ORIGINAL ARTICLE

Prospective Registry of Antithrombotic Therapy in Acute Coronary Syndromes (EPICOR)

Registro prospectivo de tratamiento antitrombótico en síndromes coronarios agudos (EPICOR)

MARCELO TRIVI[1], ALEJANDRO LAKOWSKY[2], CECILIA ZEBALLOS[1], ERNESTO DURONTO[3], LILIA LOBO MÁRQUEZ[4], CARLOS RAPALLO[5], JUAN FUSELLI[6], GERARDO ZAPATA[7]

ABSTRACT

Background: We present the two-year follow-up results of the EPICOR study Argentine cohort, a prospective, international, observational, multicenter registry designed to determine the use of antithrombotic therapy patterns in the routine clinical practice of patients with acute coronary syndrome (ACS). The study enrolled a total of 438 consecutive patients with ST-segment elevation myocardial infarction (STEMI, 41%) or non-ST-segment elevation ACS (NSTE-ACS, 59%) discharged alive from public, private, and community hospitals. Mean age was 62 years, 76% of patients were male, 71% hypertensive, 64% smokers, 19% diabetic and 40% had history of previous cardiovascular disease. Overall mortality was 4.8% at 1 year and 7.3% at 2 years. Use of dual antiplatelet therapy was 80% at one year and 53% at 2 years (p <0.0001), with no differences between those with or without ST-segment elevation. The 2-year incidence of ischemic and major bleeding events was 15.3% and 1.8%, respectively.
Conclusion: Beyond the one-year administration recommended by the guidelines, a high percentage of persistent dual antiplatelet therapy was observed at 2 years, with a low incidence of major bleeding events, suggesting a clinical risk-benefit selection.

Key words: Registry, Acute coronary syndrome, Myocardial infarction, Antithrombotic treatment, Long-term follow up, Mortality

RESUMEN

Presentamos los resultados a dos años de seguimiento de la cohorte argentina del estudio EPICOR, un registro internacional, multicéntrico, observacional, prospectivo, diseñado para determinar los patrones de utilización de la terapia antitrombótica en pacientes con síndrome coronario agudo en el contexto de la práctica clínica habitual. Se enrolaron 438 pacientes consecutivos con infarto de miocardio con supradesnivel del segmento ST (STEMI, 41%) o SCA sin supradesnivel del segmento ST (NSTE-ACS, 59%), externados vivos de centros hospitalarios públicos, privados y de comunidad. La media de edad fue 62 años, el 76% eran varones, el 71% hipertensos, el 64% fumadores, el 19% diabéticos y el 40% tenían antecedentes de patología cardiovascular previa. La mortalidad global fue del 4,8% al año y del 7,3% a los 2 años. El uso de doble antiagregación plaquetaria fue del 80% al año y del 53% a los 2 años (p > 0,0001), sin diferencias entre aquellos con supradesnivel del ST o sin este. La incidencia de eventos isquémicos y hemorrágicos mayores a los 2 años fue del 15,3% y del 1,8%, respectivamente.
Conclusión: Se observó un elevado porcentaje de persistencia de la doble antiagregación plaquetaria a los 2 años, más allá del año recomendado por las guías, con baja incidencia de hemorragias mayores, lo que sugiere una selección clínica de riesgo-beneficio.

Palabras clave: Registro - Síndrome coronario agudo - Infarto de miocardio - Tratamiento antitrombótico - Seguimiento a largo plazo - Mortalidad

Abbreviations

ACS	Acute coronary syndrome	**NSTE-ACS**	Non-ST-segment elevation ACS
AMI	Acute myocardial infarction	**PCI**	Percutaneous coronary intervention
CABG	Coronary artery bypass grafting	**QoL**	Quality of life
CONAREC	Argentine Council of Cardiology Residents	**SAC**	Argentine Society of Cardiology
DAPT	Dual antiplatelet therapy	**STEMI**	ST-segment elevation myocardial infarction
FAC	Argentine Federation of Cardiology		

Rev Argent Cardiol 2019;87:6-14. http://dx.doi.org/10.7775/rac.v87.i1.14242
SEE RELATED ARTICLE: Rev Argent Cardiol 2019:87:1-3. http://dx.doi.org/10.7775/rac.v87.i1.14625

Received: 08/16/2018 – *Accepted:* 10/16/2018

Address for reprints: Marcelo Trivi, Blanco Encalada 1543 (1428) Buenos Aires, Argentina, marcelotrivi@yahoo.com

[1] Instituto Cardiovascular de Buenos Aires, Buenos Aires
[2] Sanatorio Mater Dei y AstraZeneca Buenos Aires
[3] Fundación Favaloro, Buenos Aires
[4] Instituto de Cardiología de Tucumán, San Miguel de Tucumán
[5] Sanatorio Itoiz, Avellaneda
[6] CEMIC, Buenos Aires
[7] Instituto Cardiovascular de Rosario, Rosario

INTRODUCTION

In recent years, registries have become very important to obtain information on epidemiological data and on the use of therapies prescribed to patients, in order to promote the optimal use of available resources. (1)

The aim of the EPICOR study (long-tErm follow-up of antithrombotic management Patterns In acute CORonary syndrome patients, NCT01171404) was to obtain information on the use of antithrombotic treatment patterns in patients who survive an acute coronary syndrome (ACS) with or without ST-segment elevation. The study was carried out in different countries and hospitals for a maximum of 2 years after discharge, according to the usual standard of care of health institutions and participating countries, as well as the patients´ incidence of cardiovascular (CV) events and bleeding, mortality, quality of life of and use of healthcare resources. (2-4)

This study describes the two-year follow-up findings of the EPICOR study Argentine cohort.

