



Therapeutic marks of the acute coronary syndrome: a single-center familiarity

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General Note



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ABSTRACT

Background: Acute coronary syndrome is a major health concern with an increase in the sedentary lifestyle in Saudi Arabia. With the spectrum ACS clinical presentations, choosing an appropriate treatment guideline is a challenge. Therefore, this study aimed to explore the therapeutic marks of ACS in a Single-center acquaintance. **Methodology:** Information regarding 156 ACS patients were re-claimed from King Khalid hospital, Ha'il, Northern Saudi Arabia. All patients were admitted to the hospital during a year period and diagnosed as having ACS. **Results:** Most of the patients in the study were presenting with STEMI followed by NSTEMI and

unstable angina, representing 83/156(53%), 43/156(28%), and 30/156(19%), respectively. For males, the most common ACS type was STEMI 69/130(83%) followed by NSTEMI 38/130(29%), whereas, STEMI 17/26(65%) was the most common type in females followed by unstable angina 7/26(27%). The risk of NSTEMI associated with males, the relative risk (RR) and the 95% confidence interval (CI) was; RR (95%CI) = 1.52 (0.6615 to 3.4926), P = 0.3239, z statistic = 0.986. The risk of unstable angina associated with females, the RR (95%CI) = 1.5217 (0.7305 to 3.1699), P = 0.2621, z statistic = 1.121. *Conclusion:* ACS is prevalent in Northern Saudi with the most common types of STEMI followed by NSTEMI and unstable angina. Males are more susceptible to the disease than females. The therapeutic targets involved in the management of patients are in aligned with the globally used guidelines with the expectation of the absence of Ticagrelor and Prasugrel antiplatelet regime.

Keywords: Acute coronary syndrome, NSTEMI, STEMI, unstable angina, Saudi Arabia, therapeutic

1. INTRODUCTION

The term acute coronary syndrome (ACS) is used to denote symptoms associated with acute myocardial ischemia or ischemic heart disease. ACS has three clinical types: ST-segment elevation myocardial infarction (STEMI), Non-ST-segment elevation myocardial infarction (NSTEMI), and Unstable angina (Petrovic et al., 2020). Although there is substantial progress in the prognosis of ACS, yet considerable morbidity and mortality persist (Sánchez-de-la-Torre et al., 2020).

Electrocardiographic presentation embodies the foremost way for the classification of ACS, which primarily depends on the presence or absence of ST-segment elevation (Gach et al., 2018). The therapeutic decision and prognostication for patients with ACS usually depend on the severity of the condition during patient presentation (Jia et al., 2020). Elder patients usually present with more severe states of the diseases (Yilmaz et al., 2019; hmed et al., 2019). However, health care staff ought to follow the scientific guidelines once the likelihood of the ACS is reputable and associated with chest pain. Early involvement of antithrombotic, anticoagulant treatment and revascularization timing reduces the risk of ischemic and hemorrhagic events (Gach et al., 2018).

However, there is limited data regarding ACS from Saudi Arabia. Most available information pertaining to patients presenting with heart conditions and admitted to a coronary care unit (CCU) (Al-Ghamdi, et al., 2018; Alhabib et al., 2019). Thus our present investigation aimed to explore the therapeutic marks of ACS in a Single-center acquaintance.

2. MATERIALS AND METHODS

In this study data pertaining to 156 patients were retrieved from King Khalid hospital, Ha'il, Northern Saudi Arabia. All patients were admitted to the hospital during a year (January 2018 to January 2019) period and diagnosed as having ACS. In addition to electrocardiography and physical examination, cardiac biomarkers testing, radiologic tests, and patients' history were employed to characterize the diagnosis of ACS as; unstable angina, none-ST-segment elevation myocardial infarction or ST-segment elevation myocardial infarction. Data regarding demographical characteristics and subsequent management were obtained from patients' files.

Data analysis

Acquired data were examined with the SPSS program. A Chi-square test was employed using a 95% confidence level. A P-value < 0.05 was deliberated statistically significant.

