Perioperative Outcomes in Patients Undergoing Transcatheter Aortic Valve Replacement With Concomitant Mitral Regurgitation

- *Reza Amani-Beni: Bahar Darouei:*
- *Mehrdad Rabiee*
- *Ghazal Ghasempour Dabaghi*
- *Reza Eshraghi*
- *Ashkan Bahrami:*
- *Ehsan Amini-Salehi*
- *Seyyed Mohammad Hashemi*
- *Sadegh Mazaheri-Tehrani*
- *Mohammad Reza Movahed*

- *1- Isfahan Cardiovascular Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran.*
- *2- Social Determinants of Health Research Center, Isfahan University of Medical Sciences, Isfahan, Iran.*
- *3- Student Research Committee, Kashan University of Medical Sciences, Kashan, Iran.*
- *4- Guilan University of Medical Sciences, Rasht, Iran.*
- *5- Cardiovascular Research Center, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.*
- *6- Child Growth and Development Research Center, Research Institute for Primordial Prevention of Non-Communicable Disease, Isfahan University of Medical Sciences, Isfahan, Iran.*
- *7- Department of Medicine, University of Arizona College of Medicine, Phoenix, USA.*
- *8- Department of Medicine, University of Arizona Sarver Heart Center, Tucson, AZ, USA.*

CRF®

TCT® TRANSCATHETER CARDIOVASCULAR THERAPEUTICS®

Disclosure of Relevant Financial Relationships

We have no Conflict of interest.

Faculty disclosure information can be found on the app.

Background:

- AS is often linked to other valvular heart diseases, such as MR
- This has been reported to be present in 20-80% of these patients, according to previous studies
- The PARTNER trial reported that 20% of patients who underwent surgical or TAVR due to severe AS also had concurrent moderate-to-severe MR
- The prognostic role of baseline MR in perioperative outcomes after TAVR has been a topic of ongoing research.
- Several studies have found that moderate to severe MR (MR ≥2) is associated with several perioperative clinical adverse outcomes compared to none-to-mild MR (MR <2); some have reported minimal impact

- .Deeb GM, Reardon MJ, Chetcuti S, et al. 3-year outcomes in high-risk patients who underwent surgical or transcatheter aortic valve replacement. Journal of the American College of Cardiology. 2016;67(22):2565-2574.
- 7Mantovani F, Fanti D, Tafciu E, et al. When aortic stenosis is not alone: epidemiology, pathophysiology, diagnosis and management in mixed and combined valvular disease. Frontiers in Cardiovascular Medicine. 2021;8:744497.
- 8Leon MB, Smith CR, Mack M, et al. Transcatheter aortic-valve implantation for aortic stenosis in patients who cannot undergo surgery. New England Journal of Medicine. 2010;363(17):1597-1607.
- 9Bedogni F, Latib A, De Marco F, et al. Interplay between mitral regurgitation and transcatheter aortic valve replacement with the CoreValve Revalving System: a multicenter registry. Circulation. 2013;128(19):2145-2153.
- 10Amat-Santos IJ, Castrodeza J, Nombela-Franco L, et al. Tricuspid but not mitral regurgitation determines mortality after TAVI in patients with nonsevere mitral regurgitation. Revista Española de Cardiología (English Edition). 2018;71(5):357-364.
- Freitas-Ferraz AB, Lerakis S, Barbosa Ribeiro H, et al. Mitral regurgitation in low-flow, low-gradient aortic stenosis patients undergoing TAVR: insights from the TOPAS-TAVI registry. Cardiovascular Interventions. 2020;13(5):567-579.