METHODS

EPICOR is a prospective, international, observational study of patients discharged after a hospitalization for ACS with a 2-year follow-up. The study was designed to describe patterns of antithrombotic use, short-term and long-term clinical outcomes (ischemic and bleeding events), quality of life (QoL), and economic impact associated with the initial combination of drugs during hospitalization, as well as the duration of treatment, and number and reasons for discontinuations or interruptions after discharge in the different clinical contexts.

A detailed description of the EPICOR study design has been published elsewhere. (2) The information was collected through telephone interviews; the first call was made 6 weeks after discharge and then every 3 months for a maximum of 2 years.

During telephone calls, information was obtained on the occurrence of new events, including thrombotic and hemorrhagic events; scheduled or non-scheduled hospitalizations, the continuity or discontinuation of antithrombotic drugs prescribed at discharge; medical consultations and procedures, and patient QoL. The latter was evaluated using the EuroQol 5-Dimension questionnaire (EQ-5D) and the EuroQol Visual Analogue Scale (EQ-VAS). The EQ-5D scale covers 5 domains (mobility, self-care, usual activities, pain/discomfort and anxiety/depression); a range from 0 to 1 is used to calculate a value for each health status, where 0 is death and 1 is a state of perfect health.

The information was provided by the patients or their relatives. When a patient reported an ischemic or bleeding event, a trained interviewer contacted the attending physician.

Statistical analysis

The present work provides a descriptive analysis. Baseline categorical variables between groups were compared using the chi square test or Fisher's exact test, considering a p value <0.05 as statistically significant. The occurrence of stroke or bleeding events, antithrombotic treatment implemented and its duration in relation to the index event, gender, age (<65 or ≥65 years), history of diabetes mellitus, and patient QoL are described.

Ethical considerations

The protocol was approved by the Ethics Committee of each participating institution.

RESULTS

In Argentina, the study was carried out in 30 centers in 9 provinces and included 438 patients, 178 (41%) with ST-segment elevation myocardial infarction (STEMI) and 260 (59%) with non- ST-segment elevation ACS (NSTE-ACS). The participating centers included 8 university hospitals, 5 non-university centers, 5 regional or community hospitals and 12 private institutions, representing the diversity of the country's healthcare system. The institutions were secondary or tertiary care centers, all with coronary care unit; 83% had hemodynamics lab (available 24 hours a day in 92% of centers), and 73% practiced CV surgeries.

Patients' demographic characteristics and CV history are summarized in Table 1.

Information was available at 2 years on 429 patients (98%). Twelve percent of patients (52/438) were prematurely withdrawn from follow-up and stratified as follows: 32 patients died, 19 withdrew their consent to participate and 1 patient was lost to follow-up

The use of prehospital antithrombotic therapy was very low: aspirin 7%, clopidogrel 2%, thrombolytics 2% and enoxaparin <1%.

Aspirin and P2Y12 receptor inhibitors were administered mostly during hospitalization, while the use of other injectable antithrombotic therapies (fondaparinux, bivalirudin, and IIb/IIIa inhibitors) was remarkably low (~1%) (Table 2). (4)

Patterns of use of long-term antithrombotic therapy.

At the time of hospital discharge, 98% of patients with STEMI and 99% of those with NSTE-ACS were receiving aspirin; clopidogrel, 71% and 73%; and prasugrel, 17% and 8%, respectively (ticagrelor was not available at the time of the registry). Overall, 81% of the population received dual antiplatelet therapy (DAPT) and 5% oral anticoagulants.

The use of DAPT was 80% at 1 year and 53% at 2 years, with minor differences between STEMI and NSTE-ACS patients (Table 3).

Dual antiplatelet therapy was implemented in 69 diabetic patients at discharge; 94% were still receiving DAPT at 6 months, 87% at 12 months and 72% at 24 months.

During the first year, 73% of women received DAPT compared with 82% of men, and these proportions were 56% and 53% at two years, respectively.

Greater use of DAPT was reported in patients ≥65 years of age until the end of the follow-up period compared with younger patients (63% vs. 47%, respectively).