Ethical consent

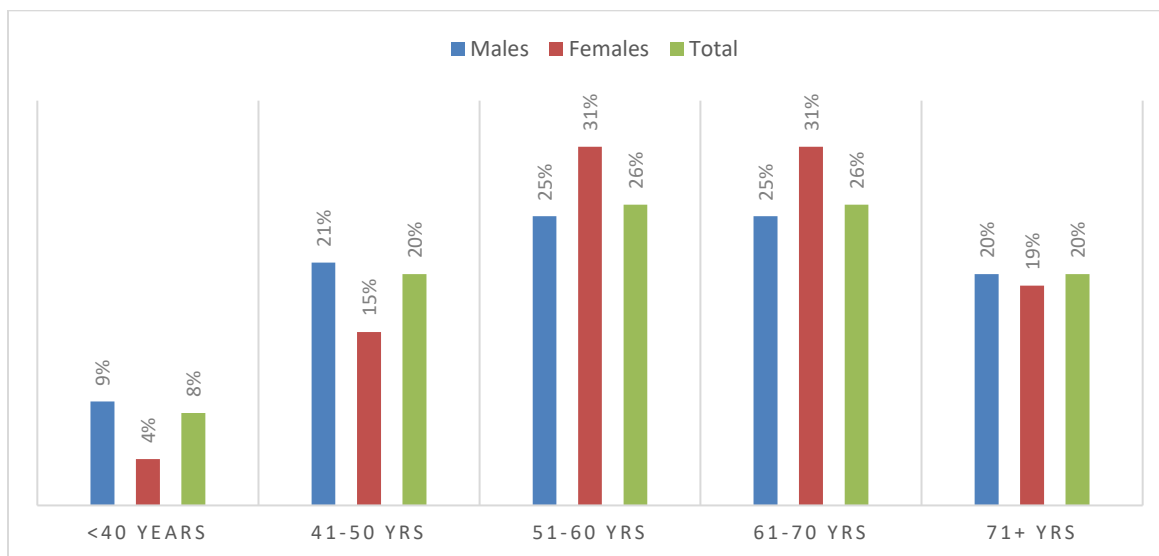
The study was approved by the Ethical Committee at the University of Ha'il, Saudi Arabia. The study took into account the ethical standards of the 1964 Helsinki declaration and its subsequent modifications or analogous ethical standards.

3. RESULTS

Out of the 156 ACS patients, 130(83%) were males and 26(17%) were females, aged 27 to 90 years with a mean age of 59 years. The age distribution was relatively similar for both sex ratios, as indicated in Table 1, Fig 1.

Table 1. Distribution of the patients by age and sex

Variable	Males	Females	Total
Age			
<40 years	12	1	13
41-50	27	4	31
51-60	33	8	41
61-70	32	8	40
71+	26	5	31
Total	130	26	156

**Figure 1.** Patients by age and sex

Most patients in the study were presented with STEMI followed by NSTEMI and unstable angina, representing 83/156(53%), 43/156(28%), and 30/156(19%), respectively. For males, the most common ACS type was STEMI 69/130(83%) followed by NSTEMI 38/130(29%), whereas, STEMI 17/26(65%) was the most common type in females followed by unstable angina 7/26(27%). The risk of NSTEMI associated with males, the relative risk (RR) and the 95% confidence interval (CI) was; RR (95%CI) = 1.52 (0.6615 to 3.4926), P = 0.3239, z statistic = 0.986. The risk of unstable angina associated with females, the RR (95%CI) = 1.5217 (0.7305 to 3.1699), P = 0.2621, z statistic = 1.121.

Anterior ACS is the most commonly encountered followed by Anteroseptal, and Anteroseptal constituting 41/141(29%), 40/141(28.4%), and 31/141(22%), correspondingly. In males, Anterior 38/120(31.7%) was the most common type followed by Inferior 36/120(29.8%), hence, in females, Anteroseptal 6/21(28.6%), was the most common type followed by Anterolateral 5/21(23.8%), as indicated in Table 2, Fig 2.

