

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](https://doi.org/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 rights.

- 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 12

IMPACT

Tricuspid regurgitation (TR) is a common echocardiographic finding that is present in 70-90% of the general population. While a trivial form is often seen in healthy individuals, with structurally normal valves and no clinical impact, moderate or severe TR is associated to excess cardiac morbidity and mortality¹. The incidence of moderate-severe TR is higher in women and increases with advancing age, with an age-adjusted prevalence of 0.55%. Approximately 4% of subjects aged 75 years or more have clinically relevant TR². Epidemiological studies suggest that moderate or severe TR affects approximately 1.6 million individuals in the United States²⁻⁴. Furthermore, amongst patients with heart failure and reduced ejection fraction, the prevalence of moderate-severe TR is 26% and independently affects prognosis^{5,6}.

Even though surgery is the only definitive treatment for severe TR, it is rarely performed. The majority of tricuspid valve operations are performed concomitantly to left-sided valve surgeries, while only approximately 14% are performed in isolation⁷⁻⁹.

The main objective of the thesis was to analyse patients undergoing isolated tricuspid valve surgery, either repair or replacement, and identify predictors of outcome, as well as provide further proof that early tricuspid valve surgery is feasible, with a low associated risk and good outcomes.

The surgical impact is the common thread throughout the thesis, which mainly deals with the challenges in isolated TR.

The main challenges in the field of isolated TR are surgical timing and patient selection. The great reluctance in performing isolated TV surgery is a consequence of the reported high in-hospital mortality rates and poor clinical short and long-term outcomes. Older studies have in fact reported an in-hospital mortality ranging from 8 to 37%, associated to 55% mortality at 5 years^{7,10}. However, the baseline clinical presentation of such patients and the stage of disease may have negatively impacted on the outcome¹¹. In our research we addressed this issue and analysed outcomes of patients treated in early stages of disease, therefore patients referred to treatment with adequate timing, versus patients treated in late stages due to lengthy medical management. Both in-hospital and mid-term results were assessed and results strongly support the current train of thought of early referral and surgical correction. We demonstrated that patients treated before the occurrence of overt symptomatology, RV dilation or dysfunction, and without end-organ involvement, experienced no in-hospital mortality and fewer postoperative complications. Furthermore, at follow-up, survival was approximately 100% with no further hospitalizations for right heart failure.

Regarding adequate patient selection, we decided to provide external validation of a risk score recently made available, specific for isolated TV surgery. The TRI-SCORE, based on our

experience, will allow risk stratification of every single patient and as a consequence appropriate patient selection for surgical treatment. It will be interesting to assess its validity in patients candidates for transcatheter interventions, in order to choose between every treatment option.

Finally, another rarely investigated aspect of TR is valve incompetence due- or related-to the presence of intracardiac leads. In our experience, tolerating moderate or severe TR in these settings is not a favourable attitude for the patient. A more aggressive surgical approach should be kept since valve repair is still feasible in more than two-thirds of patients, with no durability difference between lead-induced and lead-associated TR.

All these considerations taken together may contribute to a clearer indication to management and treatment of patients with isolated tricuspid regurgitation. All the explored topics will need further data, from multicentric and prospective studies, in order to further build and expand the knowledge and practice of isolated tricuspid valve surgery. all the studies collected in this thesis were initial stepping stones for this long research journey.

References

- [1] Nath J, Foster E, Heidenreich PA. Impact of Tricuspid Regurgitation on Long-Term Survival. *J Am Coll Cardiol* 2004; 43: 405–409.
- [2] Topilsky Y, Maltais S, Medina Inojosa J, et al. Burden of Tricuspid Regurgitation in Patients Diagnosed in the Community Setting. *JACC Cardiovasc Imaging* 2019; 12: 433–442.
- [3] Topilsky Y, Nkomo VT, Vatury O, et al. Clinical outcome of isolated tricuspid regurgitation. *JACC Cardiovasc Imaging* 2014; 7: 1185–1194.
- [4] Enriquez-Sarano M, Messika-Zeitoun D, Topilsky Y, et al. Tricuspid regurgitation is a public health crisis. *Prog Cardiovasc Dis* 2019; 62: 447–451.
- [5] Neuhold S, Huelsmann M, Pernicka E, et al. Impact of tricuspid regurgitation on survival in patients with chronic heart failure: unexpected findings of a long-term observational study. *Eur Heart J* 2013; 34: 844–852.
- [6] Benfari G, Antoine C, Miller WL, et al. Excess Mortality Associated With Functional Tricuspid Regurgitation Complicating Heart Failure With Reduced Ejection Fraction. *Circulation* 2019; 140: 196–206.
- [7] Zack CJ, Fender EA, Chandrashekar P, et al. National Trends and Outcomes in Isolated Tricuspid Valve Surgery. *J Am Coll Cardiol* 2017; 70: 2953–2960.
- [8] Alqahtani F, Berzingi CO, Aljohani S, et al. Contemporary Trends in the Use and Outcomes of Surgical Treatment of Tricuspid Regurgitation. *J Am Heart Assoc*; 6. Epub ahead of print 2017. DOI: 10.1161/JAHA.117.007597.
- [9] Kilic A, Saha-Chaudhuri P, Rankin JS, et al. Trends and outcomes of tricuspid valve surgery in north america: An analysis of more than 50,000 patients from the society of thoracic surgeons database. *Ann Thorac Surg* 2013; 96: 1546–1552.
- [10] Vassileva CM, Shabosky J, Boley T, et al. Tricuspid valve surgery: The past 10 years from the Nationwide Inpatient Sample (NIS) database. *J Thorac Cardiovasc Surg* 2012; 143: 1043–1049.
- [11] Latib A, Grigioni F, Hahn RT. Tricuspid regurgitation: What

is the real clinical impact and how often should it be treated? *EuroIntervention* 2018; 14: AB101–AB111.