Usefulness of Placing a Wire From the Contralateral Femoral Artery to Improve the Percutaneous Treatment of Vascular Complications in TAVI

Utilidad de colocar una guía desde la femoral contralateral para facilitar el tratamiento percutáneo de complicaciones vasculares en los TAVI

To the Editor,

Transcatheter aortic valve implantation (TAVI) using a transfemoral (TF) approach is a widely used therapeutic option for the treatment of patients with inoperable severe aortic stenosis or at high surgical risk. Technical improvements and greater operator experience have enhanced the safety of the procedure, although the rate of complications, in particular bleeding and vascular complications, is still high.

Most vascular complications can be rapidly and successfully treated by percutaneous techniques if access is adequate.[1] Several authors have described strategies to manage complications via anterograde access from the contralateral femoral[2,3] or the radial artery[4] or via retrograde access from the ipsilateral femoral artery.[5] However, the anterograde techniques described include a delayed approach to therapeutic access at the end of the procedure, when the vascular complication can hinder guidewire introduction and prevent its rapid and adequate management.

The present study evaluated the usefulness of routine placement of a wire in the therapeutic femoral artery from the contralateral femoral artery, introduced at the start of the procedure, to prevent and/or treat vascular complications.

We analyzed data from 159 consecutive patients treated by TF-TAVI at a single hospital between July 2008 and October 2012; in all patients, 18-Fr introducers and percutaneous closure with the Prostar XL device were used after implantation of the Edwards-SAPIEN XT (n = 88) or Medtronic CoreValve (n = 71) prosthesis.

The patients were divided into 2 sequential groups: group I consisted of patients treated conventionally (no guidewire, n = 57, until July 2010), and group II was composed of patients in which a contralateral guidewire was advanced at the start of the procedure (with guide, n = 102, as of August 2010). Additionally, in the final 28 patients in this group, a technical variant consisting of balloon inflation at low atmospheres in the puncture area after Prostar closure was used to facilitate hemostasis at this level. The baseline characteristics and 30-day hemorrhagic, vascular, and renal complications according to the Valve Academy Research Consortium (VARC)-2 definitions were compared to analyze therapeutic management in the event of complications.

The results are shown in the Table. Both groups had similar baseline characteristics, except for the valvular area, which was larger in group II. Vascular complications and therapeutic femoral bleeding were similar in both groups; the most common complication was incomplete arteriotomy closure with the Prostar device.

Although there were no differences in the total number of vascular complications, group II showed significant reductions in serious complications, total mortality, and vascular access complications.

Table
Description of Patients' Baseline Characteristics, Complications, Vascular Complications, and Therapeutic Management

	Group I, no guidewire	Group II, with guidewire	*P*
Baseline data			
Patients	57	102	
Demographic and biometric factors			
Age, mean (SD), y	84 (5)	83 (5)	.09
Women	36 (63)	68 (67)	.66
Body mass index, mean (SD)	27 (4)	28 (5)	.20
Risk factors and comorbidity			
Diabetes mellitus	14 (25)	37 (36)	.13
Hypertension	43 (75)	87 (85)	.12
Peripheral vascular disease	3 (5)	7 (7)	1
Lung disease	10 (18)	30 (29)	.10
Cerebrovascular disease	5 (9)	13 (13)	.45
Heart disease			
Coronary disease	24 (42)	44 (43)	1
Prior angioplasty	12 (21)	18 (18)	.60
Prior surgery	3 (5)	9 (9)	.54
Atrial fibrillation	17 (30)	40 (39)	.24
Ejection fraction, mean (SD), %	58 (13)	59 (15)	.58
Aortic valve			
Aortic valve area, mean (SD), cm^2	0.55 (0.2)	0.63 (0.2)	.04
Mean gradient, mean (SD), mmHg	53 (16)	50 (16)	.27
Surgical risk			
EuroSCORE I	20 (11)	17 (9)	.10
Therapeutic prefemoral assessment			
Minimum diameter, mean (SD), mm	7.19 (1.1)	6.89 (1.1)	.09
Moderate-to-severe calcification	14 (26)	23 (23)	.38
Moderate-to-severe tortuosity	22 (41)	39 (39)	.58
Preprocedure laboratory workup			