Table 2. Distribution of the patients by ACS type, diagnosis, and sex

Variable	Males	Females	Total
ACS type			
Unstable angina	23	7	30
NSTEMI	38	5	43
STEMI	69	17	83
Total	130	26	156
Diagnosis			
Anterior	38	3	41
Posterior	3	0	3
Inferior	36	4	40
Anteroseptal	25	6	31
Anterolateral	14	5	19
Anteroinferior	4	3	7
Total	120	21	141

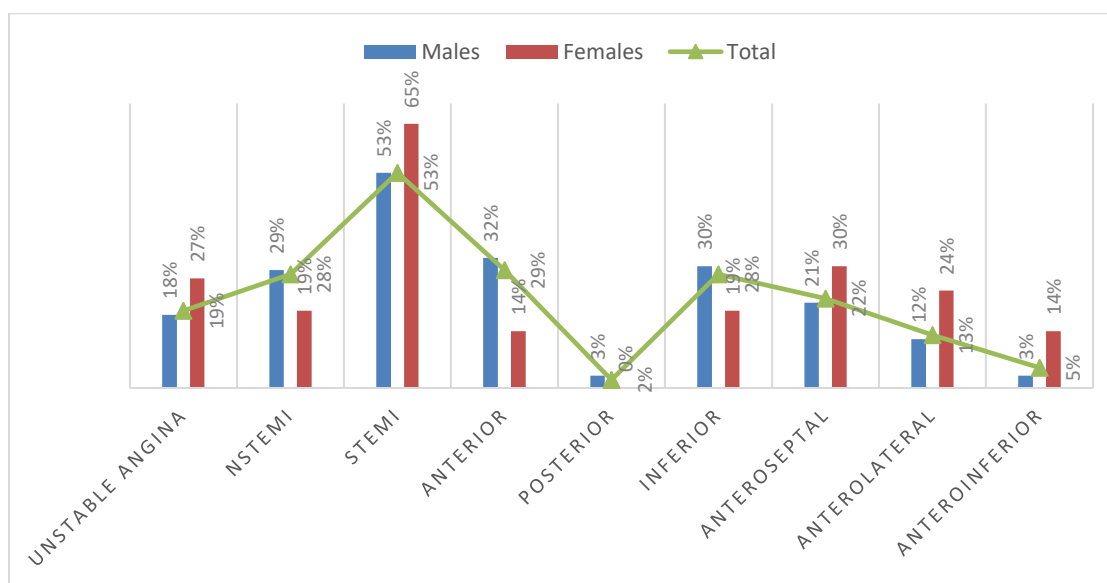


Figure 2. Patients by ACS type, diagnosis, and sex

Table 3, Fig 3, summarized the distribution of the patients by Nonstable ACS and treatment. The great majority of patients were given acetylsalicylic acid (ASA) 149/156(95.5%). Nitroglycerin was used in 62/156(40%) patients, 25/83(30%) with STEMI, 21/43(49%) with NSTEMI, and 16/30(53.3%) with unstable angina. All patients were given oxygen (100%). Only one patient with STEMI was given morphine.

Thrombotic agents were given to 33/156(21.2%) patients, of whom 29/33(88%) were with TTEMI. Percutaneous coronary intervention (PCI) was utilized for only two patients with unstable angina. Clopidogrel was used in 137/156(88%) patients included 74/83(89%) with STEMI, 38/43(88%) with NSTEMI, and 25/30(83%) with unstable angina.

