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Aortic Valve repair in adults: determinants of surgical techniques and clinical outcome from the AVIATOR registry.

Introduction

Over the past few decades, there has been an increased interest in surgical treatment that preserves the native valve in patients with aortic valve disease. Current guidelines advise physicians to consider aortic valve repair as an alternative to aortic valve replacement in experienced centers, when anatomically possible (1, 2)

A wide variety of valve-sparing surgical techniques remains available to the cardiothoracic surgeon, that can be implemented in adult patients with aortic valve dysfunction (3). Despite the rise in interest in such forms of surgical treatment, the assessment of short- and longterm outcome after aortic valve repair has proved to be complicated, namely due to a lack of standardization in reporting both the surgical techniques used and the clinical outcome measures after surgery. Additionally, analyzing determinants of the use of surgical techniques and differences in clinical outcome between available techniques of surgical aortic valve repair in adults has proved to be difficult.

The Aortic Valve repair InternATiOnal Registry (AVIATOR) initiative has been launched in order to enhance uniform scientific reporting and to update and improve guidelines. Thus providing a comprehensive database of clinical outcome after aortic valve repair surgery, which accommodates to the need for further investigation into determinants of use and differences in outcome between various available techniques.

Aim of study

By using the comprehensive data provided within AVIATOR, we will conduct an analysis in which we will compare and aim to observe possible determinants of application of surgical techniques and in clinical outcome after different forms of surgical aortic valve repair in adult patients.

Methods

Patients will be assigned to groups, depending on the surgical technique that was used for aortic valve repair. A comparison will be made in clinical outcome between these groups. Determinants of the use of surgical techniques will be assessed using propensity scores, taking into account various characteristics (e.g. center size).

Inclusion criteria

Adult patients with aortic valve dysfunction, either primary dysfunction or secondary dysfunction due to aortic root dilation, that have received a form of aortic valve repair.

Exclusion criteria

Any form of aortic dissection

Patients with active infective endocarditis

Primary outcome

Postoperative structural aortic valve dysfunction

Need for reintervention

Secondary outcome

Early and late mortality

Postoperative bleeding

Nonstructural aortic valve dysfunction

Valve related thrombo-embolic events

Endocarditis

Statistical methods

- Continuous variables will be presented as mean ± SD. Categorical variables will be presented as counts and percentages.

- Comparison analyses between groups will be conducted through unpaired t-tests in normally distributed continuous variables and through Mann-Whitney-U tests in continuous variables with a skewed distribution.
- Comparison analyses between groups will be conducted through chi-squared tests.
- Effect size of variables on primary outcome will be analyzed through univariable and multivariable analysis using the Cox proportional hazards model for time-varying variables.
- Actuarial survival will be analyzed and portrayed through Kaplan-Meier survival curves.

Variables needed

- Center size
- Age
- Sex
- Body mass index
- Preoperative NYHA class
- Hemodynamics: aortic stenosis or insufficiency, mitral regurgitation or other non-aortic valve disease
- Aortic valve morphology
- Disease etiology
- Previous cardiac intervention
- Left ventricular ejection fraction
- Left ventricular end-diastolic diameter
- Left ventricular end-systolic diameter
- Ascending aorta diameter
- Aortic root diameter
- Aortic annulus diameter
- Sinus Valsalva diameter
- Sinotubular junction diameter
- Grade of aortic regurgitation
- Transvalvular peak pressure (mmHg)
- Procedure
    - Applied surgical technique for valve repair (e.g. cusp shaving, raphe resection etc.)
    - Application of aortic root surgery
    - Aortic arch surgery
        - Hemi-arch replacement
        - Total arch replacement
- Concomitant procedures
    - Mitral valve repair
    - Mitral valve replacement
    - Other valve repair or replacement
    - Coronary artery bypass grafting
    - Other

Early and late outcome

- Mortality
- Reintervention
  - Aortic valve
  - Aortic root
  - Non-aortic-valve-related cardiac
  - Reexploration for bleeding
- Structural valve deterioration
  - Reintervention
- Non-structural valve dysfunction
  - Reintervention
- Endocarditis
  - Reintervention
- Thromboembolism
  - Reintervention
- Valve thrombosis
  - Reintervention
- Cerebrovascular accident (CVA) (stroke and transient ischemic attack)
  - Thromboembolic
  - Hemorrhagic
- Stroke
  - Thromboembolic
  - Hemorrhagic
- Transient ischemic attack (TIA)
  - Thromboembolic
  - Hemorrhagic
- Postoperative aortic regurgitation grade as per protocol
- Postoperative transvalvular peak pressure (mmHg)
- Postoperative left ventricular ejection fraction
- Postoperative left ventricular end-diastolic diameter
- Postoperative left ventricular end-systolic diameter

Time schedule

Analyses will take place within 3 months after receiving of the data

Writing of the article will take place within 3 months after analyses

References

1. Baumgartner H, Falk V, Bax JJ, De Bonis M, Hamm C, Holm PJ, et al. 2017 ESC/EACTS Guidelines for the management of valvular heart disease. Eur Heart J. 2017;38(36):2739-91.

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3. Boodhwani M, de Kerchove L, Glineur D, Poncelet A, Rubay J, Astarci P, et al. Repair-oriented classification of aortic insufficiency: impact on surgical techniques and clinical outcomes. J Thorac Cardiovasc Surg. 2009;137(2):286-94.