Clinical and Epidemiological Approach of the Acute Coronary Syndrome in A Hospital in the Center of Ecuador

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Abstract
Introduction: Acute coronary syndrome is the leading cause of mortality in Ecuador, despite efforts and modern diagnostic and laboratory processes continues to be a health problem worldwide and especially in developing countries. Objective: To determine the clinical characteristics and epidemiological profile of patients with acute coronary syndrome. Material and methods: A descriptive, retrospective study was carried out on patients treated at the Cardiology Department of the Carlos Andrade Marín Hospital in the city of Quito - Ecuador. The data were selected from a sample of 207 patients and analyzed using the SPSS V.25 software. Results: It was determined that the majority of patients resided in urban areas, the average age of presentation was 66 years (+/- 13.96). The main pathological antecedents linked to coronary syndrome were arterial hyper- tension, diabetes and ischemic heart disease; typical chest pain was predominant; mestizo patients presented a lower development of IAMCEST compared to other ethnic groups (OR: 0.930; 95% CI: 0.872-0.993), the his- tory of malignancies predisposes to a larger class on the Killip scale upon admission (OR: 1,593; 95% CI: 1,093-5,871). In patients with hypothyroidism and cancer, a greater predisposition of infarction was found. Conclusion: The timely identification and proper management of comorbidities such as cardiac arrhytimias, hypothyroidism and previous myocardial infarction are pathologies to be taken into account because they pre- dispose to increase the presentation of coronary events and their recurrence in the population over 50 years.
Keywords: Acute coronary syndrome, Risks Factors, Epidemiology

1. Introduction

According to the 2017 ESC Guideline on the treatment of ST-segment elevation coronary syndrome, acute myocardial infarction is defined as a clinical-pathological event, in which there is evidence of myocardial damage that is defined as the elevation of cardiac troponins above the 99th percentile of the upper limit of reference , with evidence of myocardial necrosis in a clinical setting compatible with ischemia (1) (11). In this context, the main objective of the present study was to determine demographic characteristics, harmful habits, clinical admission, comorbidities associated with infarction and its association with the type of coronary syndrome , Killip scale at discharge and recurrence of infarction of a group of patients with acute coronary syndrome hospitalized. two in a hospital belonging to Social Security located in the center-north of Quito - Ecuador; this approach will allow a greater knowledge of the factors associated with coronary syndrome typical of the Ecuadorian population and thus implement more appropriate measures for its prevention and management.

2. Objective

To determine the clinical characteristics and epidemiological profile of patients with acute coronary syndrome.

3. Material and Methods

A descriptive, retrospective study was conducted by reviewing the electronic medical records of 207 patients over 18 years of age with
acute coronary syndrome diagnosed clinically, by means of electrocardiogram and laboratory tests (ultrasensitive troponins), in the service of Cardiology – Chorological Care Unit of the HCAM (Hospital Carlos Andrade Marín
– Quito, Ecuador). Patients with incomplete medical histories and other types of an- gina other than unstable angina were excluded. The sampling method used was simple random probabilistic, selecting 207 patients admitted to the unit from May 2017 to May 2018. The required information was obtained from the AS 400 computer system of the hospital where the research was carried out.

4. Results

It should be noted that all data were collected directly from electronic medical records, no data, comorbidity or habit was collected or corroborated by the researcher which could predispose to bias. The analysis of the information was carried out using the statistical program SPSS V25. The required consent was requested in writing to the research directorate of the institution, mentioning the objectives and use of the results obtained.
207 patients were included, of which 168 were men,

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the mean age of the sample studied was 66 years (+/- 13.9). The distribution of infarction types were: ST elevation (STEMI) (54.1%), no ST elevation (NSTEMI) (35.3%) and unstable angina (10.6%). Table 1 shows the main demographic characteristics of the population studied. The

Typical chest pain , dyspnea and smoking were the most frequent characteristics of the population studied as shown in Table 2.

Patients over 50 years of age were the ones with the highest recurrence of infarction with statistical significance, among other facts.

demographic factors (Table 3). The presence of ischemic cardiopathy, arrhythmias and neoplasia prior to the diagnosis of infarction were statistically important factors within the research (Table 4).

