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9 Triage of patients with acute coronary syndrome at the emergency department: a retrospective study

Abstract

Background: Acute coronary syndrome represents a considerable challenge worldwide as one of the causes of death; its diagnosis is often very complex. It includes acute myocardial infarction with ST-segment elevation, acute myocardial infarction without ST-segment elevation, unstable angina pectoris, and sudden cardiac arrest.

Methods: This retrospective cohort study included 678 patients who were admitted to the emergency department between 2015 and 2019 with acute coronary syndrome. Triage data were reviewed for vital signs, baseline characteristics, chief complaints, demographic variables, mode and time of arrival, triage, diagnosis, and treatment. Regression was used to identify key symptoms and patient characteristics at triage encounter to predict acute coronary syndrome.

Results: A total of 678 triage records were identified. The average age of the sample was 67 years old, 58.6% male, and 31.8% came by themselves to the emergency department. The most common diagnosis was acute myocardial infarctions without ST elevation (38.2%). Chest pain and difficulty in breathing were the two most common symptoms. Most patients were not assigned to the appropriate triage category, i.e., were diagnosed as less urgent.

Discussion and conclusion: This study presents the triage of patients with acute coronary syndrome at the emergency department to provide a comprehensive insight into their care. By identifying patient symptoms at the emergency department, nurse triage recognizes patients with acute coronary syndrome on time, thus increasing the accuracy of determining the triage category, which will impact the treatment outcome of patients.

Keywords: Acute myocardial infarction, Unstable angina pectoris, Heart arrest, Nurse, Triage

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9.1 Introduction

Acute coronary symptom (ACS) represents a large healthcare problem worldwide, as one of the leading causes of death [1, 2]. It includes acute myocardial infarction with ST-segment elevation (STEMI), acute myocardial infarction (AMI) without ST-segment elevation (N-STEMI), and unstable angina pectoris (NAP) [3]. The cause in all forms of ACS is usually the same, and only the clinical presentation differs from one form to the other [3].

ACS occurs due to erosion or rupture of atherosclerotic coronary plaque where a blood clot forms, narrows, or closes the coronary lumen. In the area supplied by this artery, acute myocardial ischaemia develops. If ischaemia is severe and prolonged, this results in myocardial necrosis. The electric pulse conduction is also altered, which causes malignant ventricular tachyarrhythmia: ventricular tachycardia or fibrillation [4]. The occurrence of symptoms is often the first indicator of a change in health. Therefore, this can make it difficult for patients to identify accurately and interpret ACS symptoms on time, especially if the symptoms deviate from what the patient takes as a "normal state" or if the symptoms are like other non-cardiac ones [5]. Chest pain occurs at rest in 80% of ACS patients, and in the remaining 20% of patients at the slightest effort [6]. The pain is severe, burning, squeezing in the chest area, and extending into the neck, arms, and upper abdomen [7, 8]. Other accompanying symptoms include dyspnoea, nausea, vomiting, paleness, and perspiration [9].

It is important that triage nurses act quickly and, above all, correctly [10]. Rapid recognition of ACS symptoms is crucial for further treatment. Each triage nurse contributes to treating such a patient; therefore, it is important for them to be well-trained in the onset of ACS, the characteristic signs and symptoms, treatment methods, and response to any changes in health condition [11, 12].

To recognize ACS, it is important to record an electrocardiogram (ECG) and measure blood pressure, heart rate, saturation, and blood drawn according to the scheme laid down for ACS. An intravenous cannula is inserted for as much flow as possible, usually into the left cubital vein [13]. In the case of AMI, the patient is prepared for emergency coronary angiography, saving valuable time for the intervention healthcare team [14].

