

## Isolated tricuspid valve regurgitation

Citation for published version (APA):

Sala, A. (2023). Isolated tricuspid valve regurgitation: assessment, timing and surgical treatment. [Doctoral Thesis, Maastricht University]. Maastricht University. https://doi.org/10.26481/dis.20230606as

Document status and date: Published: 01/01/2023

DOI: 10.26481/dis.20230606as

**Document Version:** Publisher's PDF, also known as Version of record

### Please check the document version of this publication:

 A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.

• The final author version and the galley proof are versions of the publication after peer review.

 The final published version features the final layout of the paper including the volume, issue and page numbers.

Link to publication

#### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these riahts.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
  You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

### Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

# Chapter 13

## SUMMARY

## 262| Summary

**Chapter 2.** In this retrospective study, the applicability of a novel classification of patients with tricuspid regurgitation based on 5 stages and the in-hospital outcomes following isolated tricuspid valve surgery were investigated. Patients in earlier stages of the disease (Stage 2) more frequently received tricuspid valve repair. Hospital mortality was 5.8%, in particular 0% in Stages 2-3 and 15.3% in Stages 4-5. Both intensive care unit and hospital lengths-of-stay were longer in more advanced stages (p<0.001). Furthermore, patients in stages 4-5 developed more postoperative complications, such as acute kidney injury (3.7-10% in Stages 2-3 vs 44-100% in Stages 4-5) and low cardiac output syndrome (15-50% in Stages 2-3 vs 71-100% in Stages 4-5).

**Chapter 3.** This study aimed at defining the profile of patients with a complicated versus a non-complicated postoperative course following isolated tricuspid valve surgery. Patients with a negative postoperative course had worse baseline clinical and echocardiographic characteristics. At univariate analysis, chronic kidney disease, ascites, previous right heart failure hospitalizations, right ventricular dysfunction, previous cardiac surgeries, tricuspid valve replacement and higher MELD scores were identified as predictors of negative outcome. At multivariate analysis, liver enzymes and diuretics' dose were predictors of complicated postoperative course.

## 264| Summary

**Chapter 4.** We reviewed the literature regarding isolated tricuspid regurgitation. Management of patients with severe isolated TR remains controversial and stand-alone surgery is rarely performed. Isolated TR is present in different clinical scenarios, and in all cases, if left untreated, is a strong predictor of prognosis. In fact, this pathology has a poor natural history due to the negative effects of TR on right ventricular function and as a consequence end-organ function. Analysing the available therapeutic options, it appears evident that surgery remains the only definitive treatment, whenever the surgical risk is acceptable. Therefore, awareness is necessary in order to obtain optimal timing for surgical referral and improve outcome for these patients.

**Chapter 5.** In this study, the mid-term outcomes of patients previously studied according to the 5 Stages classification undergoing isolated tricuspid valve surgery were investigated. At 5 years, overall survival was 100% in Stage 2, 88% in Stage 3 and 60% in Stages 4-5. Furthermore, cumulative incidence function of re-hospitalization for right heart failure was 0% for Stage 2 and 20% for Stages 3, 4 and 5. Therefore, both short and mid-term outcomes support early referral for surgery in isolated tricuspid regurgitation, with excellent survival at 5 years and no further hospitalizations for right heart failure.

**Chapter 6.** This study aimed at assessing a subgroup of patients affected by tricuspid regurgitation due to the presence of an intracardiac lead. Long-term results of the surgical treatment of tricuspid regurgitation in this setting are not extensively studied. More than 60% of patients were diagnosed with cardiac implantable electronic device (CIED)-induced tricuspid regurgitation, while the remining 32% with CIED-related tricuspid regurgitation. Tricuspid valve repair was still possible in 63% of patients, with good long-term results and no durability difference between CIED-induced and CIED-associated cases.

**Chapter 7.** A commentary was written in response to a retrospective single-centre study published in the European Journal of Cardio-Thoracic Surgery, assessing clinical outcome of patients undergoing isolated tricuspid valve surgery. The study reported good outcomes but had excluded from their cohort all patients with severe right or left heart failure, severe pulmonary hypertension, end-stage renal disease and liver disease. Once again, this underlines the importance of early referral and timely treatment to obtain good surgical results.

**Chapter 8.** Another commentary was published to accompany a multi-centre, retrospective study regarding short and longterm outcomes of patients undergoing isolated tricuspid valve surgery submitted to the European Journal of Cardio-Thoracic Surgery. This commentary wants to highlight how the

## 266| Summary

widespread idea that <u>all</u> patients affected by isolated tricuspid regurgitation and at high risk for surgery can be effectively treated with transcatheter options is not truthful. In fact, just as for surgery, also in the case of transcatheter treatment optimal timing and adequate patient selection are crucial for outcome.

**Chapter 9.** We reviewed the literature regarding transcatheter and surgical treatment of tricuspid regurgitation in order to identify all factors capable of predicting right ventricular decompensation or favourable responders. The most relevant predictors of outcome for both treatment strategies are symptomatology (NYHA functional class and medical therapy), end-organ involvement (hepatic congestion and renal dysfunction), and right ventricular function (TAPSE and tissue doppler imaging). In transcatheter treatment studies, right ventricular function has been particularly analysed. Right ventricle-pulmonary artery (RV-PA) coupling has been found to be a powerful predictor of outcome, assessing whether RV function is correctly compensated for specific loading conditions. As a result, right heart catheterization should be considered as part of the preoperative workup of patients.

**Chapter 10.** In this study, we performed a retrospective review of our surgical experience in isolated tricuspid valve surgery based on a novel dedicated risk score, the TRI-SCORE. The aim of the study was to validate the ability of the TRI-SCORE in predicting in-hospital mortality and long-term follow-up outcomes following isolated tricuspid valve surgery. in our experience, the risk score showed high discrimination and high accuracy regarding both in-hospital outcomes and also longterm mortality. A cut-off value for increased risk of isolated TV surgery was 5.