Table *(Continued)*
Description of Patients' Baseline Characteristics, Complications, Vascular Complications, and Therapeutic Management

	Group I, no guidewire	Group II, with guidewire	*P*
Creatinine, mean (SD), mg/dL	1.39 (0.6)	1.24 (0.5)	.10
Hemoglobin, mean (SD), g/dL	12 (2)	12 (2)	.77
Hematocrit, mean (SD), %	37 (6)	37 (5)	.73
30-day complications (VARC-2 definitions)			
Total mortality	10 (18)	6 (6)	.02
Myocardial infarction	0	0	1
Ischemic stroke	2 (4)	0 (0)	.13
Bleeding	17 (30)	21 (21)	.19
Potentially fatal	7 (12)	3 (3)	.04
Major	1 (2)	6 (6)	.42
Minor	9 (16)	12 (12)	.47
Renal failure	12 (23)	21 (21)	.84
Grade I	11 (19)	17 (17)	.71
Grade 2	1 (2)	3 (3)	.64
Grade 3	0	1 (1)	
Vascular complications	23 (40)	31 (30)	.54
Major	10 (18)	7 (7)	.04
Minor	9 (16)	19 (19)	.65
Closure device failure	4 (7)	5 (5)	.72
Access-related complications. Therapeutic management			
Vascular or bleeding complication at therapeutic access	22 (39)	31 (30)	.29
Type of vascular complication (nonexclusive)			
Dissection	5 (9)	2 (2)	.10
Perforation	3 (5)	3 (3)	.67
Incomplete Prostar closure, with or without bleeding	15 (26)	25 (25)	.80
Pseudoaneurysm	2 (4)	1 (1)	.29
Stenosis/ischemic event	5 (9)	3 (3)	.14
Serious hematoma	3 (5)	0 (0)	.04
Type of bleeding			
Potentially fatal	6 (11)	0 (0)	.002
Major	1 (1.4)	6 (6)	.42
Minor	8 (14)	11 (11)	.55
Treatment of vascular complication			
Interventional cardiology (balloon)	8 (14)	8 (8)	.21
Interventional cardiology (stent)	5 (9)	21 (21)	.05
Surgery	4 (7)	1 (1)	.06
Mortality			
Total	10 (18)	6 (6)	.02
Related to vascular complication	3 (5)	0 (0)	.045
Details on patients with vascular complication			
Patients	22	31	
Procedure duration, mean (SD), min	172 (53)	129 (44)	.002
Amount of contrast material, mean (SD), mL	190 (89)	215 (89)	.30
Transfused blood units, mean (SD)	3.4 (5)	2.4 (2)	.51
Hospitalization duration, mean (SD), d	8.9 (9)	9.1 (7)	.98

SD, standard deviation; VARC-2, Valve Academic Research Consortium.
Unless otherwise indicated, the data are expressed as No. (%).

In the therapeutic management of complications, group I had more surgical repairs and more stents than group II (the Figure shows an example of the second group). Interventional cardiology was highly effective in the treatment of vascular complications in both groups, and bleeding was completely resolved in the 26 patients treated with a stent.

In patients managed by surgery, the procedure was performed immediately for incontrollable bleeding in 4 patients in group I, and for ischemia at 48 hours postprocedure in the only patient who underwent surgery in group II.

