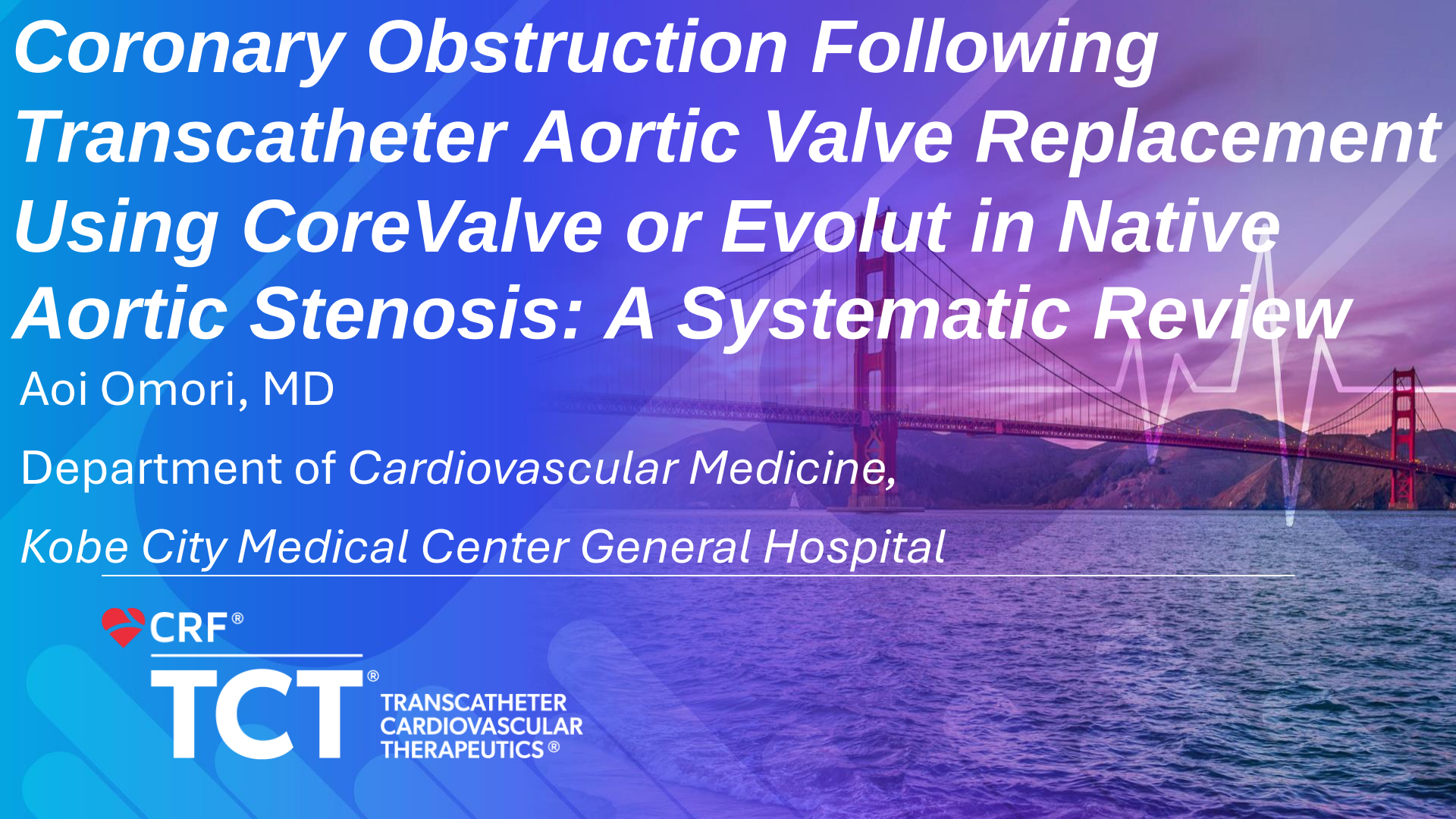
Coronary Obstruction Following Transcatheter Aortic Valve Replacement Using CoreValve or Evolut in Native Aortic Stenosis: A Systematic Review

Aoi Omori, MD

Department of *Cardiovascular Medicine,*

Kobe City Medical Center General Hospital



CRF®

TCT® TRANSCATHETER CARDIOVASCULAR THERAPEUTICS®

Disclosure of Relevant Financial Relationships

Drs. Taniguchi, Hayashi, Ishizu, and Tabata have received lecture fee from Edwards Lifesciences, Medtronic, and Abbott.
Shinichi Shirai is a proctor of Edwards Lifesciences, Medtronic, and Abbott. Hiroshi Takiguchi has been an employee of Eli Lilly Japan since April 1, 2024.
I, Toshiaki Toyota, Kenji Ando, and Yutaka Furukawa do not have any financial relationships to disclose.