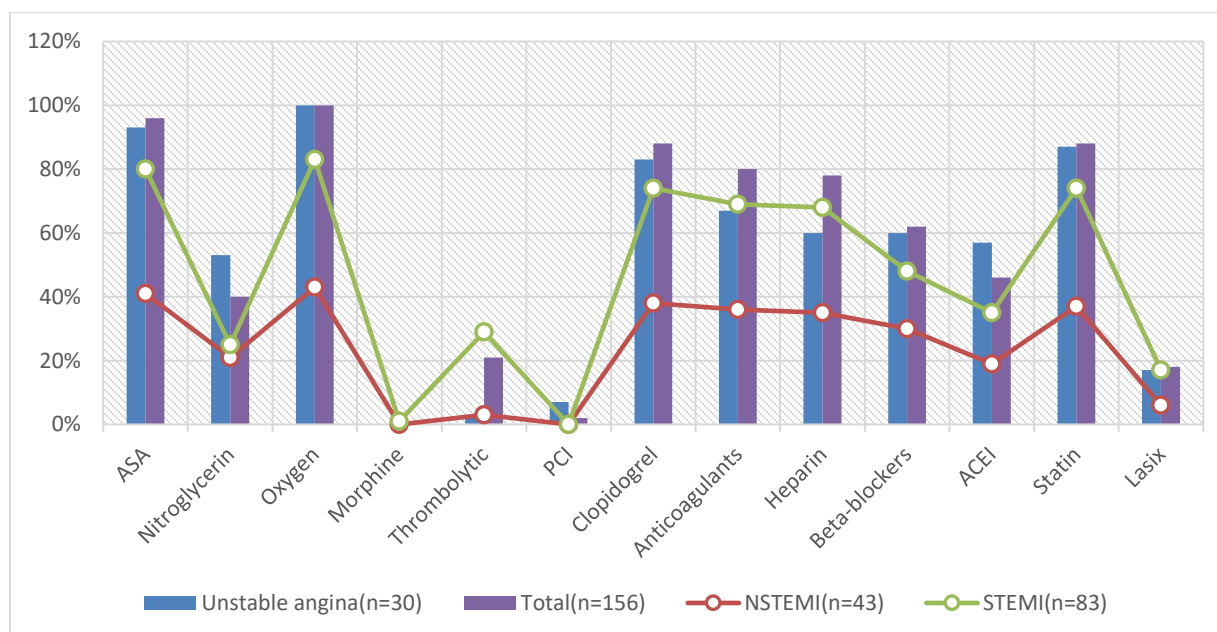


Figure 3. Patients by ACS type and treatment

Anticoagulants were used in 125/156(80%) patients included 69/83(83%) with STEMI, 36/43(84%) with NSTEMI, and 20/30(66.7%) with unstable angina. Warfarin was used in only 5/156(3.2%) patients. Heparin was used in 121/156(77.6%) patients included 68/83(82%) with STEMI, 35/43(81.4%) with NSTEMI, and 18/30(60%) with unstable angina.

Beta-blockers were used in 96/156(61.5%) patients included 48/83(58%) with STEMI, 30/43(70%) with NSTEMI, and 18/30(60%) with unstable angina.

Angiotensin-converting enzyme *inhibitors* (ACEI) were used in 71/156(45.5%) patients included 35/83(42%) with STEMI, 19/43(44%) with NSTEMI, and 17/30(56.7%) with unstable angina.

Statin was used in 137/156(88%) patients included 74/83(89%) with STEMI, 37/43(86%) with NSTEMI, and 26/30(86.7%) with unstable angina.

Diuretics (Lasix) was used in 28/156(18%) patients included 17/83(20.5%) with STEMI, 6/43(14%) with NSTEMI, and 5/30(16.7%) with unstable angina.

Table 3. Distribution of the patients by ACS and treatment

Variable	Unstable angina (n=30)	NSTEMI (n=43)	STEMI (n=83)	Total (n=156)
ASA				
Yes	28	41	80	149
No	2	2	3	7
Nitroglycerin				
Yes	16	21	25	62
No	14	22	58	94
Oxygen				
Yes	30	43	83	156
No	0	0	0	0
Morphine				
Yes	0	0	1	1
No	30	43	82	155
Thrombolytic				
Yes	1	3	29	33
No	29	40	54	123
PCI				
Yes	2	0	0	2
No	28	43	83	154
Clopidogrel				
Yes	25	38	74	137
No	5	5	9	19
Anticoagulant				
Yes	20	36	69	125
No	10	7	14	31
Warfarin				
Yes	2	1	2	5
No	28	42	81	151
Heparin				
Yes	18	35	68	121
No	12	8	15	35
Beta-blocker				
Yes	18	30	48	96
No	12	13	35	60
ACEI				
Yes	17	19	35	71
No	13	24	48	85
Statin				
Yes	26	37	74	137
No	4	6	9	19
Lasix				
Yes	5	6	17	28
No	25	37	66	128