Among the 24 patients who were discharged with oral anticoagulation therapy (5.5% of the population), 18 received DAPT simultaneously with at least one antiplatelet medication maintained throughout the

Table 1. Demographic characteristics of the population

	STEMI (n=178)	NSTE-ACS (n=260)	Total (n=438)
Age in years: Mean (SD)	59.2 (11.5) #	64.0 (11.9)	62.1 (12)
Male gender	146 (82.0%) *	186 (71.5%)	332 (75.8%)
BMI: mean (SD)	28.3 (4.1)	28.4 (4.3)	28.4 (4.3)
Hypertension	111 (62.4%) #	201 (77.3%)	312 (71.2%)
Hypercholesterolemia	76 (42.7%) *	142 (54.6%)	218 (49.8%)
Diabetes mellitus	26 (14.6%)	59 (22.7%)	85 (19.4%)
Family history of coronary heart disease	35 (19.7%)	47 (18.1%)	82 (18.7%)
Smoking	118 (66.2%)	161 (61.9%)	279(63.6%)
Previous coronary heart disease	39 (21.9%) #	137 (52.7%)	176 (40.2%)
Prior AMI	15 (8.4%) *	62 (23.8%)	77 (17.6%)
Prior PCI	17 (9.6%) *	64 (24.6%)	81 (18.5%)
Prior CABG	5 (2.8%)	22 (8.5%)	27 (6.2%)
Chronic angina	3 (1.7%) *	41 (15.8%)	44 (10.0%)
TIA/ stroke	4 (2.2%)	10 (3.8%)	14 (3.2%)
Peripheral vascular disease	8 (4.5%)	23 (8.8%)	31 (7.1%)

STEMI: ST-segment elevation myocardial infarction; NSTE-ACS: Non-ST-segment elevation acute coronary syndrome. SD: Standard deviation; BMI: Body mass index; AMI: Acute myocardial infarction; PCI: Percutaneous coronary intervention; CABG: Coronary artery bypass grafting; TIA: Transient ischemic attack; * p<0.05 vs. NSTE-ACS; # p<0.01 vs. NSTE-ACS.

Table 2. Use of diagnostic and therapeutic resources during the acute phase of the ACS (hospital stage)

	STEMI (n=178)	NSTE-ACS (n=260)	Total (n=438)
Aspirin	97%	96%	97%
Clopidogrel	81%	84%	83%
Prasugrel	17%	8%	12%
No antiplatelet agent	<1%	<1%	<1%
Antiplatelet monotherapy	20%	18%	19%
Dual antiplatelet therapy (DAPT)	77%	81%	79%
DAPT+ GP IIb/IIIa inhibitors	3%	<1%	1%
Thrombolytics	20%	0%	8%
Unfractionated heparin	34%	35%	35%
LMWH	26%	31%	29%
Fondaparinux	1%	1%	1%
Bivalirudin	0%	<1%	<1%
GP IIb/IIIa inhibitors	3%	<1%	1%
Acenocoumarol	6%	3%	4%
β blockers	90%	93%	92%
ACEI or ARB	75%	66%	70%
Statins	99%	96%	97%
Reperfusion (PCI or thrombolysis)	79%	47%	60%
Coronary angiography	84%	78%	80%
Coronary angioplasty	66%	47%	55%
CABG	2%	5%	4%
Echocardiogram	84%	63%	71%
Functional tests	13%	12%	13%

ACS: Acute coronary syndrome; STEMI: ST-segment elevation myocardial infarction; NSTE-ACS: Non-ST-segment elevation acute coronary syndrome. GP IIb-IIIa inhibitors: Glycoprotein IIb-IIIa inhibitors; LMWH: Low molecular weight heparin; β blockers: Beta-adrenergic blockers; ACEI: Angiotensin-converting enzyme inhibitors; ARB: Angiotensin II receptor blockers; PCI: Percutaneous coronary intervention; CABG: Coronary artery bypass grafting.

Drug/index event	STEMI	NSTE-ACS	Total	p
Discharge	**n=178**	**n=260**	**n=438**	
DAPT - n (%)	151 (84.8)	205 (78.8)	356 (81.3)	ns
ASA alone - n (%)	21 (11.8)	49 (18.8)	70 (16.0)	ns
AP alone - n (%)	3 (1.7)	3 (1.2)	6 (1.4)	ns
None - n (%)	1 (0.6)	1 (0.4)	2 (0.5)	ns
Unknown - n (%)	2 (1.1)	2 (0.8)	4 (0.9)	ns
6 months	**n=142**	**n=192**	**n=334**	
DAPT - n (%)	131 (92.3)	175 (91.1)	306 (91.6)	ns
ASA alone - n (%)	10 (7.0)	14 (7.3)	24 (7.2)	ns
AP alone - n (%)	1 (0.7)	2 (1.0)	3 (0.9)	ns
None - n (%)	0	1 (0.5)	1 (0.3)	ns
12 months	**n=138**	**n=186**	**n=324**	
DAPT - n (%)	115 (83.3)	145 (78.0)	260 (80.2)	ns
ASA alone - n (%)	22 (15.9)	34 (18.3)	56 (17.3)	ns
AP alone - n (%)	1 (0.7)	4 (2.2)	5 (1.5)	ns
None - n (%)	0	3 (1.6)	3 (0.9)	ns
24 months	**n=122**	**n=154**	**n=276**	
DAPT - n (%)	65 (53.3)	82 (53.2)	147 (53.3)	ns
ASA alone - n (%)	53 (43.4)	67 (43.5)	120 (43.5)	ns
AP alone - n (%)	2 (1.6)	4 (2.6)	6 (2.2)	ns
None - n (%)	2 (1.6)	1 (0.6)	3 (1.1)	ns