Table 1. General demographic characteristics in patients with coronary syndrome

Variable		Overviewn %
Age		
From 18 to 50 years old	26	12,6%
Over 50 years old	181	87,4%
Sex		
Male	168	81,2%
Female	39	18,8%
Ethnic group		
Mestizo	195	94,2%
Indigenous	4	1,9%
Afroecuatoriano	8	3,9%
Occupational Category		
Public Employee	61	29,5%
Private Employee	89	43,0%
Retirement	57	27,5%
Level of Education		
Illiteracy	1	,5%
Primary	79	38,2%
High school	65	31,4%
Superior	62	30,0%
Region of Origin		
Costa	30	14,5%
Sierra	174	84,1%
Orient	3	1,4%
Area of Residence		
Urban	165	79,7%
Rural	42	20,3%

Source: Study database Prepared by: Miranda E. (2019).

Table 2. Distribution of the population according to the clinic of admission, habits and BMI.

Variable	Feature	N	%
Clinic			
	Chest Pain	185	89,37%
	Dyspnea	23	11,11%
	Headache	5	2,41%
	Diaforesis	62	29,95%
	Epigastric Pain Nausea	739	3,38% 18,84%
	Vomit	9	4,34%
	Other	26	12,56%
Habits			
	Tobacco	121	58,45%
	Alcohol	95	45,89%
	Drugs	5	2,41%
	Sedentariness	20	9,66%
	Other	12	5,79%
	None	55	26,57%
Imc			
	Less Than 18.5 Kg/M2 18,5 A 24,9 Kg/M2	156	0,50% 27,05%
	25 A 29,9 Kg/M2	106	51,20%
	30 A 34,9 Kg/M2	36	17,39%
	35 A 39,9 Kg/M2	6	2,89%
	40 Kg/M2 Or Greater	2	0,96%

Source: Study database Prepared by: Miranda E. (2019)

Table 3. Relationship between demographic characteristics and recurrence of infarction

Variable Recidivas					IC***95%		p***	
	Yes		No		OR	Lower Limit	Limit	Superior
	n	%	n	%				
Age								
From 18 to 50	5	9,60%	23	14,80%	0,248	0,061	1,015	0,028***
years Over 50	47	90,40%	132	85,20%	1,138*	1,043	1,241	
years								
Sex								
Male	42	80,80%	126	81,30%	1,025	0,886	1,187	0,744
Female	10	19,20%	29	18,70%	0,894	0,455	1,757	
Ethnic group								
Mestizo	50	96,20%	145	93,50%	**	**	**	0,487
Indigenous	0	0,00%	4	2,60%	**	**	**	
Afro-Ecuadorian	2	3,80%	6	3,90%	**	**	**	
Occupation Category								
Employee	13	25,00%	47	30,30%	**	**	**	0,695
Public Employee	25	48,10%	65	41,90%	**	**	**	
Private Retirement	14	26,90%	43	27,70%	**	**	**	
Level of Education								
Primary illiteracy	1	1,90%	0	0,00%	**	**	**	0,793
	18	34,60%	61	39,40%	**	**	**	
High school	16	30,80%	49	31,60%	**	**	**	
Superior	17	32,70%	45	29,00%	**	**	**	
Region of Proceden- cia								
Costa	9	17,30%	21	13,50%	**	**	**	0,187
Sierra	41	78,80%	133	85,80%	**	**	**	
Orient	2	3,80%	1	0,60%	**	**	**	
Area of Residence								
Urban	36	69,20%	129	83,20%	0,892	0,744	1,069	0,169
Rural	16	30,80%	26	16,80%	1,49	0,852	2,608	

Pearson's Chi Square
Source: Study database Prepared by: Miranda E. (2019).