Table 4, Fig 4, summarized the distribution of the patients by ACS type, treatment, and sex. ASA was used in 124/130(95.4%) males and 25/26(96.2%) females. Nitroglycerin was used in 50/130(38.5%) males and 12/26(46.2%) females. Thrombolytic agents

were used in 29/130(22.3%) males and 4/26(15.4%) females. Clopidogrel was used in 111/130(85.4%) males and 26/26(100%) females. Anticoagulant was used in 103/130(79.2%) males and 22/26(84.6%) females. Warfarin was used in 5/130(3.8%) males and 0/26(0%) females. Heparin was used in 99/130(76%) males and 22/26(84.6%) females. Beta-blockers were used in 99/130(76.2%) males and 19/26(73%) females. ACEI was used in 58/130(44.6%) males and 13/26(50%) females. Statin was used in 115/130(88.5%) males and 22/26(84.6%) females. Lasix was used in 21/130(16.2%) males and 7/26(27%) females.

Table 4. Distribution of the patients by ACS type, treatment, and sex

Variable	Males (n=130)	Females (n=26)	Total (n=156)
ASA			
Yes	124	25	149
No	6	1	7
Nitroglycerin			
Yes	50	12	62
No	80	14	94
Morphine			
Yes	1	0	1
No	129	26	155
Thrombolytic agents			
Yes	29	4	33
No	101	22	123
PCI			
Yes	2	0	2
No	128	26	154
Clopidogrel			
Yes	111	26	137
No	19	0	19
Anticoagulant			
Yes	103	22	125
No	27	4	31
Warfarin			
Yes	5	0	5
No	125	26	151
Heparin			
Yes	99	22	121
No	31	4	35
Beta-blockers			
Yes	77	19	96
No	53	7	60
ACEI			
Yes	58	13	71
No	72	13	85
Statin			
Yes	115	22	137
No	15	4	19
Lasix			
Yes	21	7	28
No	109	19	128