STEMI: ST-segment elevation myocardial infarction; NSTE-ACS: Non-ST-segment elevation acute coronary syndrome. DAPT: Dual antiplatelet therapy ASA: Aspirin (acetylsalicylic acid); AP: P2Y12 antiplatelet agents

Table 3. Variation in the use of antiplatelet drugs from discharge to the two-year follow-up in the EPICOR study in Argentina.

study and up to 2 years: 50%, with DAPT; 43%, with aspirin alone; and 7%, with clopidogrel alone.

Of the 226 patients who underwent percutaneous coronary intervention (PCI) during hospitalization (105 STEMI), 82% continued with DAPT at 1 year and 50% at 2 years. In the case of patients who had not undergone angioplasty, the use of DAPT was lower at 1 year (75%), and greater at 2 years (60%). This difference was even greater in the STEMI group (Figure 1).

The percentages are estimated on the total number of patients discharged with DAPT and who underwent PCI alone (n=226) or no revascularization procedure (n=128). The data of patients who underwent coronary artery bypass grafting (CABG) is not included due to its small number (two patients).

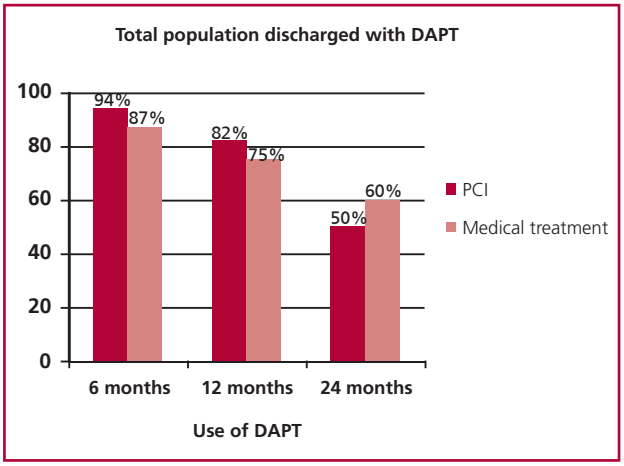

Fig. 1. Profile of dual antiplatelet therapy (DAPT) use during the two-year follow-up based on in-hospital revascularization procedures

Ischemic cardiovascular events and bleeding

The incidence of CV events was 15.3% (67/438) at 2 years: 12.9% among patients with STEMI (23/178) and 16.9%, among NSTE-ACS patients (44/260). The rate of CV events at 2 years was 16.7% in patients receiving anticoagulation therapy, 10.7%, in patients with DAPT and 6.0%, in patients with antiplatelet monotherapy. As these therapeutic strategies were not randomized, differences in patient characteristics and baseline risk factors could justify these discrepancies.

Bleeding events were observed in 1.8% of patients (8/438), during the 2-year follow-up, without differences between patients with STEMI or NSTE-ACS. The CRUSADE score measured in a subset of patients presented a median of 22 (range: 13-32). The incidence of bleeding at 2 years was 20.8% among patients receiving oral anticoagulants (5 of 24 patients); 0.6%, in those with DAPT; and 1.5% in patients with antiplatelet monotherapy. In patients with STEMI, bleeding events were reported earlier than in NSTE-ACS patients, all within 3 months of discharge, although they occurred exclusively in subjects receiving oral anticoagulants.

Long-term mortality

Overall mortality of the Argentine cohort was 3.2%, 4.8% and 7.3% at 6, 12 and 24 months of follow-up, respectively (32/438 patients at 2 years). Mortality at 2 years was 9.0% (16/178 patients) and 6.2% (16/260 patients) in patients with STEMI and NSTE-ACS, respectively.

The majority of deaths were due to coronary causes. Congestive heart failure and cardiac arrhythmias were rare causes of death. One death was reported due to bleeding, which corresponded to an intracranial hemorrhage in a patient with NSTE-ACS.

Utilization of healthcare resources

The vast majority of patients were followed up by a cardiologist, and few went to a clinician or another specialist during the study. From discharge up to the end of the 2-year follow-up, 84% of patients visited a cardiologist 4 or more times and 20% of patients went to an emergency room. In 16% of cases patients were hospitalized to undergo some kind of procedure (usually minor and without urgency) at 6 months after discharge; 27% at 12 months; and 37% at 2 years. Coronary angiography, PCI and cardiac surgery was performed in 2.5%; 1.4% and 0.5% of patients, at 1 year; and in 3.9%, 2.3% and 1%, at 2 years, respectively.

