Immediate and late outcomes of endovascular treatment of stable angina

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ABSTRACT

Objective: To evaluate the short and long term results of percutaneous angioplasty in patients with stable angina at the Interventional Cardiology Service of the *Clinica Internacional*. **Methods and Materials:** Retrospective and observational study. The data base of the service was reviewed and the clinical, angiographic, monitoring variables of all patients with stable angina treated from February 2009 to June 2013 were obtained. Success criteria as well as complications were defined, according to international guidelines. All the patients who received the procedure more than 8 months were included in the monitoring study. **Results:** During the period of study 122 lesions in 88 patients were treated. The most of them were male patients with hypertension and dyslipidemia. The access used more frequently was radial. Angiographic success was obtained in 96.7% of patients, procedure success in 95.6%, and clinical success in 91.4%. No deaths were registered. One acute myocardial infarction and one minor stroke (1.1%) occurred. **Conclusions:** The coronary angioplasty performed in patients with stable angina is safe and effective. The Clinica Internacional got results which were comparable to the international records published.

Key words: Angina. Angioplasty. Stent.

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INTRODUCTION

Stable angina is the consequence of plaque progression within coronary arteries, up to the point of limiting blood flow. Despite of being a common and disabling condition, it has not received the same treatment as acute coronary syndromes in reference to scientific studies.

The prevalence of stable angina increases with age, reaching –in Western populations between 65 and 74 years old– a range between 10% and 15% in women, and 10% and 20% in men[1,2].

Researches done abroad demonstrated efficacy and safety of angioplasty with stent, under well-defined indications[3,4].

During the year 2007 and 2008 studies were published comparing coronary angioplasty with the medical treatment, without benefits from the first one, both in events and quality of life[5,6]. However, the high proportion of angioplasties without stent, as well as the low use of medicated stents, disagrees with the treatment currently used.

International records, especially those performed in the 'real world', demonstrate a high rate of success as well as a low level of complications[7]. Likewise, the studies showed a long term benefit, especially after introducing medicated stents[8,9].

This study is aimed to show the results obtained in the last four years at the Interventional Cardiology Service of the *Clinica Internacional,* presenting short and long term outcomes, which will contribute to know local experience.

MATERIALS AND METHODS

A retrospective and observational study was carried out at the Interventional Cardiology Service of the *Clinica Internacional,* reviewing its data base on coronary angioplasty. All patients, diagnosed with stable angina, who had a coronary angioplasty between February 2009 and June 2013, were included.

Being a retrospective study, it was assumed the diagnosis of stable angina was done according to criteria indicated by international guidelines[3,4]. All patients received double platelet anti-aggregation before the procedure, and continued with this during a particular period given by their cardiologist, according to the type of stent.

Demographic, clinical, angiographic data of each patient were recorded. The monitoring study was considered only in patients who had the angioplasty eight or more months before.

The method of approach and the stent type to be used were selected according to each case and the surgeon's criterion.

Angiographic success was defined as a residual stenosis lower than 10%, with Thrombolysis flow in myocardial infarction grade 3 (TIMI 3), without occlusion of any significant lateral branch, without dissection limiting the flow, thrombus and distal embolization. Procedure success was defined as the absence of the biggest intrahospital events when there is angiographic success. Clinical success was defined as the absence of symptoms related to ischemia –during eight months– in patients who showed angiographic and procedure success. Complications, as well as the criteria of re-stenosis, were defined according to international guidelines[10-13].

For monitoring patients, both the database and medical histories were reviewed. When the patient had a coronarography made eight months after the angioplasty at least, an angiographic monitoring study was applied. If the patient had a stress test, myocardial perfusion or echocardiogram of stress applied eight months after the angioplasty at least, a functional monitoring study was carried out. And, if they only had the doctor's appointment for monitoring during the time described, a clinical monitoring study was applied.

RESULTS

During the period of study, 122 lesions were treated in 88 patients diagnosed with stable angina. The average age was 63.5 + 11.8 years old (ranging from

40 to 92 years old). Most of them were male patients (86%). High blood pressure and dyslipidemia were the most frequent factors of cardiovascular risk (85% and 73% respectively). Diabetic population was constituted by 18.9% of patients.

As for the treated lesions, those were classified according to the criteria of the Society for Cardiovascular Angiography and Interventions[14], having 19.7% of complex lesions (type II, III and IV).

The most frequently treated artery was the anterior descending artery (45.9%), in 23% of the cases the proximal segment of this one was treated. 21.3% of lesions were found in a fork.

Clinical and angiographic data are shown in Table 1.

Table 1. Clinical Features of Patients.