Introduction

✓ Coronary obstruction following transcatether aortic valve replacement (TAVR) in native aortic stenosis is a rare (< 1.0%) but fatal complication with high mortality.

Ribeiro HB et al. J Am Coll Cardiol. 2013 22;62:1552-62.
Jabbour RJ et al. J Am Coll Cardiol. 2018 10;71:1513-1524.

✓ The mechanisms and managements about coronary obstruction following TAVR remain unclear, especially with CoreValve or Evolut.

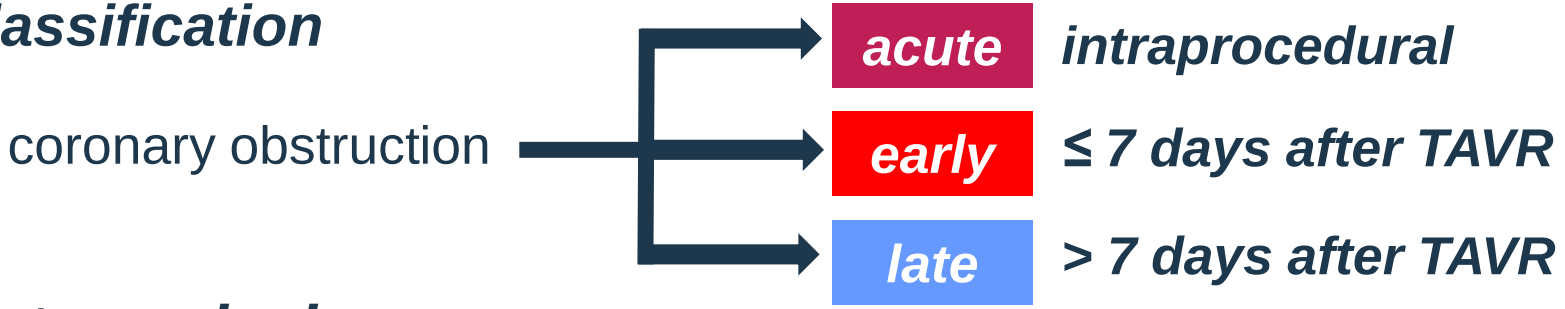
Methods

✓ ***a comprehensive systematic review***

reports about coronary obstruction following TAVR (CoreValve or Evolut)

published from Mar. 2007 to Jan. 2025

✓ ***Classification***



✓ ***Data analysis***

Jabbour RJ et al. J Am Coll Cardiol. 2018 10;71:1513-1524.

