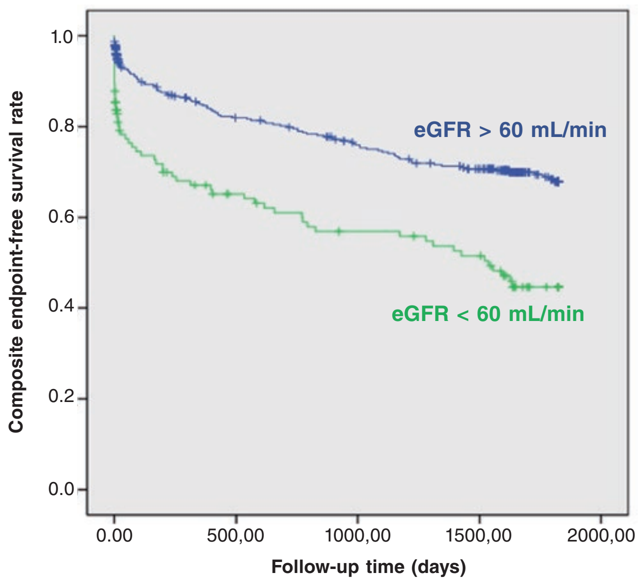

		Admission	1 year	3 years	5 years
GFR < 60 mL/min	At risk	180	131	99	63
	Events	25	30	33	30
GFR > 60 mL/min	At risk	646	436	380	301
	Events	25	52	78	87
	Log-rank (Mantel-Cox)	< .001	.001	.001	.001

Figure 1. Survival curves after 5 years based on the presence or absence of kidney disease. eGFR, estimated glomerular filtration rate.

AUTHORS' CONTRIBUTIONS

The text has been prepared and revised with the participation of all signatory authors.

CONFLICTS OF INTEREST

None.

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Safety and efficacy of the transradial access when performing percutaneous coronary interventions to treat chronic total coronary occlusions

Eficacia y seguridad del acceso transradial en el intervencionismo coronario percutáneo de oclusiones totales crónicas

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To the Editor,

Transradial access has been popularized in percutaneous coronary interventions (PCI). However, the percutaneous management of chronic total coronary occlusions (CTO) is still predominantly via transfemoral access. This study assessed the efficacy and safety profile of a transradial access strategy in a PCI on a CTO and its impact on hospital stay.

A total of 237 consecutive patients treated with PCI on their CTO were included in a single-center registry that compared the results of 2 vascular access strategies used over 2 consecutive periods of time: transfemoral between May 2013 and October 2018, and transradial from November 2018. A total of 40 patients were excluded from the analysis of the transfemoral strategy via transradial access and 9 were excluded from the transradial strategy via transfemoral or mixed radial-femoral access (figure 1). The *Hospital Universitario de Salamanca* clinical research ethics committee approved the study protocol and obtained the patients' informed consent.

The patients who not have any PCI related complications remained in observation at the cardiology day hospital for, at least, 6 to 8 hours. Those who remained asymptomatic and without alterations on their ECGs were discharged from the hospital the same day with outpatient control of their renal function between 48 and 72 hours after the procedure.

In patients hospitalized with acute coronary syndrome, the PCI on the CTO was delayed after completing target and other lesion revascularization with revascularization criteria. In patients treated with multiple catheterization attempts on the CTO, the characteristics of the latest procedure were analyzed. The advanced techniques used were rotablation, re-entry devices, and the CART and CART-REVERSE techniques.

Technical success was defined as the successful recanalization of the CTO with residual stenosis < 50% and TIMI (Thrombolysis in Myocardial Infarction) grade 3 flow. Procedural technical success was defined as the lack of in-hospital mayor adverse cardiovascular events: overall mortality, stroke, acute myocardial infarction, unstable angina or new revascularization. Periprocedural complications included coronary dissections and perforations, pericardial effusion, tamponade, and cardiogenic shock. In-hospital complications included contrast-induced nephropathy, vascular complications, and in-hospital mayor adverse cardiovascular events according to the guidelines. Also, mayor adverse cardiovascular events at the 30-day follow-up were registered.