The use of a contralateral guidewire in TF-TAVI procedures was initially described by Sharp et al.[2] These authors observed a surgical repair rate of 70% for vascular complications, and reported

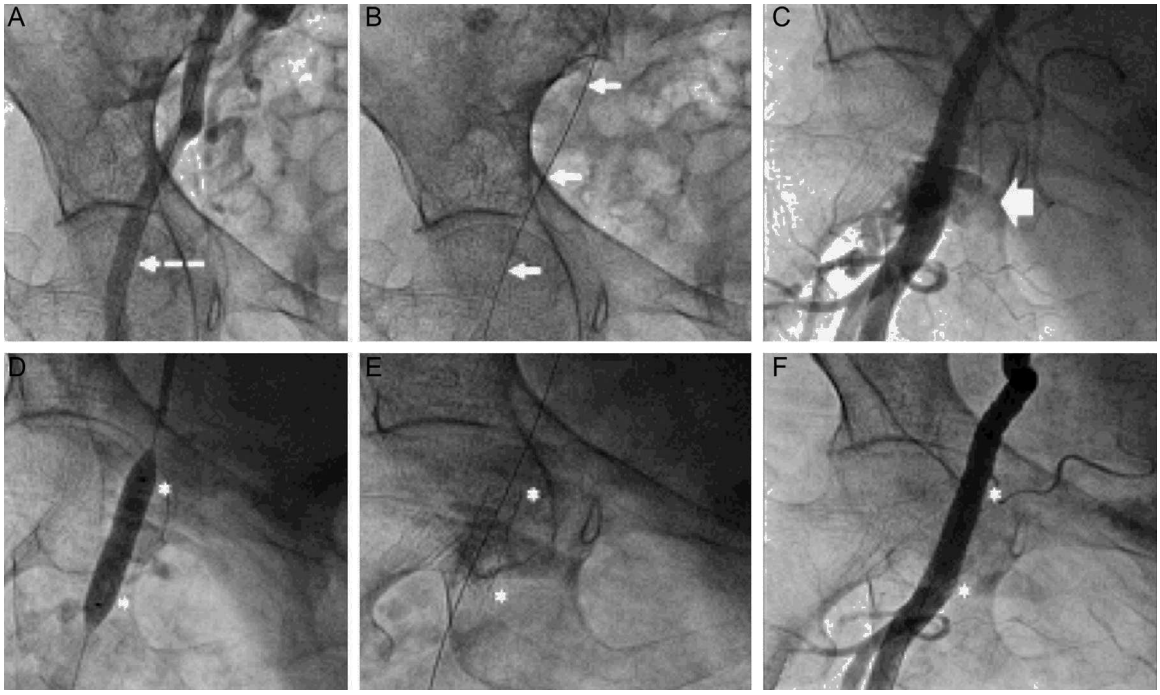

Figure. Group II patient treated by stent implantation. A: Right femoral angiography; puncture site selection (arrow). B: Angioplasty guidewire (arrows) advanced from the contralateral femoral artery. C: Angiography after Prostar closure; capillary leak syndrome of contrast material is observed in the puncture area. D: Implantation of Advanta V12 drug-eluting stent in the capillary leak syndrome area. E: Fluoroscopic image of the stent (asterisk). F: Final angiographic image.

that balloon compression hemostasis was able to stabilize the patient until the procedure. Buchanan et al[4] proposed anterograde left radial access using a long coaxial balloon to promote hemostasis during suturing. If there was persistent bleeding, additional contralateral femoral access was used to attempt percutaneous repair of the complication.

Frerker et al[5] described ipsilateral retrograde access and achieved percutaneous repair of most vascular complications with this technique, although with a higher number of minor complications related to dual ipsilateral access.

In our series, the wire was passed from the contralateral femoral artery rapidly and readily in all patients, was not associated with any complications, and allowed immediate percutaneous repair of the complication in all patients.

The use of a contralateral guidewire in TF-TAVI procedures does not decrease the incidence or type of complications, but could reduce the severity and clinical repercussions of these complications and facilitate percutaneous treatment. Because this study was sequential, experience may have led to better outcomes in the second group.

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