

20.10.2022

Bicavales Klappensystem zur Behandlung der Trikuspidalklappeninsuffizienz



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Tricuspid Regurgitation is Frequent but Rarely Treated

1.6M

Moderate to severe TR prevalence

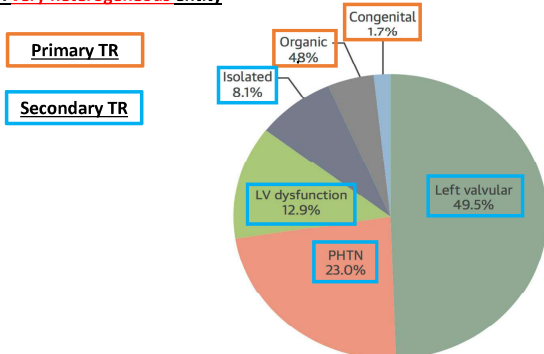


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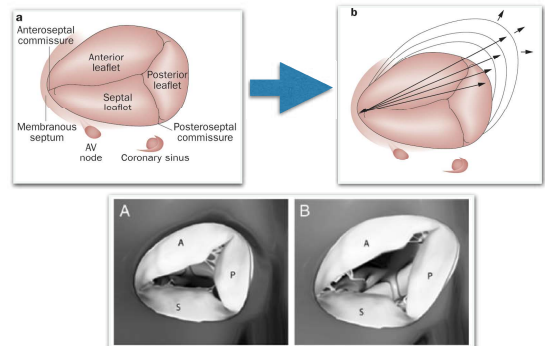
Surgical procedures annually

Numbers reflective of US data
Stage D, Liodicep J. Journal of Thoracic and Cardiovascular Surgery. 2006;132:1254-61.
McCarthy PM, Sales VL. Current Treatment Options in Cardiovascular Medicine. 2010;12:587-597.

A very heterogeneous entity



Anatomie der Trikuspidalklappe



Shinn, S. H. & Schaff, H. V. (2013) Evidence-based surgical management of acquired tricuspid valve disease
Nat. Rev. Cardiol. doi:10.1038/nrcardio.2013.5

The need for a new tricuspid regurgitation grading scheme

Rebecca T. Hahn¹ and Jose L. Zamorano^{2*}

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Table 1 Proposed expansion of the 'Severe' grade

Variable	Mild	Moderate	Severe	Massive	Torrential
VC (biplane)	<3 mm	3-6.9 mm	7-13 mm	14-20 mm	≥21 mm
EROA (PISA)	<20mm ²	20-39 mm ²	40-59 mm ²	60-79 mm ²	>80 mm ²
3D VCA or quantitative EROA*			75-94 mm ²	95-114 mm ²	≥115 mm ²

VC, vena contracta; EROA, effective regurgitant orifice area; 3D VCA, three-dimensional vena contracta area.

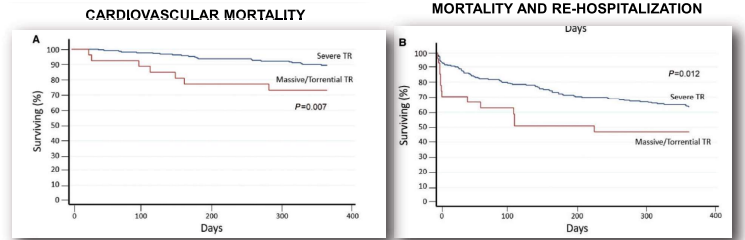
*3D VCA and quantitative EROA

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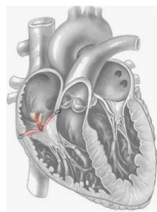
European Heart Journal - Cardiovascular Imaging (2017) 18, 1342-1343
doi:10.1093/ehjci/ehx139

Mid-term outcome of severe tricuspid regurgitation: are there any differences according to mechanism and severity?