To adjust the rate of technical success and total in-hospital complications due to the baseline and procedural differences seen between the patients of both strategies, a multivariate binary logistic regression analysis was conducted including variables with *P* values < .10 in the univariate analysis.

The results of 150 patients treated with PCI on a CTO via transfemoral access were compared to those of 38 patients treated via transradial access. Table 1 shows the patients' baseline characteristics, procedural and event-driven data at the follow-up. No significant differences were seen on the baseline characteristic including the score obtained in the J-Chronic Total Occlusion scale.

The PCI on the CTO was successful in 162 patients (86.2%) from the overall sample, and in 50 patients (84.7%) with J-Chronic Total Occlusion scale scores > 2 without differences between both strategies. Transfemoral access was the most commonly used bilateral vascular access and large-caliber guide catheters and a larger volume of contrast were used without any other differences reported in relation to the intervention.

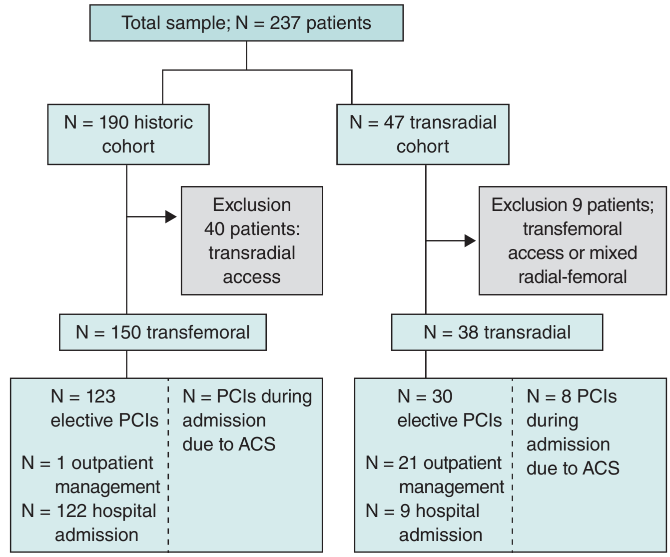

Figure 1. Flow chart of the patients included in the study. ACS, acute coronary syndrome; PCI, percutaneous coronary intervention.

The percentage of outpatient procedures performed was higher in the transradial strategy (up to 70% of the procedures performed via transradial access in hospitalizations outside the non-acute coronary syndrome setting (figure 2). Consequently, hospital stay was shorter in patients treated via transradial access. No differences were seen in periprocedural or in-hospital complications or in the 30-day follow-up.

In the multivariate analysis, previous surgical revascularizations (odds ratio [OR] = 0.12; 95% confidence interval [95%CI], 0.02-0.87; *P* = .036) were the only independent predictive factor associated with lower chances of technical success in the PCI on the CTO. The past medical history of diabetes (OR = 5.71; 95%CI, 1.65-17.79; *P* = .006), surgical revascularization (OR = 3.96; 95%CI, 1.1513.66; *P* = .029) or previous failed PCI on the CTO (OR = 4.76; 95%CI, 1.46-15.51; *P* = .018) were independent predictors of a higher risk of total in-hospital complications. No differences were seen in the chances of technical success or risk of complications based on the access route.

Recent studies have shown that transradial access in PCIs performed on CTOs reduces bleeding and vascular complications. Also, that efficacy is similar to the one reached via transfemoral access[1]. However, in most of these studies, transradial access was spared for the management of less complex CTOs.