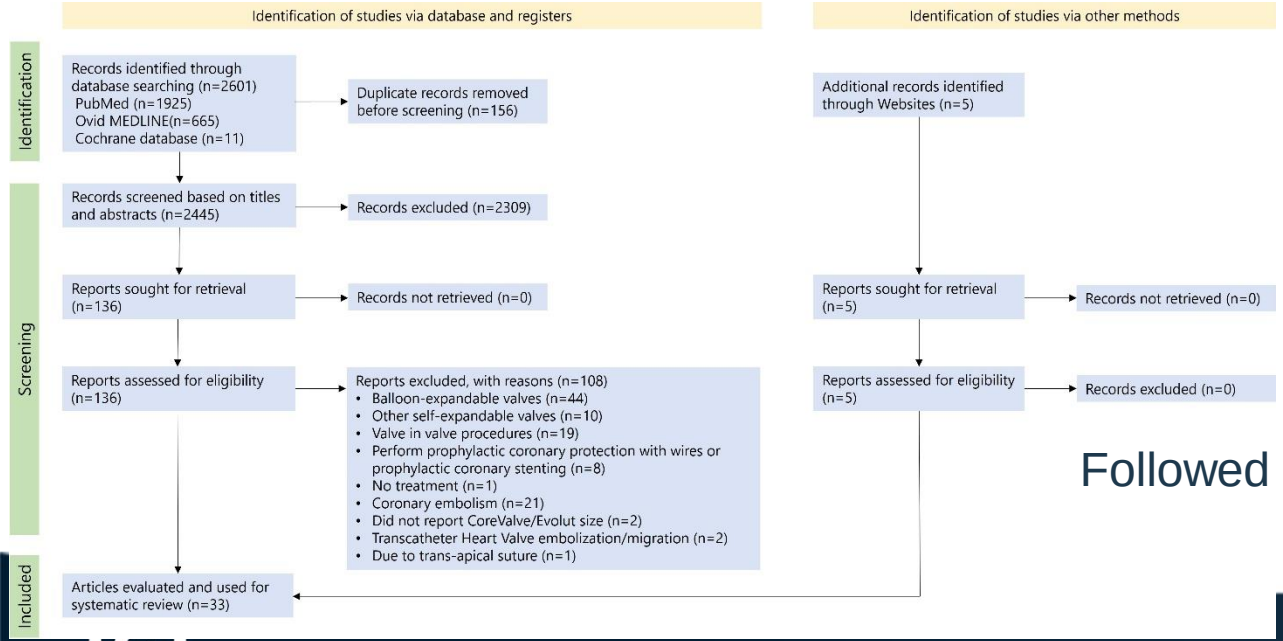
baseline data: clinical, echocardiographic, CT characteristics

procedural data: valve type/size, clinical presentation, management

Results: inclusion

✓ Out of 2601 reports, **33** reports (**39** patients) were included.

exclusion : other valves, valve-in-valve, prophylactic wire or stenting, obstruction due to embolism or migration, etc.



Followed the PRISMA 2020 statement

BMJ 2021;372:n71

Results: characteristics and management

	Number of available data	Overall (N=39)	Acute or early obstruction (N=19)	Late obstruction (N=20)	P value
Clinical characteristics					
Age, years	37	82.6 ± 6.4	83.3 ± 7.5	82.1 ± 5.5	0.58
Female	37	**34 (92%)**	**14 (82%)**	**20 (100%)**	0.050
CT characteristics					
Perimeter	28	68.6 ± 5.7	69.6 ± 6.8	67.3 ± 3.5	0.28
Obstructed coronary artery height <12 mm	30	17 (57%)	10 (63%)	7 (50%)	0.49
Mean SOV diameter below the manufacturer's recommended threshold	24	**10 (42%)**	**4 (40%)**	**6 (43%)**	0.89
Valve size	39				
23 mm		1 (3%)	0	1 (5%)	-
26 mm		**32 (82%)**	**14 (74%)**	**18 (90%)**	-
29 mm		6 (15%)	5 (26%)	1 (5%)	-
31 mm CoreValve		0	0	0	-
34 mm Evolut		0	0	0	-

✓ ***Females and the 26-mm valve*** were predominant.

✓ In ***40%*** of the cases, the mean SOV diameter was below the threshold.

Results: characteristics and management

	Number of available data	Overall (N=39)	Acute or early obstruction (N=19)	Late obstruction (N=20)	P value
Timing	39				
Acute		11 (28%)	11 (58%)	-	-
Early		8 (21%)	8 (21%)	-	
Late		20 (51%)	-	20 (51%)	-
Clinical presentation					
ACS	39	**32 (82%)**	**18 (95%)**	**14 (70%)**	0.04
Culprit artery					
LCA	39	**26 (67%)**	**15 (79%)**	**11 (55%)**	0.12
RCA	39	6 (15%)	3 (16%)	3 (15%)	
Both	39	7 (18%)	1 (5%)	6 (30%)	
Treatment					
Emergency treatment	39	32 (82%)	19 (100%)	13 (65%)	0.004
Percutaneous intervention (coronary stenting or snaring)	39	28 (72%)	17 (89%)	11 (55%)	0.02
Unsuccessful PCI	30	7 (23%)	2 (13%)	**5 (33%)**	0.20
Surgical intervention	39	11 (28%)	2 (11%)	9 (45%)	0.02

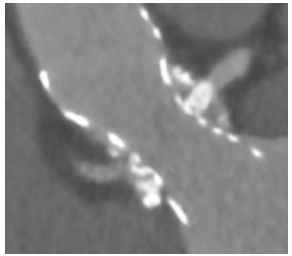
✓ ***ACS*** was more common in acute or early and ***LCA*** obstruction was predominant.