Health-related quality of life

The evaluated functional domains (mobility, self-care, usual activities) revealed that most of the patients had no problems at discharge and, in general, their health status remained unchanged or improved during follow-up. A progress was observed in the areas related to anxiety/depression throughout the follow-up period. Specifically, 45% of patients presented some degree of anxiety or depression at discharge, 51% corresponding to STEMI and 40% to NSTE-ACS, but both groups showed clinical improvement in the following months and only 17% of patients reported anxiety or depression at two years. There was no relationship between the presence of depression and DAPT duration. The profile of QoL parameters during follow-up is summarized in Table 4.

DISCUSSION

The EPICOR study is a registry designed to study patterns of antithrombotic therapy in patients with ACS and a long-term follow-up period (2 years). (2) Significant variations were observed between different geographical regions in the use of antithrombotic drugs and hospital procedures, and it is possible that they can be related to the organization of the healthcare systems. In this regard, more than 40% of patients with STEMI in Latin America did not receive any reperfusion therapy compared with approximately 20% of patients in several European regions, and it was often preferred to opt for less expensive antithrombotic drugs. (3)

In Argentina, most of the epidemiological data on ACS arise from scientific societies, such as the Argentine Society of Cardiology (SAC), the Argentine Federation of Cardiology (FAC) and the Argentine Board of Cardiology Residents (CONAREC), which have performed various registries on the subject. (1, 5-14) As other authors have stated, data on medication at hospital discharge and adherence to treatment during follow-up were not available in most of the registries on acute myocardial infarction (AMI) in Argentina. (5)

Similarly to results reported in the CONAREC XVII registry, (11) EPICOR shows a high percentage of dual antiplatelet use at discharge, which is an indicator of the quality of care in ACS.

In our study, adherence to antiplatelet therapy during the first year was high: 80% of patients discharged with DAPT maintained this therapy at 12 months, in accordance with current recommendations. (15-21) However, the high rate of continuous use of DAPT at two years was striking, with 53% of the patients still receiving dual antiplatelet therapy, despite guidelines recommended only a 12-month DAPT period after the event. Only more recently, since 2014, the results of randomized studies in patients with remote AMI (22), post-stent angioplasty (23-24) and various meta-analyses (25-26) suggested that a more aggressive antiplatelet treatment than aspirin monotherapy after one year could be beneficial in certain groups of patients.

Table 4. Evolution of the EQ-5D index score and of the incidence of anxiety/depression from discharge to the two-year follow-up period.

		Temporal evaluation point				
		Discharge	6 months	12 months	18 months	24 months
EQ-5D* index	N	422	222	283	232	270
	Mean (SD)	0.79 (0.26)	0.90 (0.19)	0.86 (0.23)	0.84 (0.24)	0.88 (0.22)
Change from baseline level	N		215	271	225	260
	Mean (SD)		0.08 (0.27)	0.05 (0.29)	0.04 (0.30)	0.06 (0.28)
Anxiety/depression		45%	15%	28%	23%	17%

* This evaluation was made with the EQ-VAS visual analog scale (the score is expressed in a scale between 0 and 1, where 0 equals death and 1 represents a state of perfect health). All patients who provided data for a particular visit are included in the calculation for that particular visit.

It could be hypothesized that the reason why more than half of the patients continued with DAPT up to two years after the event could be a high rate of revascularization during follow-up or that physicians had classified these patients within a high-risk group of CV events and decided to continue with DAPT. However, the overall rate of CV events after discharge was low, including re-hospitalizations and angioplasties. In fact, due to the design of the study, the population enrolled in the EPICOR registry can be considered as a population at low risk of CV events, given that only subjects who were discharged alive after the ACS were enrolled. This is demonstrated by the low overall mortality rate recorded (4.8% at 1 year, 7.3% at two years), which was lower than in other registries on ACS, to the few CV events, both ischemic as hemorrhagic, registered during follow-up and to a 4-5-year lower average age compared with other similar registries. (14, 27-28) The reasons for this high rate of long term dual antiplatelet use are only theoretical, but we could think of physician-related or patient-related causes. With regard to physicians, a good clinical outcome ("why change the treatment if the patient is doing well?"); an inertial effect, with reiteration of the same prescriptions in successive visits; and knowledge of patient inclusion in a prospective design registry may have influenced their behavior. With regard to the patient, acknowledgement of being observed in a clinical study and the quarterly phone calls, in which he was questioned about his health status and medication intake, could have exerted a positive effect on pharmacological adherence. Several studies have shown better adherence and clinical outcomes through non-pharmacological interventions based on telephone calls. (29-31)

A higher than expected percentage of prolonged DAPT was also observed at two years in patients >65 years, in diabetics and in non-reperfused STEMI cases (patients who received stents, both in the global cohort and especially in the STEMI subgroup showed the greatest drop in the use of DAPT between one and two years). These patients may have been treated for a longer period because they were perceived as being at greater risk of suffering an ischemic events than those of the global cohort.