In our study, the PCIs performed on CTOs via transradial access were safe even in outpatients without episodes of contrast-induced nephropathy or late cardiac tamponade. None of the study patients developed late tamponade beyond the first 6 to 8 hours after the procedure. Similarly, transradial access reached a high rate of success comparable to the one reached via transfemoral access even in more complex lesions and with significantly shorter hospital stays. Outpatient treatment was possible in over two thirds of the patients with scheduled procedures, which is consistent with the 63.6% reported by a recent study on complex lesions where CTOs were < 5% of the total lesions.[2]

The impact of a transradial access strategy on hospital stay after a PCI on a CTO has not been studied yet. To this day, the factors associated with outpatient management after performing a PCI on a CTO have only been analyzed in 1 registry.[3] According to this registry, same-day hospital discharges were possible in 41.6% of

Table 1. Baseline characteristics of the patients, and procedural and event characteristics at the follow-up

	Transfemoral strategy (N = 150)	Transradial strategy (N = 38)	Total (N = 188)	*P*
Baseline clinical and angiographic characteristics				
Age (years)	66.8 ± 11.5	64.2 ± 11.1	66.3 ± 11.4	.209
Sex, male (N, %)	131 (87.3)	29 (76.3)	160 (85.1)	.088
Arterial hypertension (N, %)	97 (68.3)	29 (76.3)	126 (70)	.339
Diabetes mellitus (N, %)	55 (36.7)	14 (36.8)	69 (36.7)	.984
Dyslipidemia (N, %)	97 (64.7)	25 (65.8)	122 (64.9)	.387
Chronic kidney disease (N, %)	20 (13.3)	5 (13.2)	25 (13.3)	.501
Peripheral arteriopathy (N, %)	26 (18.8)	3 (8.3)	29 (16.7)	.207
LVEF (%)	51.1 ± 13.1	54.1 ± 10.4	51.7 ± 12.7	.139
Previous coronary surgery (N, %)	19 (12.7)	2 (5.6)	21 (11.3)	.377
Anatomical SYNTAX score	23.1 ± 11.5	22.3 ± 10.6	22.8 ± 11.1	.744
> 1 CTO	25 (16.7)	8 (21.1)	33 (17.6)	.526
Location of the CTO (N, %)				.051
LAD	48 (32)	6 (15.8)	54 (28.7)	
RCA	87 (58)	24 (63.2)	111 (59)	
LCX	15 (10)	8 (21.1)	23 (12.2)	
Previous failed PCI on CTO (N, %)	18 (12)	4 (10.5)	22 (11.7)	.801
J-CTO scale	2.7 ± 0.9	2.5 ± 1.1	2.6 ± 1.0	.466
J-CTO scale > 2 (N, %)	41 (54.7)	18 (64.3)	59 (57.3)	.380
Characteristics of the angioplasty procedure on the CTO				
Contralateral injection (N, %)	129 (86)	27 (71.1)	156 (83)	.029
CTO access route (N, %)				
Antegrade	133 (73.5)	30 (63.8)	163 (71.5)	.142
Retrograde	17 (9.4)	3 (6.4)	20 (8.8)	
Hybrid	31 (17.1)	14 (29.8)	45 (19.7)	
Antegrade guide catheter (Fr)	6.3 ± 0.5	6.0 ± 0.1	6.3 ± 0.5	< .001
Retrograde guide catheter (Fr)	6.1 ± 0.5	5.9 ± 0.3	6.1 ± 0.4	.002
IVUS (N, %)	8 (6.2)	1 (2.7)	9 (5.4)	.685
PCI-CTO advanced techniques (N, %)	36 (24)	10 (26.3)	46 (24.5)	.767
Drug-eluting stent (N, %)	128 (97.7)	33 (100)	161 (98.2)	.380
Stent total length (mm)	83.5 ± 36.5	82.5 ± 33.7	83.3 ± 35.8	.884
Contrast volume (mL)	396.6 ± 229.7	280.9 ± 146.4	373.6 ± 220.3	< .001
Fluoroscopy time (min)	47.0 ± 45.1	43.8 ± 31.9	46.4 ± 42.9	.711
Radiation–Kerma (Gy)	3.5 ± 2.9	3.4 ± 2.9	3.5 ± 2.9	.919
Technical success (N, %)	129 (86.6)	33 (86.8)	162 (86.6)	.893
Procedural success (N, %)	107 (71.3)	29 (76.3)	136 (72.3)	.540
Outpatient PCI (N, %)	1 (0.7)	21 (55.3)	22 (11.7)	< .001
Outpatient elective PCI (N, %)	1 (0.8)	21 (70)	22 (14.4)	< .001