Triage nurses often do not recognize or miscategorize a patient suspected of having ACS [13]. Sanders and Devon [15] and Weeks and Edna Jones [16] note and add that triage nurses do not identify approximately 45% of these cases. Moreover, Benjamin et al. [17] state that one out of five patients with ACS dies early in the event of symptoms. With an early diagnosis of ACS, 10–20% mortality can be reduced, and the correct assessment at triage encounter is important [16, 17]. The clinical presentation of symptoms of a potential ACS is complex, and it is difficult for the triage nurse to distinguish between those who recognize an ACS and those who rule it out [18].

An accurate cardiac triage decision depends on triage nurses' personal traits, knowledge, and experience. The triage nurse must have sufficient experience and knowledge [19] of the common ACS symptoms, to prevent delays in treatment and improve treatment outcomes.

An early and accurate triage of a patient with suspected ACS is important to prevent delays in treatment and treatment outcomes [13]. Proper triage by the triage nurse leads to the fast taking of short anamnestic history, which is very important for further treatment, as survival, and later, the quality of the patient's life depend on it [14]. Triage nurses should be aware of all important patient symptoms and factors independently predictive of ACS.

The chapter aims to identify the demographic and other patient characteristics with ACS triaging by the triage nurse and present the treatment of patients with ACS in the emergency department (ED).

9.2 Methods

This study was based on the retrospective cohort study using multiple pre-existing data sources.

9.2.1 Setting

The study was conducted at a large medical centre's ED in Slovenia. Patient treatment data were obtained using pre-existing data sources in the medical records of patients. The records of all patients diagnosed with ACS were retrieved using a predetermined table and collected from 1 January 2015 to 31 December 2019.

9.2.2 Study population

This retrospective cohort study included medical records of adult patients ($\geq$ 19 years), with the final diagnosis of ACS and its related diagnoses determined by the physician at discharge from ED or relocation to the ward. The exclusion criteria were medical records of younger patients ($\leq$ 19 years) without a diagnosis of ACS and their related diagnoses determined by the physician at discharge from ED or relocation to the ward. Also, patient medical records with missing data, without Manchester Triage System (MTS), or unreadable font were excluded. Figure 9.1 displays the selection process of the medical record of patients with ACS.

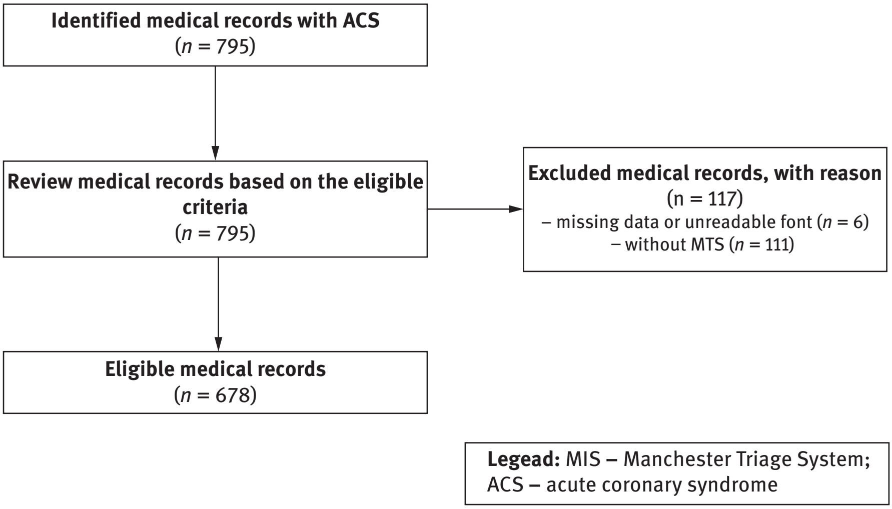

Fig. 9.1: The selection process of a patient's medical record with ACS. MTS, Manchester Triage System; ACS, acute coronary syndrome.