Table 4. Relationship between associated pathological history and recurrence of infarction

Comorbili- dad Relapses					p***			
	Si		No		IC***95%			
	n	%	No	%	OR	Limit Inferior	Upper limit	
High blood pressure								
Yes	16	30,80%	57	36,80%	1,309	0,677	2,566	0,433
No	36	69,20%	98	63,20%				
Diabetes Mellitus 2								
Yes	4	7,70%	15	9,70%	1,286	0,407	4,063	0,668
No	48	92,30%	140	90,30%				
Ischemic Heart Disease								
Yes	19	36,50%	1	0,60%	4,618	1,463	5,816	0,001***
No	33	63,50%	154	99,40%				
Arrhythmias								
Yes	0	0,00%	8	5,20%	3,092	1,981	6,817	0,031***
No	52	100,00%	147	94,80%				
Thyroid Pathology								
Yes	0	0,00%	5	3,20%	1,291	0,988	2,983	0,198
No	52	100,00%	150	96,80%				
Chronic kidney disease								
Yes	1	1,90%	4	2,60%	1,351	0,148	12,367	0,789
No	51	98,10%	151	97,40%				
Dyslipidemias								
Yes	1	1,90%	11	7,10%	3,896	0,491	30,932	0,167
No	51	98,10%	144	92,90%				
Neoplasias								
Yes	6	11,50%	6	3,90%	0,309	0,095	1,004	0,041***
No	46	88,50%	149	96,10%				

** Pearson's Chi Square*
Source: Study database Prepared by: Miranda E. (2019).

In addition, although mortality was not investigated in the present work, it is interesting to show that mortality is-
Killip's cove remains an adequate indicator of the severity of infarction as shown in Table 5.

Table 5. Relationship between related pathological history and the Killip and Kimball scale

Comorbidity		Classification Killip-Kimball						p***			
		Classes I		Classes II		Classes III		Classes IV		IC***95%	
n		%	n	%	N	%	n	%	OR	Limit Inferior	Upper limit
High blood pressure											
Yes	54	32,30%	15	53,60%	1	14,30%	3	60,00 %	3	0,439	27,77 0,024***
No	113	67,70%	13	46,40%	6	85,70%	2	40,00 %			
Diabetes Mellitus 2											
Yes	16	9,60%	3	10,70%	0	0,00%	0	0,00%	2	1,166	5,984 0,048**
No	151	90,40%	25	89,30%	7	#####	5	100,00 %			
Isq heart disease	uémica										
Yes	18	10,80%	1	3,60%	1	14,30%	0	0,00%	1	0,145	9,708 0,007***
No	149	89,20%	27	96,40%	6	85,70%	5	100,00 %			
Arrhythmi as											
Yes	7	4,20%	1	3,60%	0	0,00%	0	0,00%	2	0,469	7,167 0,911
No	160	95,80%	27	96,40%	7	#####	5	100,00 %			
Thyroid Pathology											
Yes	3	1,80%	1	3,60%	1	14,30%	0	0,00%	4,341*	1,447	7,187 0,192
No	164	98,20%	27	96,40%	6	85,70%	5	100,00 %			
Disease Re	Nal Aperture	Nica									
Yes	5	3,00%	0	0,00%	0	0,00%	0	0,00%	1	0,983	6,981 0,746
No	162	97,00%	28	100,00 %	7	#####	5	100,00 %			
Dyslipide mias											
Yes	7	4,20%	1	3,60%	2	28,60%	2	40,00 %	6	1,797	19,89 0,001***
No	160	95,80%	27	96,40%	5	71,40%	3	60,00%			
Neoplasias											
Yes	11	6,60%	1	3,60%	0	0,00%	0	0,00%	2	1,093	5,871 0,004***
No	156	93,40%	27	96,40%	7	#####	5	100,00 %			

** Pearson's Chi Square*
Source: Study database Prepared by: Miranda E. (2019).

The most prevalent risk factors were age [over 50 years (p<0.765)], sex [mas- culino (p<0.555)], hypertension [STEMA-STEMI, STEAMI, unstable angina (p<0.643)], type 2 diabetes mellitus [STEMI, NSTEMI, unstable angina (p<0.091)], tobacco [STEMI, STEMI, unstable angina (p<0.089)]. Ischemic cardiopathy [STEMI, NSTEMI, unstable angina (p<0.025)], cardiac arrhythmias [STEMI, STEMI, NSTEM, unstable angina (p<0.036)] and alcohol [STEMI, NSTEAMI, unstable angina (p <0.0096)] had statistically significant associations (p< 0.05).