In other registries, the rate of adherence to antithrombotic medication has been a little lower; but these registries are mostly retrospective and based on reviews of medical records or health databases, unlike the EPICOR registry, which was a prospective study based on telephone follow-up of patients. (32)

In the EPICOR registry, the most commonly used P2Y12 blocker was clopidogrel; prasugrel was used less frequently, mainly for STEMI, and ticagrelor was not available at the time of the study. The concurrent use of oral anticoagulants was associated with a higher rate of events, especially bleeding, although patient baseline differences for the risk of bleeding could also explain it.

Finally, it is important to highlight the high prevalence of depression/anxiety at discharge present in almost half of the subjects, but with a progressive and significant improvement towards the end of the follow-up period.

Limitations

The number of patients in the Argentine cohort, 438 subjects, is low compared with other multicenter registries (not allowing the calculation of a propensity score to compare groups of patients), but similar to that of several SAC, FAC and CONAREC surveys on ACS. All the participating centers were secondary, tertiary or academic institutions, which reflects the difficulty to include primary care centers in this type of registries. The collection of data based on telephone calls could be associated with a sub-registry of some events (minor bleeding, unscheduled and unreported medical consultations, oligosymptomatic conditions, etc.) or with an overestimation of medication adherence, although there should be no loss of severe clinical events (deaths, hospitalizations or revascularizations). Moreover, the exclusion of patients who died during the hospital stage generated the selection of a population with a lower risk of CV events compared with other registries. No information is available on the type of stent used or on the percentage of fibrinolytics used as reperfusion treatment.

On the other hand, the results of the Argentine cohort were similar to those of other regions of the international EPICOR study. (33-35)

CONCLUSIONS

The EPICOR registry in Argentina provides "real world" information on the patterns of antithrombotic treatment in ACS in different types of institutions, their outcome over time and the main results in routine clinical practice after a two-year follow-up. Moreover, because it is part of a larger multicenter international registry, it will allow to compare local findings with those of other participating countries, both in Latin America and in Europe, in order to identify opportunities of improvement in patient care.

As main finding, a high percentage of persistent dual antiplatelet therapy was observed at two years, beyond the one-year administration recommended by the guidelines, which, associated with a low incidence of major bleeding, suggests a clinical risk-benefit selection.

EPICOR: List of participating investigators and centers in Argentina

Hospital Privado Córdoba - Dr. Oscar Salomone
CEMIC, Buenos Aires - Dr. Juan Fuselli
Centro Gallego de Buenos Aires - Dr. Sergio Varini
Hospital Italiano de Córdoba - Dr. Ricardo Martellotto
Hospital Centro de Salud, San Miguel de Tucumán - Dr. Héctor Luciardi
Fundación Favaloro, Buenos Aires - Dr. Ernesto Duronto
Instituto de Cardiología, San Miguel de Tucumán - Dr. Lilia

Lobo Márquez
ICR, Rosario - Dr. Gerardo Zapata
Hospital Central de Mendoza - Dr. Raquel Saá Zarandon
Sanatorio El Carmen, Salta - Dr. Edmundo Falú
Hospital Italiano de Mendoza - Dr. Federico Achilli
Instituto de Cardiología, Sanatorio Nuestra Señora del Rosario, San Salvador de Jujuy - Dr. Gustavo Bustamante Labarta
Instituto Cardiovascular de Buenos Aires - Dr. Marcelo Trivi
Hospital Pirovano, Buenos Aires - Dr. Patricia Soria
Sanatorio Juan XXIII, General Roca, Río Negro - Dr. Roberto Bernardini
Clínica Colombo, Córdoba - Dr. Marcelo Dellatorre
Sanatorio Nuestra Señora del Pilar, Ciudadela, Provincia de Buenos Aires - Dr. Alejandro García Escudero
Instituto de Cardiología de Corrientes - Dr. Stella Macin
Sanatorio Las Lomas, San Isidro, Provincia de Buenos Aires - Dr. Pablo Stutzbach
Hospital de San Isidro, Provincia de Buenos Aires - Dr. Gustavo Cardonatti
Sanatorio Itoiz, Avellaneda, Provincia de Buenos Aires - Dr. Carlos Rapallo
Hospital Español de Bahía Blanca, Provincia de Buenos Aires - Dr. Christian Patocchi
Sanatorio Modelo de Quilmes, Provincia de Buenos Aires - Dr. Adrián Hrabar
Hospital Privado de Comunidad, Mar del Plata, Provincia de Buenos Aires - Dr. Raúl Badra
Hospital Fernández, Buenos Aires - Dr. Simón Salzberg
Sanatorio Allende, Córdoba - Dr. Eduardo Moreyra
Sanatorio San Lucas, San Isidro, Provincia de Buenos Aires - Dr. Ricardo Foyé
Hospital de Emergencias Clemente Álvarez, Rosario - Dr. Marcelo Marino
Hospital Alemán, Buenos Aires - Dr. Carlos Rivas
Instituto Cenesa, Salta - Dr. Javier Sánchez
Hospital General Lamadrid, Monteros, Tucumán - Dr. Diego Stisman

Sponsor: EPICOR is a study performed by AstraZeneca.