9.2.3 Statistical analysis

All data collected for this study were entered into a Microsoft Excel 2016 program and analysed using the SPSS 28.0 statistical program. Descriptive statistics were used to summarize and analyse the following information: demographic variables; mode and time of arrival; triage category; main problems; or cause for visiting the ED; diagnosis; treatment; and treatment outcome. The data were tested beforehand for normality, using the Shapiro–Wilk test. Based on the Shapiro–Wilk test, the data were not normally distributed ($W(678) = 0.649$, $p < 0.001$). The differences between the genders were tested with the Chi-square test, Mann–Whitney *U* test, and Kruskal–Wallis test, based on the variable type. Data were displayed as numbers on total (percentage), mean (*M*), and standard deviation (SD). Predictor variables were determined by univariate logistic regression (forward method, logit function, 95% confidence interval, $\alpha < 0.05$). The regression model fit was assessed by Pearson and Hosmer-Lemeshow tests. The sensitivity and specificity of the model were assessed by analysing the area under the ROC (receiver operating characteristic) curve, taking into account acceptable discrimination of $0.7 \leq \text{ROC} < 0.8$ [20]. The correlations between the values were verified by the Spearman correlation coefficient, considering: 0–0.09 (negligible), 0.10–0.39 (weak), 0.40–0.69 (moderate), 0.70–0.89, and 0.90–1 (very strong) [21]; $p \leq 0.05$ was considered statistically significant.

9.2.4 Ethical aspects

The study was approved by the Slovenian National Medical Ethics Committee (0120-69/2019/6) and received authorization from the selected institution. The study is retrospective, meaning that it includes patients who had already completed their treatment, and the study did not have an impact on the course of treatment. Data were analysed anonymously. The study followed the principles of the Declaration of Helsinki on Medical Research Involving Human Subjects [22] and the provisions of the Convention for the Protection of Human Rights and Dignity of the Human Being concerning the Application of Biology and Medicine (Oviedo Convention) [23].

9.3 Results

During the study period, 678 patients were treated for ACS at this ED. Due to incomplete or unreadable data and lack of MTS on medical records of patients, we excluded 117 (Fig. 9.1). The mean age was 67 years (SD = 13.7), and 41.4% ($n = 281$) were female. Based on the comparison between gender and age groups, we found that there was a statistical difference between the two variables ($\chi^2(1) = 22.073$, $p < 0.001$). Women had mean age of 70.98 years (SD = 13.15), and men had 64.22 years (SD = 13.4). Of 678 patients were, 49% ($n = 332$) diagnosed with STEMI, 38.2% ($n = 259$) with N-STEMI, 6.3% ($n = 43$) with AP, and 6.5% ($n = 44$) with NAP. The final diagnosis was ACS only in 152 (22.4%) patients; 605 patients (89.2%) underwent immediate revascularization in the coronary catheterization laboratory, 54 patients (8%) were scheduled for coronary artery bypass surgery, 12 patients (1.8%) underwent pacemaker implantation, and seven patients (1%) were treated conservatively, as they refused coronary angiography. The demographic and clinical characteristics of the study population are presented in Tab. 9.1.

The overall mean systolic blood pressure was 154.24 mmHg (SD = 29.09) for the vital signs measured −156.07 mmHg (SD = 30.69) for women and 152.87 mmHg (SD = 28.10) for men. In terms of diastolic blood pressure, the overall mean was 87.93 mmHg (SD = 7.06), with 86.49 mmHg (SD = 16.37) in women and 88.94 mmHg (SD = 17.36) in men. The mean pulse rate for all patients was 83.54 beats/min (SD = 20.73). Only a statistical difference between sexes and pulse rate was found ($Z = -2.175$, $p = 0.030$). Women had a higher pulse rate on average ($M = 85.58$, SD = 20.79) than men ($M = 81.89$, SD = 20.49).

The treated patients came to the ED by different modes of arrival; 268 patients (39.5%) were brought by paramedics; 410 patients (60.5%) came from home by themselves, of which 214 (31.7%) patients were unaccompanied, and 464 (68.4%) patients were accompanied.

Tab. 9.1: Demographic and clinical characteristics.