Cristó Santoro^{1,2}, Alberto Muñoz del Castilho^{1,2}, Ariadna González-Gómez^{1,2}, Juan Manuel Montecagudo^{1,2}, Rocío Hinojar^{1,2}, Álvaro Lorenzo^{1,2}, María Abellán^{1,2}, Jose María Vieitez^{1,2}, Ana García Martín^{1,2}, Eduardo Casas Rojo^{1,2}, Soledad Ruiz^{1,2}, Vivencio Barrios^{1,2}, Jose Luis Moya^{1,2}, Jose Julio Jimenez-Nacher^{1,2}, Jose Luis Zamorano Gomez^{1,2}, and Covadonga Fernández-Gollín^{1,2}



Santoro C et al. European Heart Journal - Cardiovascular Imaging (2019) 0, 1-8



RV-Dilatation mit Dilatation des Trikuspidalklappenrings



„Tethering“ der Trikuspidalklappensegel, zunehmende RV-Dilatation und pulmonale Hypertonie

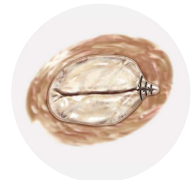
Koaptationsverlust der Trikuspidalklappensegel durch zunehmende RV-Dilatation

Surgical Repair Techniques

TRICUSPID ANNULOPLASTY¹

THE CLOVER TECHNIQUE¹

KAY REPAIR TECHNIQUE¹

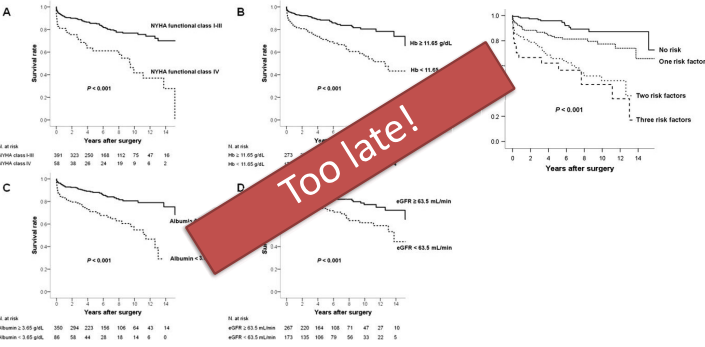


THE MOST COMMON TYPE OF SURGICAL REPAIR IS TRICUSPID VALVE ANNULOPLASTY DUE TO THE LONG TERM EFFICACY IN PREVENTING TR RECURRENCE.²

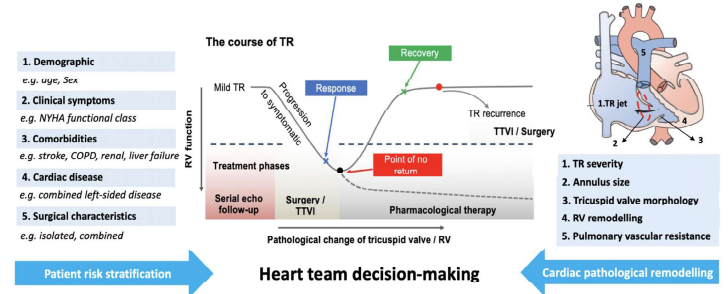
TRICUSPID VALVE REPLACEMENT IS DONE IN ABOUT 10% OF SURGICAL CASES.

¹ Rogers et al. *The tricuspid valve*. *Circulation* 2009;119:2718-25

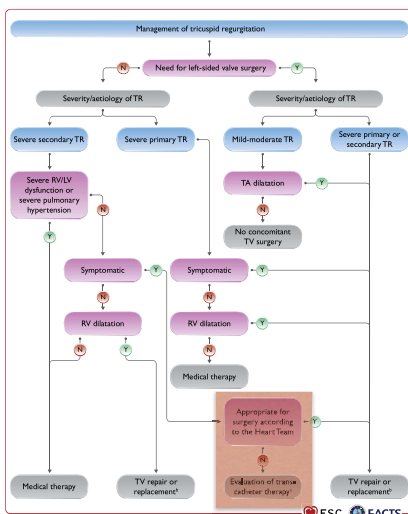
² Kilic et al. *Trends and Outcomes of Tricuspid Valve Surgery in North America: An Analysis of More Than 50,000 Patients From The Society of Thoracic Surgeons Database*. *Ann Thorac Surg* 2015;96:1546-1551



Kim JB, et al. *Heart* 2013;99:181-187



Chang CC, EurHJ 2020



2021 ESC/EACTS Guidelines for the management of valvular heart disease
 European Heart Journal (2021) 00, 1-72

Transcatheter treatment of symptomatic secondary severe tricuspid regurgitation may be considered in inoperable patients at a Heart Valve Centre with expertise in the treatment of tricuspid valve disease.^f

IIb C

Transcatheter treatment can be performed according to Heart Team at experienced valve centres in anatomically eligible patients in whom improvement of quality of life or survival can be expected.

Importantly, in the absence of advanced RV dysfunction or severe pulmonary hypertension, none of the above-mentioned therapies should delay referral for surgery or transcatheter therapy.