Age over 50 years was also associated with recurrence of infarction [(p<0.028), OR: 1,138; CI 95%: 1.043 – 1.241], as well as ischemic car- diapathy [(p<0.001), OR: 4.618; 95% CI: 1.463 – 5.816] and cardiac arrhythmias [(p<0.031), OR: 3,092; 95% CI: 1.981 – 6.817]. If -

Patients with a history of hypertensive-arterial sion, diabetes mellitus, ischemic heart disease and dyslipidemia were associated with a higher class on the Killip scale at hospital admission [(p<0.024), (p<0.048), (p<0.007), (p<0.001) res- Specifically].

5. Discussion

As has been widely shown in the medical literature, acute coronary syndrome is an entity of higher prevalence in men although there are recent studies that report an increase in the prevalence of female sex (12)(16), in the present study, of a total of 207 patients in the study. Didia, 19% are female.

The distribution in relation to sex was associated with the type of infarction, data were correlated with a similar study conducted by Alberty (3), in which

certain conventional risk factors were determined in men and women in a hospital in Slovakia; Significant differences were found in
regarding sex and type of infarction when compared with this study, finding a higher proportion of variables (STEMI: men: 84.2%; women 15.8%) in relation to what was found by Alberty (men 74%, women: 26%). In both studies, males were predominant in all infarction categories.
The data about the pathological history of importance and the type of infarction were correlated with the work carried out by Galappatthy et al (4), who determined the characteristics of infarction in a population of southern India, data were obtained that contrast with what was found in this study in relation to ischemic heart disease, which was one of the variables with statistical relevance (this study - Galappatthy: STEMI: 5% - 14.5%; NSTI: 11.9% - 23.2%; Unstable angina:
22.7% - 15.5% respectively), evidencing a higher percentage of distribution in infarction without ST elevation unlike this study in which the highest proportion of CIC had ines- stable angina, differences probably explained by the greater volume of patients that make up the comparative study.
No studies were found that accurately specify the association between the history of cardiac arrhythmia and the type of infarction, however it is necessary to mention the work carried out by AlFaleh et al (5), which included 2609 patients with coronary syndrome and heart failure, 5.1% had atrial fibrillation and coronary syndrome with concomitant ST elevation, unlike 2.0% in this study. Similarly, 19.8% of patients with atrial fibrillation associated with NSTEMI and unstable angina were obtained in relation to our data (17.2%), that is, there was a correlation between the studies determining that the infarction without ST elevation / unstable angina is more Prevalent in patients with a history of cardiac arrhythmias .
The data obtained in relation to the clinic of admission were compared with that described by DeVon (6), in his study conducted in 5 emergency services in Chicago, a similar predominance is observed regarding chest pain as the main symptom reported by the patients studied (89% in this study, DeVon 74%), diaphoresis had a lower incidence in this research (this study 30%, DeVon reports 38%).
The data from this research are contrasted with those evidenced by Bedoya-Ríos (7) who investigated the prevalence of myocardial infarction in a health institution in Colombia. A prevalence of smoking of 39.2% was found in this study in contrast to the 12.97% found by Be- doya-Ríos, in addition a lower figure of se- dentarism was found (in this study 6.49%, Bedoya-Ríos 63.48%) and higher figures of alcoholism (this study 30.85 %, Bedoya-Ríos 5.46 %). Other toxic habits with lower prevalence were not mentioned in the comparative study.
Regarding recurrence, data were compared with the retrospective study conducted by Abu-Assi et al (8) that determined recurrence and other prognostic factors in a cohort of 4345 patients who survived infarction myocardium; We found similar data regarding the accumulated percentage (this study 25.1%; Abu-Assi 23.1%) determining that 1 in 4 patients who survived acute coronary syndrome are at risk of presenting a new coronary ischemic event.
Regarding the recurrence of infarction in subjects with ischemic heart disease, it is pertinent to include what was described by Abu-Assi et al (8) in their study of infarction recovery with follow-up of patients at the first and third year of the coronary event. In this study it was determined that previous ischemic heart disease, diabetes mellitus and atrial fibrillation increased the recurrence of infarction especially in the first year of follow-up, in addition the risk increased significantly in patients over 70 years of age, a correlation similar to that in contrada in this study.
To correlate demographic variables and Killip class, data were taken from a validation study conducted at a cardiology institute in Sao Paulo – Brazil by de Mello et al (9), which included 1906 patients with infarction, but was not found. other studies that resemble characteristics in terms of ethnicity; however, a similar distribution of mestizo population was obtained in this study compared to the Caucasian population found in the comparative study (this study: Killip: I: 95.8%; II: 85.7%; III: 85.7%; IV: 100%; de Mello: Killip: I: 80.9%;
II: 84,2%; III: 84,8%; IV: 79,1%).
Patients with ejection fraction less than 40% had the following distributions in this study: class I: 2.4%; II: 35.7%; III: 28.6%;
IV: 40%, in relation to that obtained by El-Men- yar (10): class I: 17%; II: 38%; III: 62%; III: 67%.
As can be seen there are differences in the data obtained in both studies, however the hypothesis of worse prognosis is ratified in relation to the fraction of ejection after coronary event the higher the Killip scale at admission (20). In relation to the associated admission clinic, no significant differences were determined to what was found in this study, with chest pain being prevalent in all classes of the scale.