Variable	DS	Gender ($n = 678$)			
		Male ($n = 397$)	Female ($n = 281$)	Z, χ^2 or r-value	p
Age (Y; M ± SD; R)	67.02 ± 13.7; 20–94	64.22 ± 13.43; 20–92	70.98 ± 13.15; 25–94		
<65 years	299(44.1)	205(51.6)	94(33.5)	22,073[a]	<0.001*
≥65 years	379(60)	192(48.4)	187(66.5)		
Vital signs					
SBP** (M ± SD)	154.24 ± 29.09	152.87 ± 28.10	156.07 ± 30.69	−1.424[b]	0.154
DBP** (M ± SD)	87.93 ± 17.06	88.94 ± 17.36	86.49 ± 16.37	−1.552[b]	0.121
Pulse (M ± SD)	83.54 ± 20.73	81.89 ± 20.49	85.58 ± 20.79	−2.175[b]	0.030*
SpO_2 (M ± SD)	95.54 ± 3.99	95.84 ± 3.68	95.85 ± 0.90	−0.211[b]	0.833
Triage MTS (M ± SD)	2.78 ± 0.70; 2–4	2.74 ± 0.71	2.85 ± 0.69		
Red n(%)	0(0)	0(0)	0(0)	5.599[a]	0.061
Orange n(%)	255(37.6)	164(41.3)	91(32.4)		
Yellow n(%)	315(46.5)	173(43.6)	142(50.5)		
Green n(%)	108(15.9)	60(15.1)	48(17.1)		
Blue n(%)	0(0)	0(0)	0(0)		
Type of ASC *n*(%)	678(100)				
STEMI, *n*(%)	332(49)	191(48.1)	141(50.2)	0.422[c]	0.516
N-STEMI, *n*(%)	259(38.2)	153(38.5)	106(37.7)		
NAP, *n*(%)	44(6.5)	24(6)	20(7.1)		
AP, *n*(%)	43(6.3)	29(7.3)	14(5)		
Number of symptoms (*M* ± SD, R)	2.5 ± 1.19; 1–6	2.39 ± 1.17; 1–6	2.67 ± 1.18; 1–6	−3.418[b]	0.001*

*, Statistical significance ($p < 0.05$); **, mmHg; %, per cent of participants; a, Chi-square test; AP, angina pectoris; b, Mann–Whitney *U* test; c, Kruskal–Wallis test; DS, descriptive statistics; *M*, mean; MTS, Manchester Triage System; *n*, sample size; N-STEMI, non-ST elevation myocardial infarction; NAP, unstable angina pectoris; SD, standard deviation; STEMI, ST-elevation myocardial infarction.

The patients requiring help at the ED who delayed their problems for a few hours numbered 323 (47.6%), 131 patients (19.3%) delayed their problems for a while, 84 patients (12.4%) sought help within a few minutes after the onset of health problems, 63 patients (9.3%) within 10 min, and most of the patients within 30 min ($n = 77$, 11.4%). There were 194 patients (18.6%) who arrived within a few hours (≤ 6 h), of which most arrived within 1 h ($n = 84$, 12.4%) (Tab. 9.2).

Tab. 9.2: Duration of symptoms ($n = 678$).

Variable	*n*(%)
0–1 h	84(12.4)
1–6 h	110(16.2)
6–12 h	17(2.5)
12–24 h	79(11.7)
More than 24 h	388(52.2)

%, per cent of participants; *n*, sample size.

All patients were triaged into triage categories by colour: the orange triage category, in which patients must be provided medical assistance within 10 min, was assigned to 255 patients (37.6%), and the yellow triage category, which also represents the largest group of treated patients requiring medical assistance within 60 min, was assigned to 315 patients (46.5%), and the green triage category, where patients wait up to 120 min for treatment, was assigned to 108 patients (15.9%) (see Tab. 9.1). The most common triage algorithm selected by the Registered Nurse was chest pain (45.9%), adult malaise (17.7%), and dyspnoea (6.5%). The most common triage criteria chosen for triage were moderate pain (10.6%), recent problems (10.3%), rapid onset (7.9%), angina pectoris (7.6%), history of significant heart disease (6.3%), pleuritic pain (4.6%), and low SpO_2 (4.3%).