✓ In late cases, ***unsuccessful PCI*** tended to be more frequent .

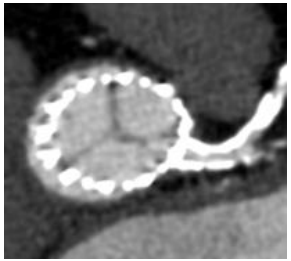
Results: etiologies

Acute or early

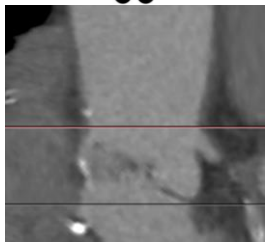
Displacement of calcified native valve leaflet



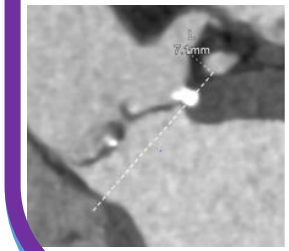
Commissural misalignment



female



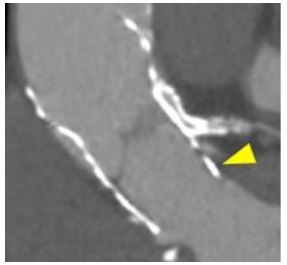
Narrow SOV



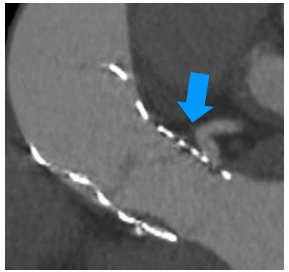
Low coronary height

late

High implantation



Endothelialization



From this systematic review

✓ **The 26-mm valve** was most frequently implicated (82%).

➡ This suggests **a device-specific relationship** with coronary obstruction.

✓ The most cases were **female** (92%), and presented as **ACS** (82%).

➡ Females generally have smaller anatomical features.

Jabbour RJ et al. J Am Coll Cardiol. 2018 10;71:1513-1524.
Ribeiro HB et al. Eur Heart J. 2018;39:687-695.

Coronary obstruction after TAVR is life-threatening, yet PCI is sometimes unsuccessful.

✓ The mechanisms of coronary obstruction varied depending on **timing**.

Why 26-mm ?

Q. Is the 26-mm valve most frequently implanted ?

A. Maybe '**No**'.

Three Generations of Self-Expanding Transcatheter Aortic Valves

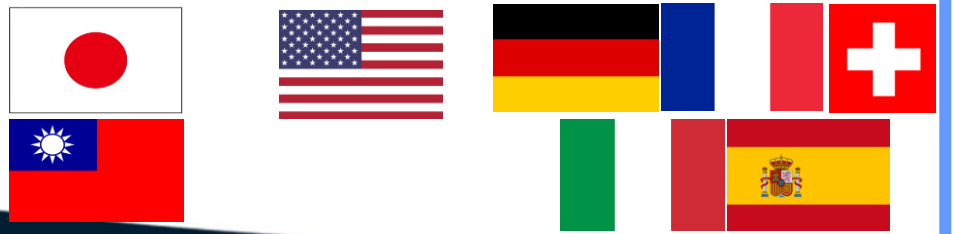
A Report From the STS/ACC TVT Registry

John K. Forrest, MD,[a] Ryan K. Kaple, MD,[a] Gilbert H.L. Tang, MD, MSc, MBA,[b] Steven J. Yakubov, MD,[c] Tamim M. Nazif, MD,[d] Mathew R. Williams, MD,[e] Angie Zhang, MS,[f] Jeffrey J. Popma, MD,[g] Michael J. Reardon, MD[h]

	CoreValve (n = 5,514)	Evolut R (n = 11,295)	Evolut PRO (n = 2,065)	p Value*
Valve size implanted				
23 mm	271 (5.0)	444 (4.0)	79 (3.9)	0.82
26 mm	1,874 (34.5)	3,869 (34.5)	695 (33.9)	0.61
29 mm	3.294 (60.6)	6.913 (61.6)	1.277 (62.3)	0.56