	Cases	n[a]	%	DS	95%	IC
Men	76	88	87.84	3.83	80.21	95.46
High blood pressure	64	75	85.14	4.16	76.84	93.43
Diabetes Mellitus	14	75	18.92	4.58	9.78	28.05
Dyslipidemia	55	75	72.97	5.20	62.61	83.33
Previous transluminal coronary angioplasty	14	76	18.42	4.16	6.57	23.16
Previous Myocardial revascularization surgery	3	86	4.05	2.30	-0.55	8.65

[a] *In some cases information of all patients was not obtained*

The most used approach was radial (67.2%), with three cases which failed, passing then to the femoral artery. Besides, medicated stents were used in 68.8% of the treated lesions, depending this decision on the clinical and angiographic characteristics of each patient. Angiographic success was obtained in 96.7% of patients, with four failed or suboptimal angioplasties and the procedure was successful in 95.6% of the cases, because one patient had a minor stroke (ACV) and another patient had an acute coronary syndrome without ST segment elevation, by the side branch occlusion during the procedure. No deaths or emergency surgeries occurred. There was one case of bleeding over the puncture site. There were no coronary perforations (see Table 2).

Regarding the eight-month minimal monitoring study, this was applied in 49 patients (70 lesions), having two cases of restenosis and one case of sub-acute stent occlusion. Twenty-three patients have not reached eight months after angioplasty yet. The long-term clinical success reached 91.4% (see Table 3).

DISCUSSION

The diagnosis of stable angina is the most common indication for scheduled angioplasties at laboratories of hemodynamics, and it is a frequent cause of outpatient service. There are numerous functional tests that reduce the possibility of finding normal coronary arteries during coronarographies.

This study was conducted to show the results of the Interventional Cardiology Service of the *Clínica Internacional* in the treatment of stable angina, and although it is a small series, it shows "real results", comparable to international works and records.

A high rate of long term success (both hospital and clinical), without deaths, emergency surgeries and a low rate of complications was achieved. Records made in the United States show a death rate between 0.2 and 1.4%, periprocedural infarction from 0.4 to 2.0% , emergency surgery from 0.3 to 1.9% , and periprocedural cerebral infarction between 0.2 and 0.9%[7,15,16]. The rate of bleeding associated with puncture was significantly lower than those reported in the international data: 1.1 vs. 2.3%, probably due to the high percentage of patients in which the radial access was used. Likewise, the low

Table 2. Angiographic features.

	N	Cases[b]	%
Number of treated arteries			
1 artery	69	88	78.41
2 arteries	19	88	21.59
3 arteries	0	88	0.00
Treated artery			
Anterior descending artery	56	122	45.90
Circumflex artery	33	122	27.05
Right coronary Artery	32	122	26.23
Venous bridge	1	122	0.82
Total			100.00
Type of injury			
Non-complex (Type I)	98	122	80.3
Complex (Type II, III or IV)	24	122	19.7
Type of injury			
Proximal anterior	28	122	23.0
descending artery			
Bifurcation	26	122	21.3
Chronic Occlusion	2	122	1.6
Approach			
Radial	82	122	67.2
Femoral	37	122	30.3
Branchial	3	122	2.5
Stent Features			
Drug-eluting stents	84	122	68.85

[b] *88 is the number of patients, and 122 the number of injuries .*

Table 3. Results.

	N	Cases	%
Angiographic Success			
Yes	118	122	96.7
No	2	122	1.6
Suboptimal	2	122	1.6
Successful Procedure [c]			
Yes	109	114	95.61
No	5	114	4.39
Adverse events [d]			
Death	0	88	0
Stoke	1	88	1.14
Emergency surgery	0	88	0
Perioperative Infarction	1	88	1.14
Bleeding	1	88	1.14
Perforation	0	88	0

[c] *114 out of 122 cases were monitored; it was not possible to complete the monitoring.*

[d] *Serious adverse events realated to the procedure , since the procedure to the discharge.*

Table 4. Monitoring.

	N	Cases	%
Sub-acute occlusion (1 injury)	1	70	1.43
Reestenosis (2 injuries)	2	70	2.86
Clinical success	64	70	91.43

rate of restenosis is related to the high percentage of patients treated with medicated stents.

Rapid development of the available techniques and materials progressively improve the evolution of these patients, reducing vascular complications with the radial approach, and restenosis with the increased use of medicated stents. This creates limitations in some long-term monitoring studies, where techniques and materials that are overcome by other ones at the time of publishing the studies are used. For example, in the study COURAGE5, only 1.8% of medicated stents were used, and in 14% of patients an angioplasty was performed only with balloon. In that study, procedure success was obtained in 89% and 34% of patients with angina after one year, which reveals a high rate of restenosis.

The limitations of this study are its retrospective nature, which assumes that internationally admitted diagnostic algorithms and the size of the sample were met, so any clinical event has a significant impact on the results, and finally the inability to monitor all the patients in the long-term.

In conclusion, angioplasty with stenting in stable angina is safe and effective. The Interventional Cardiology Service of the *Clínica Internacional* obtained a high rate of success, comparable to that one obtained in international studies of reference. The complication rate was minimal, consistent with the published literature and standards required. Although this study gives a range of the results obtained nationwide, more studies of this type are needed.

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CONFLICTS OF INTEREST

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