2021 ESC/EACTS Guidelines for the management of valvular heart disease
 European Heart Journal (2021) 00, 1-72

MELD-Score

MELD Score calculator

Dialysis \geq 2 times in past week: No

Creatinine: 1 mg/dL

Bilirubin: 1.1 mg/dL

INR: 1.5

Sodium: 137 mmol/L

MELD Score

MELD score (\geq 2016): 11

MELD score (pre-2016): 11

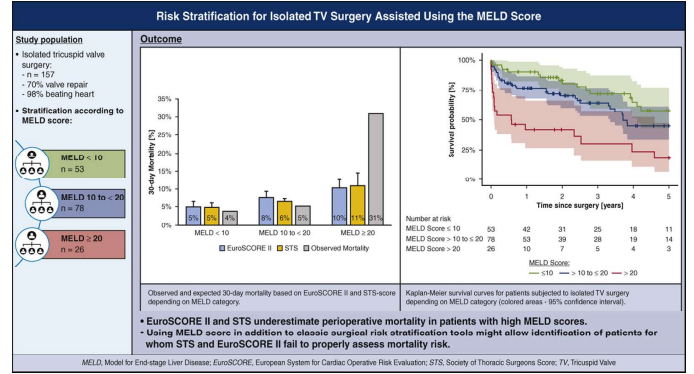
3 month mortality risk: 6%

1 2 3 4 5 6 7
8 9 0 BCK CLR

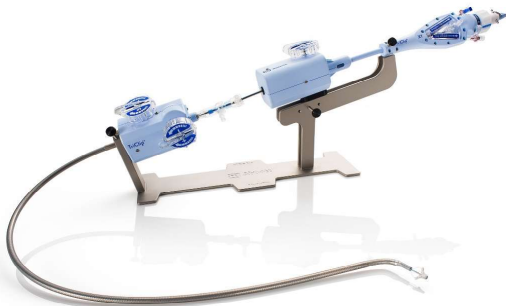
Model of end-stage liver disease

$$10 \times (0,957 \times \ln(\text{Serumkreatinin [mg/dl]})) + 0,378 \times \ln(\text{Bilirubin ges. [mg/dl]}) + 1,12 \times \ln(\text{INR}) + 0,643$$

Operation der isolierten TV

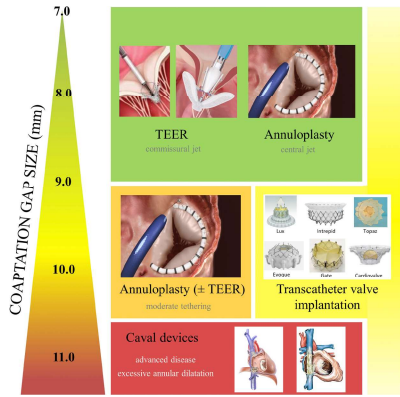


Färber, G. et al., JThorCardiovascSurg 2022



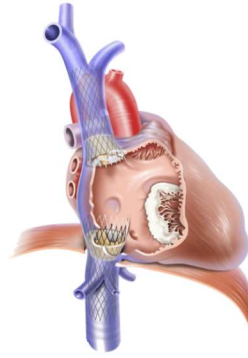
...wenn die T-TEER nicht mehr geht...

- Koaptationsdefekte
- Dünne Segel
- Kurze Segel
- Verkalkung der Segel
- Verkalkung des Anulus
- Massive Ringdilatation
- Segel oft getethered
- Ursprung der TI zwischen Posterior und Anterior
- Chordaejungle
- Aszites
- Blutungen im Magenbereich/ gastrointestinaler Stau und -vulnerabel Magenschleimhaut
- Schrittmacherinduzierte TI
- Valvula eustachii / Cor triatriatum
- Sehr abhängig von guter Visualisierung mittels TEE

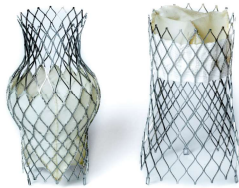


Praz, F., Bern

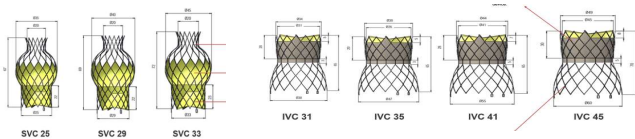
...wenn die T-TEER nicht mehr geht...