6. Conclusions

It was determined that the highest percentage of patients with coronary syndrome were male, over 50 years of age. More than 75% of heart attack patients reside in urban areas, and a similar percentage of patients with secondary and higher university education was found. 60% of patients had more than one pathological history associated with coronary syndrome, of these, the most representative were hypertension, followed by diabetes, previous ischemic heart disease, dyslipidemia and hypothyroidism.
In relation to the clinical admission, chest pain was more prevalent, other representative symptoms were diaphoresis, dyspnea, epigastric pain, headache , nausea and vomiting. The majority of the population studied were frequent tobacco users, as

well as sedentary. The recurrence of acute coronary syndrome was 25%.

It is interesting to mention that the group of patients older than 50 years presented an increased risk of developing coronary syndrome recurrence compared to younger patients. There was also a statistically significant relationship between the history of ischemic heart disease and arrhythmia with the type of infarction, in both pathologies unstable angina was the most prevalent type. Antecedents of ischemic heart disease, cardiac arrhythmias and neoplasms were associated with a greater likelihood of having a recurrence of infarction.

Patients with a history of hypertension, ischemic heart disease, dyslipidemia, careditary arrhythmias, thyroid pathology and neoplasms were placed in higher risk classes of the Killip and Kimball scale (classes III and IV) (Table 5).

The research conducted by Rolando Manuel Benites, Grimaneza Miguelina Fonseca Díaz, Yrma Santana, and David André Benites Fonseca on the prevalence and relationship between periodontitis and cardiovascular diseases. The study used the neutrosophic method to determine these connections and was published in the Neutrosophic Computing and Machine Learning journal in 2022 (21).

Additionally, we will examine the optimization model for inventories based on Monte Carlo simulation and genetic metaheuristic algorithm proposed by Torres, Gaibor, and Vazquez in the Universidad y Sociedad journal (22). We will also delve into the scientific research perspective from the neutrosophy and productivity point of view proposed by Vazquez, Ricardo, and Hernandez in the same journal (23). Moreover, the use of compensatory fuzzy logic with single valued neutrosophic numbers in university strategic management analysis as proposed by Ricardo, Fernández, and Vázquez in the International Journal of Neutrosophic Science (24) will be explored.

Lastly, we will examine the evaluation of the level of knowledge about advanced life support in cardiac arrest rhythms among resident physicians at the Ambato General Teaching Hospital conducted by Vega Falcón, Sánchez Llerena, Sánchez Martínez, and Morillo Cano, published in the Revista Universidad y Sociedad in 2020 (25).

7. Conclusions

The timely identification and adequate management of comorbidities such as cardiac arrhythmias, hypothyroidism and previous myocardial infarction are pathologies to take into account since they predispose to a greater extent to the development of coronary events and their recurrence, especially in the population over 50 years of age.

Conflict of interest

The author declares that he has no conflict of interest

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