We observed significant difference between mean MTS levels concerning the most common symptoms (chest pain: 2.75 ± 0.69, shortness of breath: 2.81 ± 0.73, nausea: 2.96 ± 0.79, pain in the left arm: 2.81 ± 0.60, $p < 0.001$) and type of ACS (STEMI: 2.76 ± 0.70; N-STEMI: 2.79 ± 0.70; and NAP: 2.70 ± 0.69, AP: 3.00 ± 0.72, $p < 0.001$). There was no significant difference in gender (male: 2.74 ± 0.71, female: 2.85 ± 0.69, $p = 0.061$), age groups (age < 65 years: 2.78 ± 0.70, age ≥ 65 years: 2.79 ± 0.70, $p = 0.990$), and concerning diabetes (diabetic: 2.81 ± 0.69, non-diabetic: $2.78 \pm .70$, $p = 0.763$) (Tab. 9.3).

Patients reported a mean of 2.5 symptoms (SD = 1.19). The most common symptoms provided by the patient, which are more likely to lead to the development of ACS, were chest pain ($n = 568$, 83.8%), difficult breathing ($n = 192$, 28.3%), nausea ($n = 99$, 14.6%), pain in the left arm ($n = 74$, 10.9%), sweating ($n = 67$, 9.9%), dizziness

Tab. 9.3: Average MTS levels with a standard deviation of the study sample.

Variables	Mean MTS level ± SD	*p*
All (*n* = 678)		
Men	2.74 ± 0.71	0.061
Women	2.85 ± 0.69	
Age < 65 years	2.78 ± 0.70	0.990
Age ≥ 65 years	2.79 ± 0.70	
Chest pain	2.75 ± 0.69	<0.001*
Shortness of breath	2.81 ± 0.73	
Nausea	2.96 ± 0.79	
Pain in the left arm	2.81 ± 0.60	
Diabetes	2.81 ± 0.69	0.763
No diabetes	2.78 ± 0.70	
STEMI	2.76 ± 0.70	<0.001*
N-STEMI	2.79 ± 0.70	
NAP	2.70 ± 0.69	
AP	3.00 ± 0.72	

*, Statistical significance at $p < 0.05$; AP, angina pectoris; MTS, Manchester Triage System; N-STEMI, non-ST elevation myocardial infarction; NAP, Unstable angina pectoris; SD, standard deviation; STEMI, ST elevation myocardial infarction.

(*n* = 52, 7.7%), pain on exertion (*n* = 47, 6.9%), general weakness (*n* = 45, 6.6%), and vomiting (*n* = 43, 6.3%). Other medical histories were atypical for ACS and occurred in less than 5% of patients.

All 678 (100%) patients had ECG performed, and 677 patients (99.9%) had blood drawn according to the ACS regimen. Other examinations performed on patients included X-rays (*n* = 62, 9.1%), laboratory urine tests (*n* = 4, 0.6%), and ultrasound of the lungs or heart (*n* = 5, 0.7%).

The most administered drug therapies at the ED prescribed by the physician during medical treatment were acetylsalicylic acid 250 mg (*n* = 341, 50.3%), glyceryl nitrate (*n* = 253, 37.3%), sodium chloride (*n* = 117, 17.3%), morphine (*n* = 83, 12.2%), and heparin (*n* = 64, 9.4%).

Among the associated diseases of the treated patients with ACS, the most common were arterial hypertension (*n* = 414, 61.1%), hyperlipidaemia (*n* = 180, 26.5%), diabetes type 2 (*n* = 144, 21.2%), and other diseases shown in Tab. 9.4.

Tab. 9.4: Patients' associated diseases.