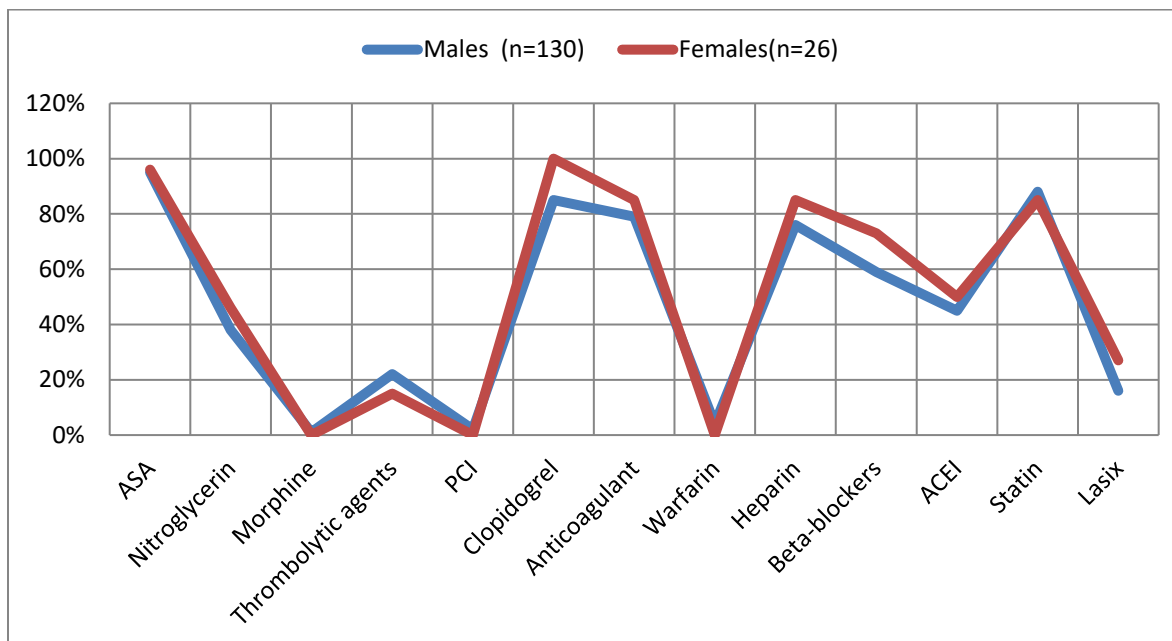


Figure 4. Patients by ACS type, treatment, and sex

The distribution of the patients by ACS type, treatment, and age was summarized in Table 5, Fig 5. ASA, Nitroglycerin, Thrombolytic, Clopidogrel, Anticoagulant, Warfarin, Heparin, Beta-blockers, ACEI, Statin, and Lasix were predominantly used in age groups, 51-60 years, 51-60, 61-70, 61-70, 61-70, 61-70, 51-60, 61-70, 51-60, 51-70, and 61-70 years, respectively as indicated in Table 5, Fig 5.

Table 5. Distribution of the patients by ACS type, treatment and age

Variable	< 40 years (n=13)	41-50 (n=31)	51-60 (n=41)	61-70 (n=40)	71+ (n=31)	Total (n=156)
ASA						
Yes	12	3	40	38	29	149
No	1	1	1	2	2	7
Nitroglycerin						
Yes	6	14	18	11	13	62
No	7	17	23	29	18	94
Morphine						
Yes	0	1	0	0	0	1
No	13	30	41	40	31	155
Thrombolytic						
Yes	6	8	9	10	0	33
No	7	23	32	30	31	123
PCI						
Yes	0	0	1	0	1	2
No	13	31	40	40	30	154
Clopidogrel						
Yes	13	25	36	37	26	137
No	0	6	5	3	5	19
Anticoagulant						
Yes	12	25	34	35	19	125
No	1	6	7	5	12	31
Warfarin						
Yes	0	1	0	3	1	5

No	13	30	41	37	30	151
Heparin						
Yes	12	24	34	33	18	121
No	1	7	7	7	13	35
Beta-blockers						
Yes	8	20	22	27	17	96
No	5	11	19	13	12	60
ACEI						
Yes	6	15	20	16	14	71
No	7	16	21	24	17	85
Statin						
Yes	11	27	37	37	25	137
No	2	4	4	3	6	19
Lasix						
Yes	2	1	8	11	6	28
No	11	3	33	29	25	128