39 cases in this study

15 10 14

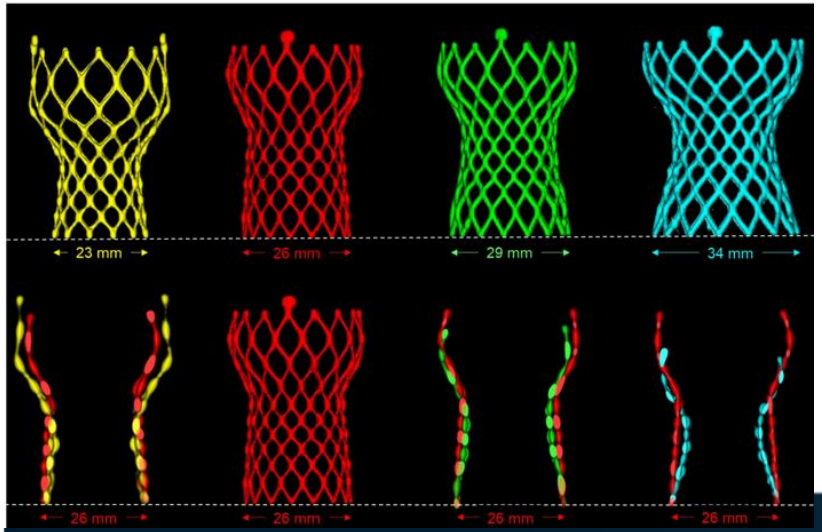


The specific structural feature of the 26-mm valve may be the key factor.

CRF TCT

The 26-mm's feature and multiple factors

CoreValve Evolut	23 mm	26 mm	29 mm	34 mm (31mm*)
Acute (intraprocedural) or Early (≤7 days)	0	**14 cases**	5 cases	0
Late (>7 days)	1 case	**18 cases**	1 case	0



The 26-mm was **cylindrical shape** in the lower half

anatomical

- ***narrow SOV***
- ***low coronary height***
- ***displacement the calcified valve***

procedural

- ***high implantation***
- ***commissural misalignment***

small gap between the valve and SOV/STJ

coronary obstruction

Limitations

✓ This study is descriptive and cannot robustly assess the incidence of coronary obstruction or conclude a higher obstruction risk with 26-mm valves.

✓ Publication bias may overestimate procedural success.

✓ Incomplete CT data limited the assessment of the relationship between the implanted valve size and SOV diameter.

Simultaneously published in *JACC: Advances*

Journal Pre-proof

Coronary Obstruction Following Transcatheter Aortic Valve Replacement With Supra-Annular Self-Expanding Valve: Review of Case Reports

Tomohiko Taniguchi, MD, PhD, Aoi Omori, MD, Toshiaki Toyota, MD, PhD, Shinichi Shirai, MD, Masaomi Hayashi, MD, Hiroshi Takiguchi, MD, PhD, Kenichi Ishizu, MD, Hiroyuki Tabata, MD, Kenji Ando, MD, Yutaka Furukawa, MD, PhD

PII: S2772-963X(25)00745-8

DOI: https://doi.org/10.1016/j.jacadv.2025.102316

Reference: JACADV 102316

To appear in: *JACC: Advances*

Received Date: 23 July 2025

Revised Date: 23 September 2025

Accepted Date: 3 October 2025

Please cite this article as: Taniguchi T, Omori A, Toyota T, Shirai S, Hayashi M, Takiguchi H, Ishizu K, Tabata H, Ando K, Furukawa Y, Coronary Obstruction Following Transcatheter Aortic Valve Replacement With Supra-Annular Self-Expanding Valve: Review of Case Reports, *JACC: Advances* (2025), doi: https://doi.org/10.1016/j.jacadv.2025.102316.

Conclusions

✓ Coronary obstruction following TAVR with CoreValve/Evolut occurred most frequently with the 26-mm valve.
The cylindrical shape may be associated with this fatal complication.

✓ Coronary obstruction was influenced by both anatomical and procedural factors. The mechanisms and managements differed according to timing.