Major adverse cardiac event risk factors	Men ($n = 397$)	Women ($n = 281$)	Total ($n = 678$)
	n(%)	n(%)	n(%)
Arterial hypertension	225(33.2)	189(27.9)	414(61.1)
Hyperlipidaemia	108(15.9)	72(10.6)	180(26.5)
Diabetes type 2	86(12.7)	58(8.6)	144(21.2)
Acute myocardial infarction	69(10.2)	29(4.3)	98(14.5)
Atrial fibrillation	37(5.5)	33(4.9)	70(10.3)
Heart failure	28(4.1)	34(5)	62(9.1)
Dyslipidaemia	34(5)	11(1.6)	45(6.6)
Chronic kidney disease	16(2.4)	26(3.8)	42(6.2)
Ischemic heart disease	22(3.2)	12(1.8)	34(5)
Angina pectoris	16(2.4)	14(2.1)	30(4.4)
Asthma	12(1.8)	15(2.2)	27(4)
Chronic obstructive pulmonary disease	17(2.5)	6(.9)	23(3.4)

%, per cent of participants; n, sample size.

Ninety-eight patients (14.5% of all patients) had already experienced AMI. One patient recovered from AMI three times, that is, 35, 29, and 22 years ago. Eight patients (1.2%) had AMI twice, the remaining patients (89 patients or 13.1%) had AMI once, and for 18 patients (2.7%), we did not obtain the year of AMI. Recurrent AMI is most common in the first few years after AMI. Cardiac arrest was experienced by 3 (0.4%) patients treated, that is, 3, 10, and 12 years ago.

Patients were hospitalized for a mean nine days (SD = 8.5). The longest hospitalization took 64 days (SD = 15.6), and the patient who was hospitalized the least was discharged on the same day he was admitted. Of all hospitalized patients, 32 patients (4.7%) died during the hospitalization. Only eight patients (1.2%) died due to ACS; in other patients ($n = 24$, 3.5%), the causes were congestive heart failure, cardiogenic shock, pneumonia, other types of shock, and others.

With Spearman's correlations (Tab. 9.5), we found negative correlations between chest pain and other symptoms of acute coronary syndrome – difficult breathing and chest pain ($r_s = -0.375$; $p < 0.01$), nausea and chest pain ($r_s = -0.312$; $p < 0.01$), and pain in the left arm and chest pain ($r_s = -0.199$; $p < 0.01$). Table 9.5 shows a further finding of a positive correlation between final diagnosis and duration of the symptoms ($r_s = 0.132$; $p < 0.01$) and final diagnosis and chest pain ($r_s = 0.134$; $p < 0.01$).

Tab. 9.5: Spearman correlation matrix of MTS, duration of symptoms, and most common symptoms of ACS.

Variable	MTS	Duration of symptoms	Chest pain	Difficult breathing	Nausea	Pain in the left arm
MTS	1	−0.061	−0.122	0.015*	0.108	−0.004*
Duration of symptoms	−0.061	1	0.214	−0.158	−0.047*	−0.026*
Chest pain	−0.122	0.214	1	−0.375	−0.312	−0.199
Difficult breathing	0.015*	−0.158	−0.375	1	−0.058*	−0.037*
Nausea	0.108	−0.047*	−0.312	−0.058*	1	−0.031*
Pain in the left arm	−0.004*	−0.026*	−0.199	−0.037*	−0.031*	1

*, Statistical significance at $p < 0.05$; MTS, Manchester Triage System.

Tab. 9.6: Regression results for the symptoms of ACS.