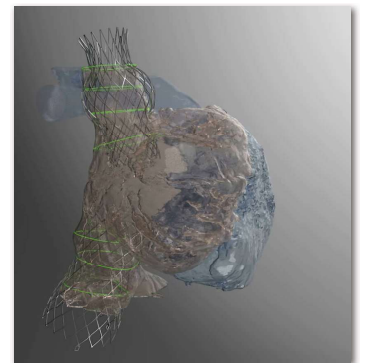
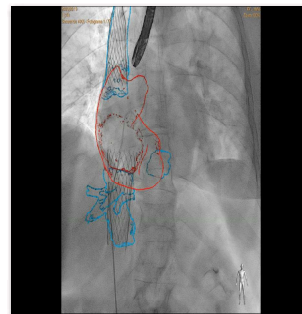
TricValve®, Fa. Products & Features®



TRICVALVE® MODEL	VALVE SIZE	PROXIMAL DIAMETER	DISTAL DIAMETER	MAXIMAL DIAMETER	LENGTH AFTER DEPLOYMENT
SVC 25	25	25	20	35	66
SVC 29	29	29	20	40	69
IVC 31	31	34	38	38	65
IVC 35	35	38	47	47	65



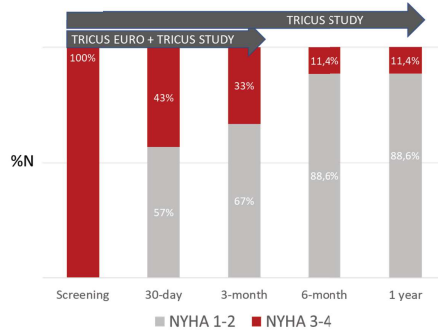
Größen IVC 41, IVC 45 und SVC 33 aktuell nicht CE-Zertifiziert



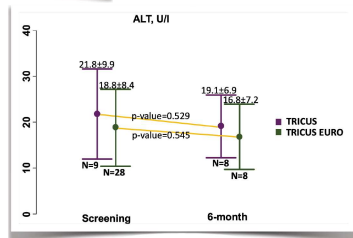
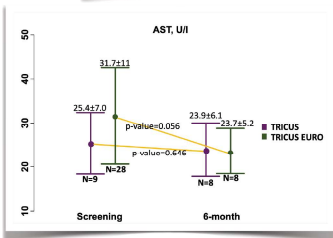
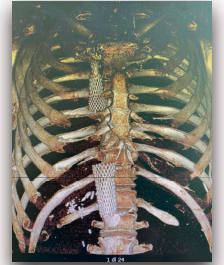
Variables	TRICUS N=9 (%)	TRICUSEuro N=35 (%)
In-Hospital mortality	0	0
Stroke/TIA	0	0
Number of valves implanted	17	70
Procedural success	8 (89)	33 (94)
Device embolization/migration	1 (11)*	1 (3)^
Conversion to surgery	1 (11)*	0 (0)
Cardiac tamponade	0 (0)	0 (0)
Access site bleeding	0 (0)	3 (9)
Non-access site bleeding	0 (0)	0 (0)
New pacemaker implantation	0 (0)	1 (3)^
Length of hospital stay (days)	9 ± 3	9 ± 8

*Immediate embolization + Surgery

^Embolization at 24h + Conservative management



NYHA	Baseline	30-day	3-month
NYHA I-II	0 (0%)	15 (50%)	19 (61.3%)
NYHA III	29 (82.9%)	15 (50%)	12 (38.7%)
NYHA IV	6 (17.1%)	0 (0%)	0 (0%)
p-value*		0.005	0.005



Was sollten Sie mitnehmen

- Die Trikuspidalklappeninsuffizienz ist eine maligne Erkrankung ohne medikamentöse Therapieoptionen
- Die Trikuspidalklappeninsuffizienz wird in 5 Grade eingeteilt
- Die Symptomatik der TI ist oft diskret, Dyspnoe tritt erst im späten Stadium auf
- Die Operation hat im späten Stadium eine sehr hohes Risiko, die T-TEER ist eine sehr gute Alternative mit niedrigem Risiko
- Bei fehlender Möglichkeit zur T-TEER ist der heterotope Trikuspidalklappenersatz (TricValve®) eine gute Alternative
- Langzeitdaten für alle Interventionen an der Trikuspidalklappe fehlen
- Seien Sie nicht zu spät!

Raffi Bekeredjian
Christian Wunder
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Lisa Kettler
Betül Eker
Yaren Acar
Dominik Bierbaum
Ragi Nagib



Vielen Dank