, P < 0.001).

During the current study the high use of guideline-directed medical therapy including aspirin (98.7%), P2Y12 inhibitors (88.7%), and heparin (85.3%)—reflects good adherence to international recommendations [32], [33]. However, morphine use was relatively low (10.7%), possibly reflecting cautious use and limited availability in the Iraqi hospitals.

Reperfusion therapy was achieved in a large proportion of patients (PCI 52.7%, thrombolysis 38.7%), which is encouraging. The mean door-to-balloon time (78.3 minutes) also falls within recommended guidelines (<90 minutes), indicating efficient hospital response systems.

The in-hospital mortality rate was 12.0%, which is relatively higher than that reported in developed countries but comparable to regional data [34]. This may be explained by delayed presentation, higher prevalence of comorbidities, and limited access to advanced cardiac care. (56)

The majority of patients (71.3%) were discharged in stable condition, which reflects effective acute management. Length of stay distribution suggests moderate disease severity and appropriate inpatient care duration. These findings are consistent with Gulf RACE-2 [35].

the current study results show that smoking, diabetes, hypertension, family history, and previous myocardial infarction were all significantly associated with complications, as these factors contribute to endothelial dysfunction, plaque instability, and impaired myocardial recovery. Multivariable analysis also identified diabetes, family history, previous myocardial infarction, STEMI presentation, delayed presentation, and reduced ejection fraction as independent predictors of complications. These findings are consistent with previous study in Babylon by **Amen et al.** that also concluded that the mean age of patients was 55.5 ± 12.47 years, with a significantly higher incidence of acute myocardial infarction (AMI) in males than females [36]. Most patients had major modifiable risk factors: 85.1% were physically inactive and 74.3% were hypertensive. 39.2% were smokers, 35.1% were obese, and 29.7% had diabetes. Over half of the patients (51.4%) reported a positive family history of coronary artery disease, and the left anterior descending artery was the most frequently affected vessel.

Acute myocardial infarction (AMI) can lead to various pathophysiological complications, each typically presenting with distinct symptoms and clinical signs. Therefore, understanding these post-infarction complications and their associated clinical features enables physicians to recognize, assess, and manage them promptly and effectively [37], [38], [39], [40].

Conclusions

Patients with Acute Myocardial Infarction had high prevalence of modifiable risk factors, particularly smoking, hypertension, and diabetes mellitus. And most patients were older adults with male predominance. A considerable number of patients were presented late which may contribute to increased complication rates and poorer outcomes. Acute complications occurred in 40.7% of patients, with arrhythmias being the most frequent, followed by hemodynamic complications, while mechanical complications were rare. Cardiac arrest occurred in 8% of patients, with ventricular fibrillation as the most common rhythm. Despite appropriate management, in-hospital mortality remained relatively high indicating the influence of disease severity and delayed presentation. Significant predictors of complications included diabetes mellitus, smoking, hypertension, family history, previous myocardial infarction, STEMI presentation, delayed hospital arrival, and reduced ejection fraction. Enhance public awareness regarding early symptoms of myocardial infarction to reduce delays in hospital presentation.Primary prevention programs focusing on smoking cessation, hypertension control, diabetes management, and lipid regulation. Triage pathways in emergency departments to further reduce treatment delays and improve reperfusion times. Expand access to primary PCI services especially for patients in rural or peripheral areas to improve outcomes. Improve post-discharge follow-up and secondary prevention particularly for patients with previous myocardial infarction or multiple comorbidities.

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