Variable	***B***	**SE**	***β***	***t***	***p***
Final diagnosis	−3.859	23.543	.229	−0.164	0.870
Duration of symptoms	4.038	1.217	0.129	3.317	0.001*
Triage colour	0.948	0.947	0.038	1.000	0.317
Chest pain	0.154	0.048	0.148	3.217	0.001*
Difficult breathing	0.034	0.086	0.017	0.398	0.691
Nausea	0.014	0.100	0.006	0.140	0.889
Pain in the left arm	0.295	0.149	0.077	1.979	0.048*
	$R = 0.124$; adjusted $R^2 = 0.310$; SE = 1.922; $F = 2.635$ ($p < 0.001$)				

*, Statistical significance at $p < 0.05$; *B*, estimated values of raw (unstandardized) regression coefficient; *F*, *F* distribution; *n*, sample size; *p*, probability; *R*, unstandardized regression coefficient; R^2, unstandardized regression squared coefficient; SE, standard error; *t*, Student's *t* distribution; and *β*, beta coefficient.

The data show that the overall regression was statistically significant ($R^2 = 0.124$, $F(4.635) = 2.635$, $p < 0.001$). Concerning the value of the standardized regression coefficient among the studied variables, we found that the duration of symptoms ($\beta = 0.129$; $p < 0.001$) has the strongest impact on chest pain ($\beta = 0.148$ $p < 0.001$), followed by the triage colour ($\beta = 0.038$, $p = 0.317$), difficult breathing ($\beta = 0.017$; $p = 0.691$), pain in the left arm ($\beta = 0.077$; $p = 0.048$), and nausea ($\beta = 0.06$; $p = 0.889$). The multiple regression analysis showed that we can explain 31% of the total variability of most prevalent symptoms of patients that lead to serious cardiac diseases, the duration of symptoms, chest pain, and pain in the left arm (Tab. 9.6).

9.4 Discussion

We present the treatment of patients with ACS at the ED, demonstrating the complexity of the highlighted issue. The mean age of the patients with ACS was 67 years, 58.6% male, and 31.8% came by themselves to the ED. The most common diagnosis was AMI without ST elevation (38.2%). Among the associated diseases of the treated patients with ACS, the most common was arterial hypertension. Chest pain and difficult breathing were the two most common symptoms as a reason for seeking help at the ED. Most patients were not assigned to the appropriate triage category, i.e., were diagnosed as less urgent. Most patients had ECG performed, and blood was drawn according to the ACS regimen. Other examinations performed on patients included X–rays, laboratory urine tests, and ultrasounds of the lungs or heart.

This chapter also identifies key symptoms and factors in patients that were available to triage nurses in the initial assessment of an ED patient's health status. The final model showed that the following baseline predictors have good differentiating value for ACS detection during initial nursing triage: chest pain, duration of symptoms, and left arm pain. By knowing which patient factors are important when a patient enters an ED seeking emergency care, triage nurses can prioritize treatment and provide timely care to those most in need of adequate ED resources, greatly impacting outcomes in ACS populations. The complexity of ACS requires much knowledge about this condition and its occurrence to identify, take measures, and treat such patients promptly, as timely and quality treatment of patients with ACS is very important. Recognizing clinical signs of ACS begins with the patient's admission at triage encounter, which was continuously performed at the ED.

In the United States, more than 5.5 million patients with symptoms suspected of ACS come to the emergency every year [18], of which 20–25% have a final diagnosis of ACS [24], while in Slovenia, this number is around 5,000 people annually [9]. In this study, 197,456 people required medical assistance, of which 678 patients who sought help in the ED had ACS diagnosed.

Triage nurses should be aware of all underlying conditions of patient factors that independently predict ACS [13]. Identifying the patient's ACS factors in the first minutes of triage is important in determining the most predictable symptoms of ACS. Approximately one in five patients with ACS will die very early in treatment [17]. According to Benjamin et al. [17] and Wu et al. [25], making an early diagnosis of ACS can reduce mortality by 10–20%. Eisen et al. [26] and Sinkovič [27] report that the prevalence of N-STEMI is certainly much higher than for other ACS conditions, as well as NAP. Moreover, STEMI, on the other hand, accounts for only a third of all ACS conditions. STEMI (49% of all treated patients) was the most diagnosed at the ED, followed by N-STEMI (38.2%), AP (6.3%), and NAP (6.5%). Of all patients treated, 58.6% were men, and 41.4% were women. Different studies [28–30] also found that the prevalence of ACS is higher in men than in women at different ages. The mean age of the treated patients was 67 years (SD = 13.7), suggesting that the prevalence of ACS is higher in older than in younger patients [29]. In our study, the oldest patients were born in 1923, and the youngest was born in 1996. The most common symptoms in almost all treated patients included chest pain, followed by shortness of breath. According to Gillis et al. [31], chest pain and shortness of breath are the most common symptoms in the elderly, which can also be confirmed in our study.