(Continues)

Table 1. Baseline characteristics of the patients, and procedural and event characteristics at the follow-up *(continued)*

	Transfemoral strategy (N = 150)	Transradial strategy (N = 38)	Total (N = 188)	*P*
Hospital stay (days)	3.4 ± 0.4	1.4 ± 0.3	2.0 ± 3.1	< .001
Periprocedural complications and events at the follow-up				
Total in-hospital complications (N, %)	23 (15.3)	5 (13.2)	28 (14.9)	.737
Periprocedural complications (N, %)				
Coronary perforations	4 (2.7)	2 (5.3)	6 (3.2)	.416
Coronary dissections	1 (1.6)	1 (2.6)	2 (1.1)	.364
Cardiac tamponade	1 (1.6)	2 (6.5)	3 (3.3)	.262
Cardiogenic shock	5 (3.3)	0	5 (2.7)	.585
In-hospital complications (N, %)				
Postprocedural AMI	5 (3.3)	1 (2.6)	6 (3.2)	.767
Stroke	1 (0.7)	0	1 (0.5)	.599
Contrast-induced nephropathy	2 (1.3)	0	2 (1.1)	.456
Vascular complications:	9 (6.0)	0	9 (4.8)	.122
Minor (N, %)	4 (2.7)	0	4 (2.1)	.309
Major (N, %)	5 (3.3)	0	5 (2.7)	.254
Cardiac surgery	1 (0.7)	0	1 (0.5)	.599
Pericardial effusion	4 (2.7)	1 (2.6)	5 (2.7)	.707
In-hospital mortality	0	0	0	ND
In-hospital MACE	6 (4)	1 (2.6)	7 (3.7)	.691
Events at the 30-day follow-up				.292
Early stent thrombosis (N, %)	0	1 (2.6)	1 (0.5)	
Unstable angina (N, %)	1 (0.7)	0	1 (0.5)	
MACE at the 30-day follow-up	7 (4.7)	2 (5.3)	9 (4.8)	.311

AMI, acute myocardial infarction; CTO, chronic total coronary occlusion; IVUS, intravascular ultrasound; LAD, left anterior descending coronary artery; LCx, left circumflex artery; LVEF, left ventricular ejection fraction; MACE, major adverse cardiovascular events; NA, not available; PCI, percutaneous coronary intervention; RCA, right coronary artery.

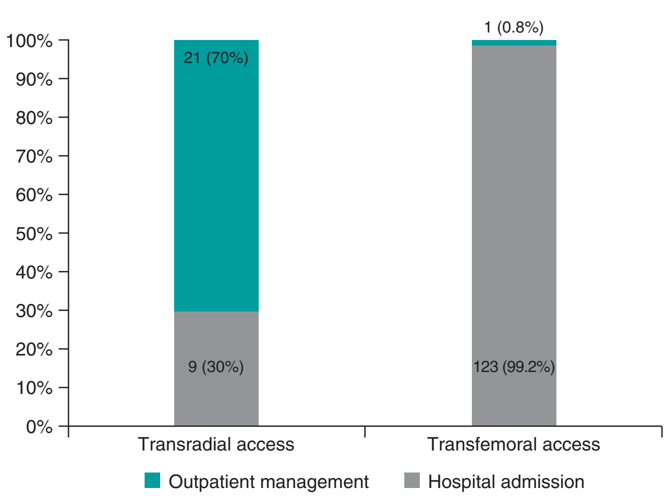

Figure 2. Outpatient management in select patients treated with percutaneous coronary intervention on chronic total coronary occlusions based on the vascular access used.

the patients probably thanks to the use of transfemoral access in most of the cases (90%).