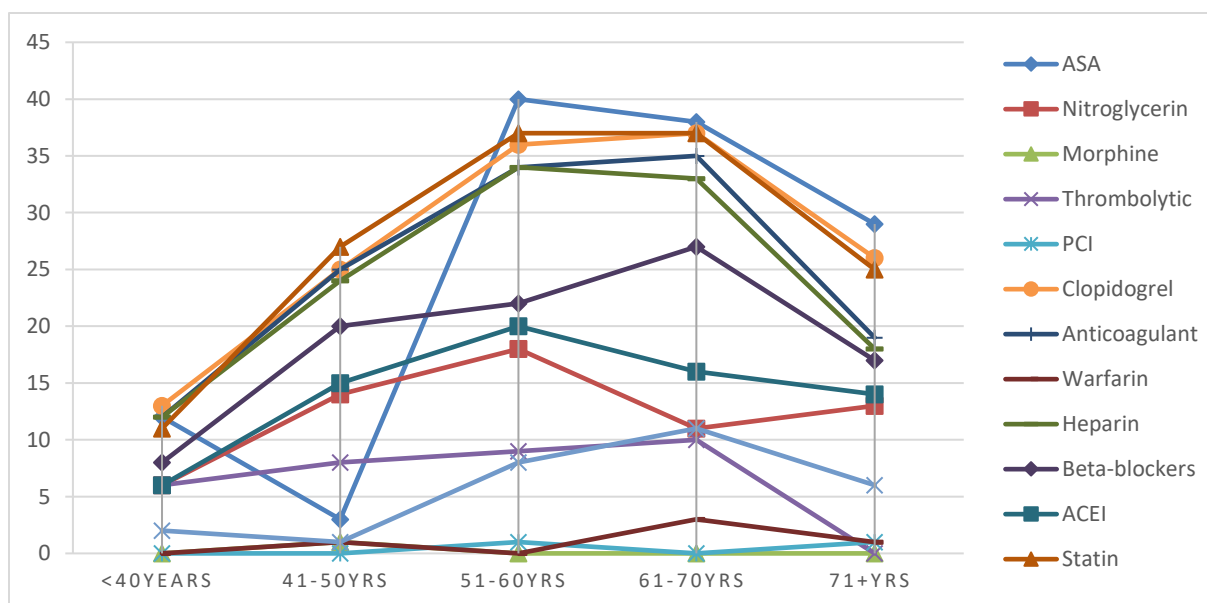


Figure 5. Patients by ACS type, treatment, and age

4. DISCUSSION

As ACS has a spectrum of clinical presentations with relative similarity with some heart complaints, it has a range of management and treatment modalities. In most instances, the determinants include the severity of the patient's state and the availability of scientific guidelines. Therefore, in the present study, we aimed to explore what was done for the patients during one year in our CCU.

In the current series of patients, the most frequent ACS type was STEMI (53%) followed by NSTEMI (28%) and unstable angina (19%), and the great majority of patients were males. Studies in this context showing variable proportions of these categories, most probably due to underline causes in a particular geographical and/or population setting (Ralapanawa et al., 2019; Krackhardt et al., 2019). Men are more susceptible to ACS than women and such findings were previously reported (Kouvari et al., 2019).

In the present study acetylsalicylic acid (Aspirin) and Clopidogrel were used in 95.5%, 88% of the patients, respectively. Antiplatelet treatment with Clopidogrel and Aspirin still used in the treatment of ACS. Although this treatment is effective, it has thromboembolic complications in some patients due to increased platelets' responsiveness (high platelets resistance), which is linked to Clopidogrel absorption and activation variability (Wójcik et al., 2019). Consequently, this combined usage is later replaced by Ticagrelor and Prasugrel antiplatelet regime, nonetheless aspirin is still extremely acclaimed in patients with acute NSTEMI (Aboal

et al., 2019). However, recent recommendations advise the use of Aspirin in all ACS patients unless there is contraindication (Braun et al., 2020).

Nitroglycerin is used in 40% of the patients in this study. Nitroglycerin is an initial treatment in ACS, particularly unstable angina, and its associated symptoms including chest pain (Barstow, 2020; Pendela et al., 2020).

Thrombotic agents, Anticoagulants, Heparin, Beta-blockers, were used in 21.2%, 80%, 77.6%, and 61.5%, respectively. ACS may be associated with high thrombotic risk because of the probability of inflammatory status (Morici et al., 2019). The use of Anticoagulants is associated with greater patients safety, particularly is ischemic events are uncertain (Roule et al., 2019). The usage of beta-blocker treatment is found to decrease the risk of in-hospital cardiac death in cases with ACS enduring percutaneous coronary intervention (Kim et al., 2019).

Angiotensin-converting enzyme inhibitors and statin were used in 45.5%, and 88% of the patients. Increased usage of these medications in patients with ACS was reported. Angiotensin-converting enzyme inhibitors, Beta-blockers, and statins were used in 84.1%, 86.9%, and 84.1% of patients in one recent study (Desta et al., 2020). Moreover, diuretics were used in 18% of the patients. The use of diuretics is common in patients with heart diseases (Jouini et al., 2019).

Although the present study made available useful information, it has some limitations including its retrospective settings.

5. CONCLUSION

ACS is prevalent in Northern Saudi with the most common types of STEMI followed by NSTEMI and unstable angina. Males are more susceptible to the disease than females. The therapeutic targets involved in the management of patients are aligned with the globally used guidelines with the expectation of the absence of Ticagrelor and Prasugrel antiplatelet regime.

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Conflicts of interest

The authors declare no conflicts of interest.

Ethical approval

Ethical committee approval code number: HREC 00136/CM-UOH.04/20.

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Data and materials availability

All data associated with this study are present in the paper.

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