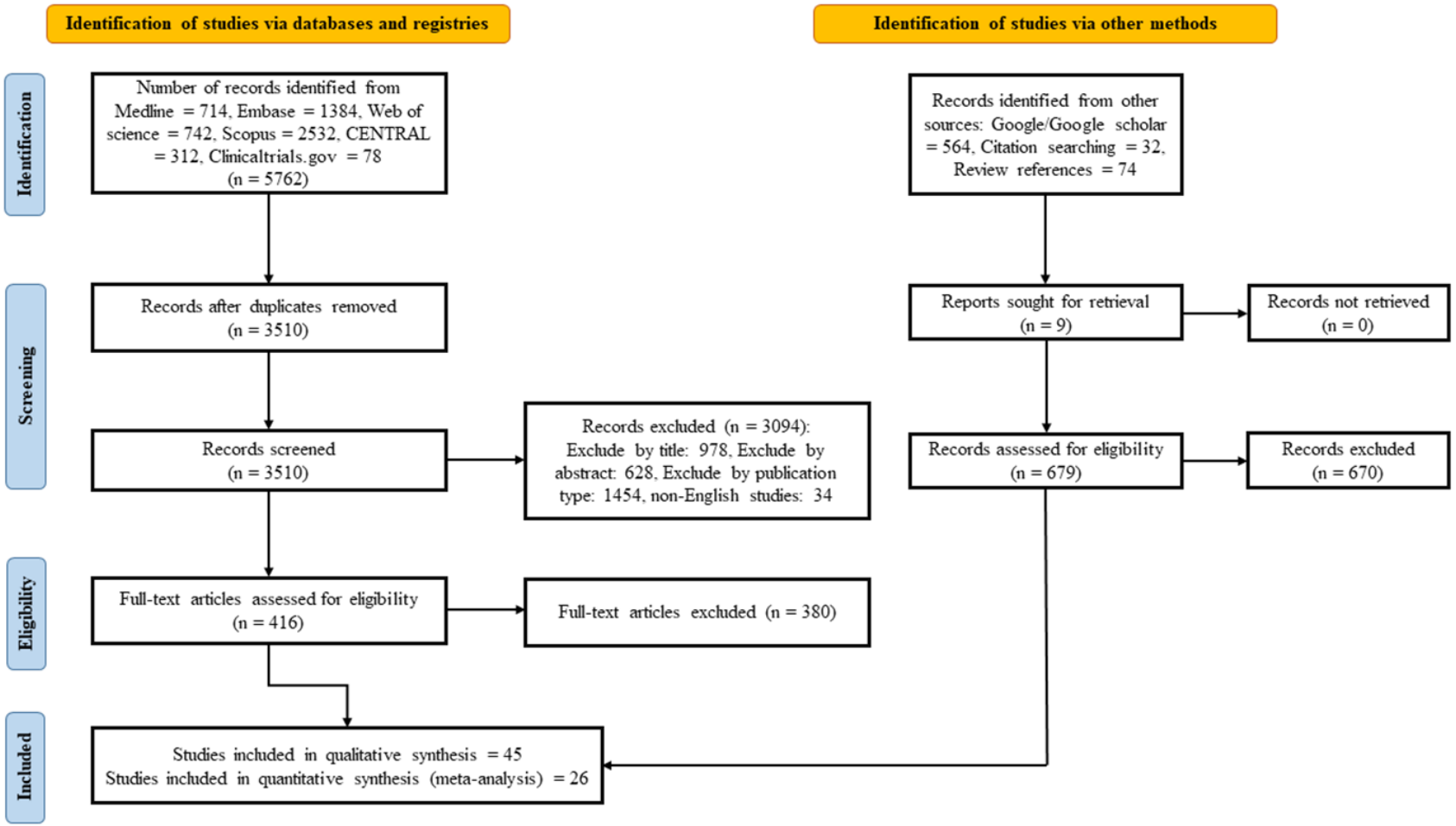
Goal of this study:

- The effects of baseline concomitant mitral regurgitation (MR) on perioperative outcomes remain unclear

- This study evaluated the impact of concomitant MR severity on short-term TAVR outcomes.

Methods:

- A systematic search of six Electronic databases was conducted
- Studies that stratified patients based on MR severity:
  - (MR ≥2 vs. <2 or MR ≥3 vs. <3)
  - And reported perioperative outcomes, including short-term mortality, in-hospital mortality, acute kidney injury (AKI), pacemaker implantation, bleeding, vascular complications, and MR improvement


Identification of studies via databases and registries
Identification of studies via other methods
Identification
Screening
Eligibility
Included
Number of records identified from Medline = 714, Embase = 1384, Web of science = 742, Scopus = 2532, CENTRAL = 312, Clinicaltrials.gov = 78 (n = 5762)
Records identified from other sources: Google/Google scholar = 564, Citation searching = 32, Review references = 74
Records after duplicates removed (n = 3510)
Reports sought for retrieval (n = 9)
Records not retrieved (n = 0)
Records screened (n = 3510)
Records excluded (n = 3094): Exclude by title: 978, Exclude by abstract: 628, Exclude by publication type: 1454, non-English studies: 34
Records assessed for eligibility (n = 679)
Records excluded (n = 670)
Full-text articles assessed for eligibility (n = 416)
Full-text articles excluded (n = 380)
Studies included in qualitative synthesis = 45
Studies included in quantitative synthesis (meta-analysis) = 26