Conflicts of interest

Dr. Alejandro Lakowsky is employed by AstraZeneca Argentina. The rest of the authors declare no conflicts of interest. (See authors' conflicts of interest forms on the website/ Supplementary material).

REFERENCES

1. Ferrante D, Tajer CD. ¿Cuántos infartos hay en Argentina? Rev Argent Cardiol 2007;75:161-2.
2. Bueno H, Danchin N, Tafalla M, Bernaud C, Annemans L, Van de Werf F. EPICOR (long-tErm follow-up of antithrombotic management Patterns In acute CORonary syndrome patients) study: rationale, design, and baseline characteristics. Am Heart J 2013;165:8-14. http://doi.org/cv72
3. Bueno H, Sinnaeve P, Annemans L, Danchin N, Licour M, Medina J, et al. Opportunities for improvement in anti-thrombotic therapy and other strategies for the management of acute coronary syndromes: insights from EPICOR, an International study of current practice patterns. Eur Heart J Acute Cardiovasc Care 2016;5:3-12.
4. Trivi M, Lakowsky A, Duronto E; en representación de los investigadores del estudio EPICOR ¿Es diferente el tratamiento antitrombótico en pacientes con síndromes coronarios agudos con y sin supradesnivel del segmento ST? Rev Fed Arg Cardiol 2015;44:206-10.
5. Allin JG, Rolandi F, Herrera Paz JJ, Maurice MF, Grinfeld L, Iglesias R. Evolución del tratamiento del infarto agudo de miocardio en la Argentina desde 1987 a 2005. Medicina (Buenos Aires) 2010;70:15-22.
6. Blanco P, Gagliardi J, Higa C, Dini A, Guetta J, Di Toro D, y cols. Infarto agudo de miocardio. Resultados de la Encuesta SAC 2005 en la República Argentina. Rev Argent Cardiol 2007;75:163-70.
7. Gagliardi J, Charask A, Higa C, Blanco P, Dini A, Tajer C, y cols. Infarto agudo de miocardio en la República Argentina. Análisis comparativo de los últimos 18 años. Resultados de las Encuestas SAC. Rev Argent Cardiol 2007;75:171-8.
8. Caccavo A, Álvarez A, Bello FH, Ferrari A, Carrique AM, Lasdica SA, y cols. Incidencia poblacional del infarto con elevación del ST o bloqueo de rama izquierda a lo largo de 11 años en una comunidad de la provincia de Buenos Aires. Rev Argent Cardiol 2007;75:185-8.
9. Aptecar E. El RAdAC, un registro necesario y bienvenido. Editorial. Rev Argent Cardiol 2012;80:436-8.
10. Cherro A, Fernández Pereira C, Torresani E, Mauro DO, Ingino CA, Álvarez JA, y cols. En representación del Grupo RAdAC. Resultados hospitalarios y factores asociados con morbimortalidad del Registro Argentino de Angioplastia Coronaria (RAdAC). Rev Argent Cardiol 2012;80:461-70.
11. Pérez GE, Costabel JP, González N, Zaidel E, Altamirano M, Schiavone M, y cols. Investigadores del Consejo Argentino de Residentes de Cardiología (CONAREC). Infarto agudo de miocardio en la República Argentina. Registro CONAREC XVII. Rev Argent Cardiol 2013;81:390-9. http://doi.org/sg9
12. Fernández HE, Bilbao JA, Cohen Arazi H, Ayerdi ML, Telayna JM, Duronto EA, et al. En representación del Registro Multicéntrico SCAR, Área de Investigación SAC y Consejo de Emergencias Cardiovasculares SAC. Calidad de atención del infarto agudo de miocardio en la Argentina. Observaciones del Registro SCAR (Síndromes Coronarios Agudos en Argentina). Rev Argent Cardiol 2014;82:373-80. http://doi.org/cv73
13. Dionisio GF, Gómez G, Macín SM, Geronazzo RJ, Kevorkian R, Ferreiros E, y cols. Comparación de dos registros de síndrome coronario agudo en la Argentina: STRATEG-SIA y SCAR (1999-2011). Rev Argent Cardiol 2015;83:300-4.
14. García Aurelio M, Cohen Arazi H, Higa C, Gómez Santa María HR, Mauro VM, Fernández H, y cols. Infarto agudo de miocardio con supradesnivel persistente del segmento ST. Registro multicéntrico SCAR (Síndromes Coronarios Agudos en Argentina) de la Sociedad Argentina de Cardiología. Rev Argent Cardiol 2014;82:275-84. http://doi.org/4wz
15. Consenso para el manejo de pacientes con Síndrome Coronario Agudo sin Supradesnivel del Segmento ST de la Sociedad Argentina de Cardiología. Rev Argent Cardiol 2014; 82(supl 1): s1-48.
16. Consenso de Infarto Agudo de Miocardio con Elevación del segmento ST de la Sociedad Argentina de Cardiología. Rev Argent Cardiol 2015; 83 (supl 4): s1-57.
17. Roffi M, Patrono C, Collet JP, Mueller C, Valgimigli M, Andreotti F. 2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: Task Force for the Management of Acute Coronary Syndromes in Patients Presenting without Persistent ST-Segment Elevation of the European Society of Cardiology (ESC). Eur Heart J 2016;37:267-315. http://doi.org/f3pwc3
18. Ibanez B, James S, Agewall S, Antunes MJ, Bucciarelli-Ducci C, Bueno H, et al. 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. The Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC). Rev Esp Cardiol (Engl Ed). 2017;70:1082. http://doi.org/gc2g49
19. The Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). 2014 ESC/EACTS Guidelines on myocardial revascularization. Eur Heart J 2014;35:2541-619.
20. Amsterdam EA, Wenger NK, Brindis RG, Casey Jr. DE; Ganiats TG; Holmes, Jr. D, et al. 2014 AHA/ACC Guideline for the Management of Patients With Non–ST-Elevation Acute Coronary Syndromes. A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol 2014;64:e139-228. http://doi.org/f2wsq3
21. O'Gara PT, Kushner FG, Ascheim DD, Casey DE, Chung MK, de

