Mitraclipin TR

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Background

The MitraClip system may be useful for tricuspid valve repair provided steering of the MitraClip can be achieved when accessing the tricuspid valve despite the anatomical differences.

Problems adapting the MitraClip to the right sided anatomy:

1. Increased anatomic variability compared to mitral valve
2. Short distance of inferior caval vein to tricuspid coaptation line
3. Orifice of VCI close to the atrial septum
4. Need for a perpendicular orientation of the CDS to the tricuspid valve plane for optimal symmetric grasping of leaflets
5. Limited options to navigate the clip delivery system
MitraClip standard orientation

Guide rotation alone will not solve the problem
MitraClip standard orientation

Guide rotation alone will not solve the problem
Direct Approach with Guiding Catheter

Problems of direct guiding catheter approach:
1) Distance to tricuspid valve plane often too short
2) no perpendicular orientation to tricuspid valve plane
Modified Munich Approach

Desired orientation of guide & CDS:
1) 180° turn of guiding catheter
2) “Anti-M” Movement of CDS
Modified Munich Approach

360° “A” = “Anti-M”

How to achieve this desired clip orientation:
1) 90° counterclockwise insertion of CDS in guiding catheter, then
2) 180° turn of inserted guide (±/- knob faces downwards), then
3) 360° turn of A-Knob will deflect CDS to the tricuspid plane
Atypical transthoracic View: Perpendicular Approach to TK-Valve

- RV
- Anterior Leaflet
- Septal Leaflet
- A - Curve of CDS
- Tip of Guiding Catheter
- RA VCI
Steering of MitraClip system in Standard Orientation: Blue line on Blue line

CDS movement: a → p → m

Atrial septal plane

Blue line on Blue line

TK-Valve Plane
Steering of MitraClip system with Modified Munich Approach: CDS Blue line 90° CCW

CDS movement:
P → m → a

Atrial septal plane

TK-Valve Plane

Blue line 90° CCW
Atypical transthoracic View: Perpendicular Approach to TK-Valve
## Patients Characteristics

<table>
<thead>
<tr>
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<th>18 patients</th>
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<tbody>
<tr>
<td>Age, yrs</td>
<td>78 ± 7</td>
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<tr>
<td>EuroScore II (%)</td>
<td>10 ± 8</td>
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<tr>
<td>NYHA class III/IV, n (%)</td>
<td>12/6 (67/33)</td>
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<tr>
<td>Isolated TR, n (%)</td>
<td>6 (33)</td>
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<tr>
<td>Combined MR &amp; TR, n (%)</td>
<td>12 (67)</td>
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<tr>
<td>Renal impairment, n (%)</td>
<td>17 (94)</td>
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<tr>
<td>Right-ventricular PM/ICD leads, n (%)</td>
<td>2 (11)</td>
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<tr>
<td>LV EF (biplane, %)</td>
<td>43 ± 4</td>
</tr>
<tr>
<td>RV EF (area change, %)</td>
<td>38 ± 12</td>
</tr>
<tr>
<td>TAPSE (mm)</td>
<td>16 ± 3</td>
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<tr>
<td>RV/RA (mmHg)</td>
<td>37 ± 12</td>
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## Results

- Placement of 41 tricuspid clips (2.3 ±0.7 / pt)
- Successful procedure with TR reduction by at least 1° in 100%

<table>
<thead>
<tr>
<th></th>
<th>In-hospital</th>
<th>30-day FU</th>
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<tbody>
<tr>
<td>Death</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MI</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Stroke</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Bleeding</td>
<td>0</td>
<td>0</td>
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<td>Unplanned Op</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Repeat interv.</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
84 y old male patient
- NYHA III – IVa with recent cardiac decompensation
- Secondary MR 3+
- Secondary TR 3+
- Stroke 2016
- Atrial fibrillation
- Reduced kidney function
- Obstructive pulmonary disease
Transcatheter Treatment of Severe Tricuspid Regurgitation With the Edge-to-Edge MitraClip Technique Clinical Perspective

by Georg Nickenig, Marek Kowalski, Jörg Hausleiter, Daniel Braun, Joachim Schofer, Ermela Yzeiraj, Volker Rudolph, Kai Friedrichs, Francesco Maisano, Maurizio Taramasso, Neil Fam, Giovanni Bianchi, Francesco Bedogni, Paolo Denti, Ottavio Alfieri, Azeem Latib, Antonio Colombo, Christoph Hammerstingl, and Robert Schueler

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Study flow chart.

77 Patients with symptomatic TR

- 10 had unfavorable anatomy
- 3 refused treatment

64 patients underwent tricuspid clipping

- Isolated tricuspid procedure: 42 patients
  - 3 patients died
- Concomitant mitral procedure: 22 patients

Follow up discharge to 30 days

Edge-to-edge repair of tricuspid regurgitation (TR).
Illustration of the steering maneuvers using a transfemoral access.
Example of echocardiographic determination of tricuspid regurgitation and right ventricular parameters.

Stapled columns diagram of tricuspid regurgitation grades at baseline and before discharge.

Boxplot diagrams of changes in tricuspid regurgitation defining echocardiographic parameters.

Stapled columns diagram of New York Heart Association (NYHA) functional class at baseline and before discharge.

Transcatheter repair of the tricuspid valve using the edge-to-edge repair technique is feasible, safe and associated with a good short-term durability.

Furthermore, the successful interventional reduction of TR appears to be associated with a favorable short-term outcome in patients with isolated tricuspid repair or combined mitral and tricuspid repair.