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Prognostic Value of Computed Tomography-Derived Membranous Septum Length in Post-TAVI Conduction Abnormalities: An Updated Systematic Review and Meta- Analysis

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Abstract

This protocol describes an updated systematic review and meta-analysis designed to evaluate the prognostic value of pre-procedural computed tomography (CT)–derived membranous septum length (MSL) for predicting new-onset conduction abnormalities following transcatheter aortic valve implantation or replacement (TAVI/TAVR). The review will synthesize evidence from observational studies using standardized methods for study selection, data extraction, and risk-of-bias assessment.
The expected outcome of this study is to clarify whether MSL measured on pre-procedural CT can reliably identify patients at increased risk of post-procedural conduction disturbances. The findings are anticipated to inform pre-procedural risk stratification, procedural planning, and patient counseling in TAVI/TAVR.

Guidelines

Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guideline

Quality In Prognosis Studies (QUIPS) tool for risk-of-bias assessment in prognostic studies

Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework

Materials

Bibliographic databases:

MEDLINE, Embase, Scopus, Web of Science

Reference management software:

Reference management software for citation storage and duplicate removal (Mendeley)

Study screening software:

Systematic review screening software for title/abstract and full-text screening (Rayyan)

Data extraction tools:

Standardized data extraction forms developed for this review (Microsoft Excel spreadsheets)

Risk of bias assessment tools:

Quality In Prognosis Studies (QUIPS) tool

Statistical analysis software:

Statistical software capable of performing random-effects meta-analysis, heterogeneity assessment, and publication bias analysis (R)

Reporting guidelines:

PRISMA checklist

Background

1 Conduction abnormalities are among the most frequent complications following transcatheter aortic valve implantation/replacement (TAVI/TAVR) and may result in permanent pacemaker implantation, increased morbidity, and adverse clinical outcomes. Pre-procedural identification of patients at higher risk of post-TAVI conduction disturbances remains an important clinical challenge. Computed tomography (CT)–derived membranous septum length (MSL) has recently emerged as a potential anatomic predictor of post-procedural conduction abnormalities; however, existing evidence remains heterogeneous and its prognostic value is not yet fully established.

Objectives

2 **Primary Objective:**

2.1 What is the prognostic value of the CT-derived membranous septum length in post-TAVI/TAVR patients for the prediction of cardiac conduction disorders?

3 **Secondary Objectives:**

3.1
- Assessment of study methodologies:

1. Quantitative synthesis (systematic review and meta-analysis):
2. Assessment of publication bias:
3. Clinical Utility:
4. Future directions and recommendations:

3.2
- Quantitative synthesis (systematic review and meta-analysis):

How can data from eligible studies be quantitatively pooled to estimate the overall prognostic value of MSL in predicting new-onset conduction abnormalities following TAVI/TAVR?

How to explore potential sources of heterogeneity across studies?

3.3
- Assessment of publication bias:

How can potential publication bias among the included studies be identified and evaluated?

3.4
- Clinical Utility:

How clinically applicable is MSL as a pre-procedural predictor of conduction abnormalities after TAVI/TAVR?

What are the potential limitations in implementing MSL measurement as a routine part of pre-TAVI risk assessment?

3.5
- Future directions and recommendations:

What are the current gaps and limitations in the literature regarding the use of MSL as a predictor of post TAVI/TAVR conduction disturbances?

What recommendations can be proposed to guide future research aimed at optimizing the measurement and clinical application of MSL or predicting conduction outcome after TAVI/TAVR?

Methodology

4 **Sources of Data and Search Strategy:**

4.1 The databases to be searched are MEDLINE, Scopus, Embase, and Web of Science. Only English records will be included. After removing duplicate records, abstract and title screening will be carried out by two
investigators independently, and full-text records of possibly eligible manuscripts will be obtained. Then the eligibility of these articles will be assessed, and any disagreement will be resolved using mutual consensus.

5 **Eligibility Criteria:**

5.1 Inclusion:
- Studies that included post-TAVI/TAVR patients who developed cardiac conduction abnormalities.
- Studies in which patients had undergone cardiac CT scan examinations before TAVI/TAVR.
- Studies that evaluated CT-derived MSL as a prognostic tool for cardiac conduction disorders following TAVI/TAVR.

5.2 Exclusion:
- Studies involving animal models, review articles, editorials, or commentaries.
- Studies not employing CT-derived MSL as a prognostic tool.
- Studies employing modalities other than CT scan, including CMR.

- Studies evaluating MSL for predicting outcomes other than post-TAVI/TAVR conduction disturbances, including paravalvular leak.

6 **Data Extraction:**

6.1 Data will be extracted independently by two investigators who will resolve differences by mutual consensus.

6.2 Risk of bias will be assessed using Quality In Prognosis Studies (QUIPS) tool. The certainty of findings will be assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework.

7 **Data Analysis:**

7.1 Main Outcome:

- Occurrence of new conduction disturbances after TAVI/TAVR:

Conduction abnormalities (CAs) should be defined according to the standard definitions of the American Heart Association, the American College of Cardiology Foundation, and the recommendations of the Heart Rhythm Society for the standardization and interpretation of ECGs in the included studies.

For each included study, the reported mean ± SD of MSL in patients with and without CAs will be
extracted and compared. The pooled difference in means will be calculated using weighted or
standardized mean differences (MD or SMD) with 95% confidence intervals (CIs). The effect
estimates, such as odds ratios (ORs), risk ratios (RRs), or hazard ratios (HRs) with corresponding
95% CIs will be extracted or calculated to quantify the association between MSL and conduction
outcomes.

7.2 Strategy for Data Synthesis:

Where studies are sufficiently homogeneous in terms of design, population, and outcome measures, data will be quantitatively combined using a meta-analysis approach. The pooled estimates will be calculated using a random-effects model to account for inter-study variability. If quantitative synthesis is not feasible due to high clinical or methodological heterogeneity, findings will be summarized qualitatively in a

narrative synthesis, structured around study design, population characteristics, imaging technique, and key outcomes.

Publication

8 This manuscript will be submitted as a journal submission.

Protocol references

Sá MP, Van den Eynde J, Jacquemyn X, et al. Computed tomography-derived membranous septum length as predictor of conduction abnormalities and permanent pacemaker implantation after TAVI: A meta-analysis of observational studies. *Catheter Cardiovasc Interv*. 2023;101(7):1203-1213. doi:10.1002/ccd.30666

Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71. Published 2021 Mar 29. doi:10.1136/bmj.n71

Hayden JA, van der Windt DA, Cartwright JL, Côté P, Bombardier C. Assessing bias in studies of prognostic factors. *Ann Intern Med*. 2013;158(4):280-286. doi:10.7326/0003-4819-158-4-201302190-00009

Guyatt GH, Oxman AD, Vist GE, et al. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ*. 2008;336(7650):924-926. doi:10.1136/bmj.39489.470347.AD