Patients in our study reported a mean of three symptoms (SD = 1.2); however, the study conducted by Kirchberger et al. [32] reports 4.6 symptoms: most commonly, diaphoresis (61%), left shoulder and arm pain (56.7%), and dyspnoea (48.5%). Furthermore, the study showed that patients with STEMI reported significantly more symptoms than patients with N-STEMI. Our study also found that patients with STEMI reported a mean of 2.6 symptoms (SD = 1.2), and patients with N-STEMI reported 2.4 symptoms (SD = 1.3). Patients who experienced vomiting, diaphoresis, or dizziness were found to have a significantly higher risk of developing STEMI. In contrast, dyspnoea and neck pain were associated with an increased risk of N-STEMI.

STEMI was the most commonly diagnosed among the ACS, and chest pain as a symptom was present in most patients. Due to the increasing number of patient visits to ED, triage is becoming more important in ED to prioritize and treat patients with potentially life-threatening diseases such as ACS [33]. According to the MTS, patients with ACS should be classified into red and orange categories [34]. Our retrospective study demonstrates that patients diagnosed with ACS were triaged as MTS level 2 and MTS level 3 (very urgent to urgent assessment) and should be seen by the physician within 10–60 min. After reviewing the triage records, we found that no patients were classified in the red category, which can be explained by the direct admission of those patients to the treatment beyond triage. Only a quarter of all triage patients were classified in the appropriate orange category. This means that the remaining treated patients were assigned to an inappropriate or lower triage category than they should be. International research suggests that many patients (even more than 50%) with ACS are classified into lower triage categories than they should otherwise be [35]. Chest pain was absent in as many as 21.6% of patients in this category, resulting from the selected lower triage category, and N-STEMI was the most frequently diagnosed in this category.

In this chapter, we present the treatment of a patient with ACS at the ED, demonstrating the complexity of the highlighted issue. The study may be helpful to all healthcare professionals who perform their work at the ED and provides insight into the treatment of these patients. Continuous education of employees is very important, as we established in the study how difficult it is to recognize ACS due to many factors and the occurrence of unusual symptoms. According to many authors [17, 36], the prevalence of ACS is certainly growing; therefore, educating the patients and the general population to take preventive interventions is necessary.

Our study does not provide insight into the actual situation or the number of treated patients, as we recorded only those who sought help at the selected ED and had a final diagnosis of ACS. We also gained insight into only one ED, so it would make sense to investigate the prevalence of ACS elsewhere in Slovenia, in a larger sample and include a prehospital unit. Many authors also report the delayed time to primary percutaneous intervention as the cause of treatment complications during hospitalization and high mortality, so it would be sensible to record the average time until intervention and determine whether this time is approximately the same as the duration recommended by international guidelines.

9.5 Conclusion

The population is ageing, and increasingly, people have various associated chronic diseases and unhealthy lifestyles, which increases the possibility of developing ACS that is difficult to identify in older patients. Timely diagnosis and treatment of ACS are crucial for the prognosis of the disease and the quality of the patient's subsequent life. Symptoms with good distinctive value have been found to identify patients with potential ACS at triage. These key patient symptoms need to be considered in the initial health assessment and can help triage nurses better differentiate patients with symptoms suggestive of ACS, and help provide faster care to those in need of immediate treatment. Therefore, the work of a triage nurse is extremely important in the triage encounter, as it depends on her/him, if the most threatening symptoms to the patient are recognized in time and treated promptly.

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