

# Predictive Factors, Management, and Clinical Outcomes of Coronary Obstruction Following Transcatheter Aortic Valve Implantation

## Insights From a Large Multicenter Registry

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### Objectives

This study sought to evaluate the main baseline and procedural characteristics, management, and clinical outcomes of patients from a large cohort of patients undergoing transcatheter aortic valve implantation (TAVI) who suffered coronary obstruction (CO).

### Background

Very little data exist on CO following TAVI.

### Methods

This multicenter registry included 44 patients who suffered symptomatic CO following TAVI of 6,688 patients (0.66%). Pre-TAVI computed tomography data was available in 28 CO patients and in a control group of 345 patients (comparisons were performed including all patients and a cohort matched 1:1 by age, sex, previous coronary artery bypass graft, transcatheter valve type, and size).

### Results

Baseline and procedural variables associated with CO were older age ( $p < 0.001$ ), female sex ( $p < 0.001$ ), no previous coronary artery bypass graft ( $p = 0.043$ ), the use of a balloon-expandable valve ( $p = 0.023$ ), and previous surgical aortic bioprosthesis ( $p = 0.045$ ). The left coronary artery was the most commonly involved (88.6%). The mean left coronary artery ostia height and sinus of Valsalva diameters were lower in patients with obstruction than in control subjects ( $10.6 \pm 2.1$  mm vs.  $13.4 \pm 2.1$  mm,  $p < 0.001$ ;  $28.1 \pm 3.8$  mm vs.  $31.9 \pm 4.1$  mm,  $p < 0.001$ ). Differences between groups remained significant after the case-matched analysis ( $p < 0.001$  for coronary height;  $p = 0.01$  for sinus of Valsalva diameter). Most patients presented with persistent severe hypotension (68.2%) and electrocardiographic changes (56.8%). Percutaneous coronary intervention was attempted in 75% of the cases and was successful in 81.8%. Thirty-day mortality was 40.9%. After a median follow-up of 12 (2 to 18) months, the cumulative mortality rate was 45.5%, and there were no cases of stent thrombosis or reintervention.

### Conclusions

Symptomatic CO following TAVI was a rare but life-threatening complication that occurred more frequently in women, in patients receiving a balloon-expandable valve, and in those with a previous surgical bioprosthesis. Lower-lying coronary ostium and shallow sinus of Valsalva were associated anatomic factors, and despite successful treatment, acute and late mortality remained very high, highlighting the importance of anticipating and preventing the occurrence of this complication. (J Am Coll Cardiol 2013;62:1552–62) © 2013 by the American College of Cardiology Foundation

Symptomatic coronary obstruction due to the displacement of the calcified native valve leaflets over the coronary ostia is a potential complication of transcatheter aortic valve implantation (TAVI). However, apart from reporting its incidence (usually <1%) in some TAVI studies (1–7), data on this life-threatening complication have been limited to case reports and very small case series (8), and to date, there has been no large registry evaluating the baseline characteristics of patients suffering this complication, its management, and clinical impact.

We recently conducted a systematic review of the literature on symptomatic coronary obstruction as a complication of TAVI that included 24 cases; all of them reported as case reports or very small case series (8). In that study, reported cases of coronary obstruction following TAVI occurred more frequently in women and patients receiving a balloon-expandable valve, and the left coronary artery (LCA) was the most commonly involved. Percutaneous coronary intervention (PCI) was a feasible and successful treatment in most cases, but hemodynamic support and/or conversion to open heart surgery were frequently needed. This study, however, had the limitations inherent to a review that collects only the information described in publications. In addition to the possible omission of data and the selection bias inherent to published cases (reported cases might tend to have better outcomes than those that are not reported), obtaining data from case reports precluded any comparison with the entire TAVI population at risk and made it difficult to evaluate the

baseline and procedural factors associated with this complication. The aim of the present study, therefore, was to evaluate the main baseline and procedural characteristics, management, and clinical outcomes of patients suffering from coronary obstruction following TAVI from a large series of consecutive patients undergoing TAVI.

## Methods

The present multicenter registry of coronary obstruction following TAVI collected retrospectively all cases with this complication from 81 centers in North America, Europe, South America, and Asia, from January 2007 to January 2013. Gathered data included the main baseline clinical, echocardiographic, computed tomography (CT), and procedural characteristics of the cases. All information on clinical presentation, diagnosis, and treatment of the coronary obstruction complication, as well as 30-day and late clinical outcomes were entered. The clinical events were defined according to the VARC (Valve Academic Research Consortium)-2 criteria (retrospective

### Abbreviations and Acronyms

<b>CABG</b> = coronary artery bypass graft
<b>CT</b> = computed tomography
<b>IQR</b> = interquartile range
<b>LCA</b> = left coronary artery
<b>logEuroSCORE</b> = logistic European System for Cardiac Operative Risk Evaluation score
<b>PCI</b> = percutaneous coronary intervention
<b>RCA</b> = right coronary artery
<b>SOV</b> = sinus of Valsalva
<b>TAVI</b> = transcatheter aortic valve implantation
<b>TIMI</b> = Thrombolysis In Myocardial Infarction

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