Imaging to select patients for Transcatheter TV

Jeroen J Bax
Dept of Cardiology
Leiden Univ Medical Center
The Netherlands
San Diego, February 2018

Research grants: Medtronic, Biotronik, Boston Scientific, Edwards Lifescience

Tricuspid Regurgitation

• TV remains as the “forgotten valve”
• Referral for isolated surgical TV repair unfrequent
• Moderate to severe TR affects 1.6 million US patients
• Only 8,000 patients/year undergo TV surgery
• Prognostic implications
Tricuspid valve

Tricuspid Anatomy

Close are: AV node, CS, RCA

Taramasso et al. EHJ 2015
What is important?

- Cause of TR:
  - Organic
  - Functional
- TR grade: quantification
- Tricuspid annulus dimensions / geometry
- RV dimensions and function

Tricuspid Regurgitation

- 90% is functional TR
- TR due to RV dilatation – in the presence of LV dysfunction
- 3 stages of disease progression
Development of TR

RV dilation
TA dilation

More RV dilation
Lack of TV coapt

TV tethering
TR; pulm HT

Taramasso et al. EHJ 2015

Functional Tricuspid Regurgitation: Prognostic Implications

5,223 patients
98% functional TR

1-year survival:
- Mild TR: 90.3%
- Moderate TR: 78.9%
- Severe TR: 63.9%

Nath et al. J Am Coll Cardiol 2004
Tricuspid Regurgitation: Prognostic Implications

TR after left-sided VHD surgery
539 patients
69±12 years old
65% prior AVR
19% prior MV surgery

Kammerlander et al. J Am Coll Cardiol 2014

Tricuspid Regurgitation: Prognostic Implications

239 patients
60±14 years old
20% pacemakers
80% ICD
CRT excluded

Hoke et al. Heart 2014
What is important?

- Cause of TR:
  - Organic
  - Functional
- TR grade: quantification
- Tricuspid annulus dimensions / geometry
- RV dimensions and function

TR grade: quantification

VC width 0.8cm

Dense CW

Systolic reversal hepatic flow

Lancellotti et al. Eur Heart Cardiovasc Imag 2013
What is important?

- Cause of TR:
  - Organic
  - Functional

- TR grade: quantification

- Tricuspid annulus dimensions / geometry

- RV dimensions and function

Tricuspid annular dimensions

>70 mm surgical measurement

>40 mm 4ch-view TTE

Tricuspid annular dimensions

N = 138 patients

Dreyfus et al. Circ Cardiovasc Imag 2015

Van Rosendael et al. EHJ Imaging 2016
TR: TV geometry

Coaptation height
>4 mm $\rightarrow$ significant leaflet tethering
>8 mm $\rightarrow$ increased risk of TVA failure


What is important?

• Cause of TR:
  – Organic
  – Functional

• TR grade: quantification

• Tricuspid annulus dimensions / geometry

• RV dimensions and function
RV dimensions and function

Van Rosendael et al. EHJ Imaging 2016

New therapies: Transcatheter Tricuspid Valve Procedures

Heterotopic implantation of caval valves
Direct annuloplasty
Filling the coaptation gap
TV replacement

F. Maisano EuroPCR 2015
New therapies: Transcatheter Tricuspid Valve Procedures

Heterotopic implantation of caval valves
Transcath prosthesis in VCI and/or VCS

Advanced RV dysfunction
only 1 prosthesis – to avoid RV failure

F. Maisano  EuroPCR 2015

Assessment of IVC: max – min diameter perimeter and area

Van Rosendael et al. Eurointervention 2015
New therapies: Transcatheter Tricuspid Valve Procedures
Forma concept

Spacer positioned in TV orifice
Distally anchored – RV apex
Improve leaflet coaptation

Filling the coaptation gap

F. Maisano EuroPCR 2015

Assessment of distance TV annulus to RV apex

Long-axis 4-chamber view
Measure distance from TV annulus to RV apex

Filling the coaptation gap

Van Rosendael et al. Eurointervention 2015
New therapies: Transcatheter Tricuspid Valve Procedures
TriCinch device

Corkscrew implanted in target zone

System is tensioned to reshape the TV annulus (TV annuloplasty)

Stent displayed in IVC to keep tension

TriCinch concept
Course of RCA vs TV annulus

Van Rosendael et al. Eurointervention 2015

Assessment of distance RCA to TV annulus

Van Rosendael et al. Eurointervention 2015