In conclusion, our study provides additional evidence in favor of using transradial access to perform PCIs on CTOs as a safe and effective option to reduce the number and length of hospital stays, which may improve the management of health resources significantly.

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AUTHORS' CONTRIBUTIONS

B. Trejo-Velasco: Design of the study. Collection of information. Statistical analysis and writing of the original manuscript. Graphic design and tables. A. Diego-Nieto: Conception original idea and design of the study. Methodology and statistical analysis. Original manuscript co-writing, manuscript review and correction, and project supervision. J. C. Núñez: Data collection. Methodology and research. Manuscript review. J. Herrero-Garibi: Data collection. Methodology and research. Manuscript review. I. Cruz-González: Design of the study. Data collection. Methodology and research. Review of the manuscript and supervision of the project. J. Martín-Moreiras: Conception, original idea and design of the study. Methodology and data collection. Revision and correction of the manuscript and supervision of the project.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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Prevention of coronary occlusions during transcatheter aortic valve-in-valve implantation using the BASILICA technique

Prevención de la oclusión coronaria en el implante de prótesis aórtica transcatéter valve-in-valve mediante técnica BASILICA

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To the Editor,

Coronary occlusion is a more common complication after transcatheter aortic valve-in-valve implantation than after transcatheter aortic valve implantation over the native valve. It is due to the displacement of the veil of the surgical valve prior to transcatheter aortic valve implantation until occluding the coronary ostium.[1] The risk is higher with surgical prostheses without stent and with those with veils mounted outside the stent. It also depends on the height of coronary ostia and width of sinuses.[2]

Coronary arteries can be protected by advancing a guidewire or even a stent inside the coronary artery at risk, which creates some sort of chimney to keep the ostium open[3] with unpredictable results especially in the long-term.

Recently, the BASILICA technique (Bioprosthetic or native aortic scallop intentional laceration to prevent iatrogenic coronary artery obstruction) has been described to avoid coronary occlusions. It consists of lacerating the veil of the surgical prosthesis facing the ostium at risk with an electrified guidewire so that it opens when implanting the new prosthesis while leaving the ostium uncovered.[4]

This is the case of an 89-year-old woman—carrier of a 19 mm Mitroflow bioprosthesis (Sorin Group Inc., Mitroflow Division; Vancouver, Canada) due to severe aortic stenosis since 2010—who was admitted to our center due to heart failure. The echocardiogram confirmed the presence of severe aortic stenosis again due to valve degeneration. The internal area of the aortic annulus according to the coronary computed tomography angiography performed was 230 cm^2 with a 54 mm-perimeter. Coronary arteries originated at the annulus 4 mm to the left and 9 mm to the right and with a 3.5 mm and 4.7 mm distance from the valve virtually implanted to the left and right ostia, respectively.

Given the risk of occlusion of the left coronary ostium, it was decided to approach this case using the valve-in-valve technique with a 23 mm Evolut PRO valve (Medtronic, Minneapolis, Minnesota, United States) using the BASILICA technique with fluoroscopy and transesophageal echocardiography guidance. Thus, via left femoral artery a 23 mm snare was advanced through a 6-Fr multipurpose catheter that crossed the bioprosthesis and allocated in the left ventricular outflow tract. Through this same artery a 0.18 inches pre-shaped guidewire was inserted, in parallel, that remained on the left ventricular apex to stabilize the position of the snare as shown on figure 1. A 14-Fr introducer sheath was used via right femoral artery (after valve implantation) to advance the system to perforate and then tear the veil. This system consisted of a 6-Fr AL 3 guide catheter with a 5-Fr 125 cm internal mammary diagnostic catheter and a 150 cm FINECROSS microcatheter (Terumo, Japan)

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