First author	Year	Country	Study design	Sample size	MR grading system	Mean age	Female, %	NOS
Rodés-Cabau et al (15).	2010	Canada	Prospective	339	MR ≥3 vs. <3	81 ± 8	187 (55.2)	5
D'Onofrio et al (3).	2011	Italy	Prospective	176	MR ≥2 vs. <2	80.73 ± 6.7	102 (58.0)	7
Di Mario et al (17).	2012	Italy	Prospective	4571	MR ≥2 vs. <2	81.4 ± 7.1	2280 (49.9)	5
Toggweiler et al (4).	2012	Canada	Prospective	451	MR ≥2 vs. < 2 and ≥3 vs. <3	81.48 ± 8.58	239 (53.0)	7
Barbanti et al (16).	2013	Canada	Prospective	331	MR ≥2 vs. < 2	83.64 ± 6.88	139 (42.0)	7
Bedogni et al (9).	2013	Italy	Prospective	1007	MR ≥2 vs. <2 and ≥3 vs. <3	81.24 ± 5.65	555 (55.1)	7
Haensig et al (19).	2013	Germany	Retrospective	439	MR ≥2 vs. < 2 and ≥3 vs. <3	81.41 ± 6.38	280 (63.8)	6
Hutter et al (18).	2013	Germany	Retrospective	268	MR ≥2 vs. <2	80.9 ± 6.5	167 (62.3)	7
Wiegerinck et al (23).	2014	Netherlands	Retrospective	375	MR ≥2 vs. <2	80 ± 7	225 (60.0)	7
Costantino et al (20).	2015	Italy	Retrospective	165	MR ≥3 vs. <3	80.2 ± 5.6	91 (55.2)	7
O'Sullivan et al (21).	2015	Switzerland	Prospective	113	MR ≥2 vs. <2	82.09 ± 5.04	46 (40.7)	9
Kiramijyan et al (12).	2016	USA	Retrospective	589	MR ≥2 vs. <2	82.85 ± 7.94	308 (52.3)	6
Cortés et al (22).	2016	Spain	Retrospective	1110	MR ≥3 vs. <3	80.48 ± 6.93	645 (58.1)	7
Amat-Santos et al (10).	2017	Spain	Retrospective	813	MR ≥2 vs. <2	80.72 ± 6.85	522 (64.2)	6
Mavromatis et al (24).	2017	Georgia	Retrospective	11104	MR ≥2 vs. < 2 and ≥3 vs. <3	84 (78–88)	5735 (51.7)	7
Vollenbroich et al (25).	2017	Switzerland	Prospective	603	MR ≥2 vs. <2	82.37 ± 5.67	329 (54.6)	7
Kindya et al (26).	2018	Georgia	Retrospective	260	MR ≥2 vs. <2	82.58 ± 6.63	120 (46.2)	7
Malaisrie et al (27).	2018	USA	Prospective	893	MR ≥2 vs. <2	81.69 ± 6.53	429 (48.0)	7

Results:

- Data from 26 studies (32,453 patients)
- Baseline moderate-to-severe MR had a 49% (95% confidence interval (CI): 1.32-1.70) increased risk of short-term mortality
- 41% (95% CI: 1.22-1.63) higher risk of in-hospital mortality than those with none-to-mild MR
- Incidence of AKI was 38% (95% CI: 1.17-1.62) higher in the MR ≥2 group.
- Patients with an MR ≥3 had an even greater 72% (95% CI: 1.37-2.16) increase in short-term mortality

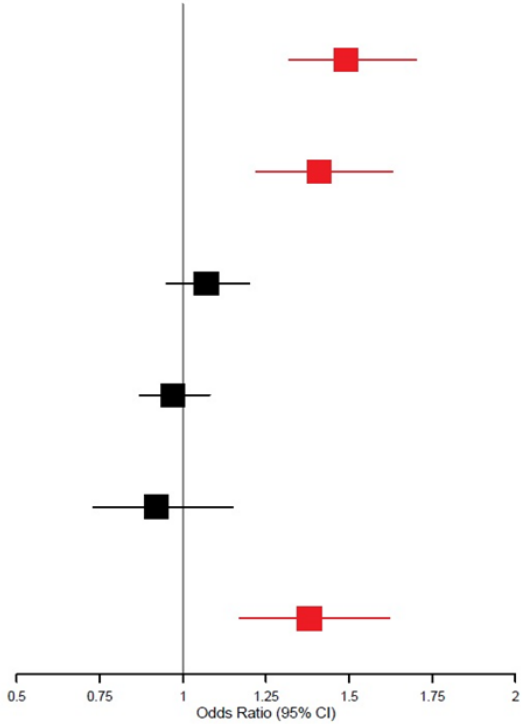
Results:

- No significant differences were observed in pacemaker implantation, bleeding, or vascular complications between groups

- Additionally, after TAVR, MR improved in 36% of patients by at least one grade within one week, increasing to 44% by one month

Peri-operative short term in hospital outcomes:

Outcome	No. of Studies	OR [95% CI]	I^2	Heterogeneity P-value
Short-term Mortality	15	1.49 [1.32, 1.70]	0%	0.750
In-hospital Mortality	7	1.41 [1.22, 1.63]	0%	0.498
Pacemaker Implantation	13	1.07 [0.95, 1.20]	0%	0.992
Bleeding	11	0.97 [0.87, 1.08]	0%	0.494
Vascular Complication	8	0.92 [0.73, 1.15]	0%	0.429
Acute Kidney Injury	6	1.38 [1.17, 1.62]	0%	0.197



Conclusion:

- In TAVR patients, MR ≥2 was associated with significantly higher early mortality and AKI risk
- This underscores the need for a comprehensive perioperative risk assessment
- Future studies should examine the differential impact of functional and degenerative MR