Lemos JA, et al. 2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction. J Am Coll Cardiol 2013;61:e78-140. http://doi.org/mn9

22. Bonaca MP, Bhatt DL, Cohen M, Steg PG, Storey RF, Jensen EC, et al. Long-term use of ticagrelor in patients with prior myocardial infarction. N Engl J Med 2015;372:1791-800. http://doi.org/6md

23. Mauri L, Kereiakes DJ, Yeh RW, Driscoll-Shempp P, Cutlip DE, Steg PG, et al. Twelve or 30 months of dual antiplatelet therapy after drug-eluting stents. N Engl J Med 2014;371:2155-166. http://doi.org/f6sh79

24. Yeh RW, Kereiakes DJ, Steg PG, Windecker S, Rinaldi MJ, Gershlick AH, et al. Benefits and risks of extended duration dual antiplatelet therapy after PCI in patients with and without acute myocardial infarction. J Am Coll Cardiol 2015;65:2211-221. http://doi.org/f3jd38

25. Udell JA, Bonaca MP, Collet JP, Lincoff AM, Kereiakes DJ, Costa F, et al. Long-term dual antiplatelet therapy for secondary prevention of cardiovascular events in the subgroup of patients with previous myocardial infarction: a collaborative meta-analysis of randomized trials. Eur Heart J 2016;37:390-99.

26. Montalescot G, Sabatine MS. Oral dual antiplatelet therapy: what have we learnt from recent trials? Eur Heart J 2016;37:344-52.

27. Hanssen M, Cottin Y, Khalife K, Hammer L, Goldstein P, Puymirat E, et al. French registry of acute ST-elevation and non ST-elevation myocardial infarction 2010. FAST-MI 2010. Heart 2012;98:699-705. http://doi.org/jf3

28. Schiele F, Puymirat E, Bonello L, Dentan G, Meneveau N, Collet JP, et al. Impact of prolonged dual antiplatelet therapy after acute myocardial infarction on 5-year mortality in the FAST-MI 2005 registry. Int J Cardiol 2015;187:354-60. http://doi.org/f7dprr

29. Zambrano C, Badra R, Cerezo G, Ferrante D, Soifer S, Varini S, y cols., por Investigadores GESICA. Seguimiento al año luego de finalizada la intervención telefónica en pacientes con insuficiencia cardíaca crónica: estudio DIAL. Rev Argent Cardiol 2005;73:7-14.

30. Smith PM, Burgess ED. Smoking cessation initiated during hospital stay for patients with coronary artery disease: A randomized controlled trial. CMAJ 2009;180:1297-303. http://doi.org/bs8kwz

31. Nieuwlaat R, Wilczynski N, Navarro T, Hobson N, Jeffery R, Keepanasseril A, et al. Interventions for enhancing medication adherence. Cochrane Database of Systematic Reviews 2014, Issue 11. Art. No.: CD000011. DOI: 10.1002/14651858.CD000011.pub4. http://doi.org/cv75

32. Kolandaivelu K, Leiden BB, O'Gara PT, Bhatt DL. Non-adherence to cardiovascular medications. Eur Heart J 2014;35:3267-76. http://doi.org/f6sskg

33. Bueno H, Pocock S, Danchin N, Annemans L, Gregson J, Medina J, et al. International patterns of dual antiplatelet therapy duration after acute coronary syndromes. Heart 2017;103:132-8. http://doi.org/f9kmvr

34. Bardají A, Leal M, Arrarte V, Garcia-Moll X, Pérez de Isla L, Bueno H. Extended dual antiplatelet therapy after acute coronary syndrome in Spain: Results from the EPICOR study. Cardiovasc Ther 2017;35(2). http://doi.org/cv76

35. Chin CT, Ong TK, Krittayaphong R, Lee SW, Sawhney JP, Kim HS, et al. Characteristics and outcomes of medically managed patients with non-ST-segment elevation acute coronary syndromes: Insights from the multinational EPICOR Asia study. Int J Cardiol 2017;243:15-20. http://doi.org/gbp2bm