Optimising Care for the Transcatheter Mitral Valve Replacement Patient

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Disclosures

Affiliation
• Proctor/Speaker
• Screening committee
• Proctor/Speaker
• Proctor/Speaker/Advisory Board

Company
• Medtronic
• APOLLO trial
• Abbott Vascular
• Boston Scientific
Why?

• TMVR patients:
  – In a chronically decompensated state
  – Can be temporarily worsened by TMVR
  – Require time to adapt after TMVR
We have to “unlearn” some of our TAVR habits for the care of these patients.
TAVR in the Modern Era
Right heart catheterization is mandatory:

- Can be challenging to identify true volume status

- Cardiac output often lower (than you think)
Watch out!

- Significant right heart failure
- Pulmonary hypertension (PA ≥ ⅔ Systemic)
- Inotropes to maintain cardiac index ≥ 2.0 L/min/M²
Don’t let your guard down.

• Repeat right heart catheterization should be mandatory close to procedure because some patients:
  – “Look good” on screening, but this can change within weeks.
CENTRAL ILLUSTRATION: The Concept of Pressure-Guided Heart Failure Therapy

## Optimization before procedure

<table>
<thead>
<tr>
<th>Measure</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary Capillary Wedge Pressure</td>
<td>≤ 18-20 mmHg</td>
</tr>
<tr>
<td>Pulmonary artery pressure</td>
<td>&lt; (\frac{2}{3}) Systemic</td>
</tr>
<tr>
<td>Cardiac Index</td>
<td>≥ 2.0 ml/min/M(^2)</td>
</tr>
<tr>
<td>Pulmonary artery saturation</td>
<td>≥ 60%</td>
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</tbody>
</table>
But you are trying too hard if…

- You have to flog the heart with > moderate inotrope (e.g. milrinone 0.375 ug/kg/min). Steer away from this patient.

- Remember, any inotropes pre-procedure will be increased intra-procedure.
Intraprocedural cautions
Intraprocedural cautions

TMVR CASE HEMODYNAMICS

- Systolic arterial pressure
- PA pressure
Intraprocedural cautions

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- Systolic arterial pressure
- PA pressure

CASE START  TRANSAPICAL
Intraprocedural cautions

**TMVR CASE HEMODYNAMICS**

- **Systolic arterial pressure**
- **PA pressure**

**Timeline:**
- **CASE START**
- **TRANSAPICAL**
- **"I WILL TAKE CARE OF PRESSURE"**

**Notes:**
- "I WILL TAKE CARE OF PRESSURE"
- "I JUST GAVE LEVO - I WILL GIVE MORE"
- "NO! GIVE EPI!"
- "OK WE ARE BETTER"
Intraprocedural cautions

TMVR CASE HEMODYNAMICS

- Systolic arterial pressure
- PA pressure

CASE START
TRANSAPICAL
"I WILL TAKE CARE OF PRESSURE"
"I JUST GAVE LEVO- I WILL GIVE MORE"
Intraprocedural cautions

**TMVR CASE HEMODYNAMICS**

- Red: Systolic arterial pressure
- Blue: PA pressure

**CASE START**
- **TRANSAPICAL**
- "I WILL TAKE CARE OF PRESSURE"
- "I JUST GAVE LEVO- I WILL GIVE MORE"
- "NO! GIVE EPI!"
Intraprocedural cautions

### TMVR Case Hemodynamics

- **Systolic arterial pressure**
- **PA pressure**

<table>
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<tr>
<th>Stage</th>
<th>Systolic arterial pressure</th>
<th>PA pressure</th>
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<tr>
<td>Case Start</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transapical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;I will take care of pressure&quot;</td>
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Why did this happen?

• Most anesthesiologists think of pressures drops as vasodilation.

• They respond with vasoconstrictors (i.e. neosyneprine, norepinephrine).
Why did this happen?

- Pressure drops during TMVR usually secondary to transiently worsening left ventricular function.

- Vasoconstrictors worsen the hemodynamic (death) spiral.
Post-operative course

• Everything is fine now right?
“Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.”

WINSTON CHURCHILL

@LifehackQuotes
Post-operative course

• Unlike TAVR patients, TMVR patients at higher risk for post-operative low output state.

• Swan-ganz monitoring to 24 hours helpful to detect low output state and need for milrinone.
Post-operative course

• Low threshold for continuing milrinone (even discharging on milrinone and weaning as outpatient).

• Be very careful with beta-blockers (avoid death by beta-blocker).
Post-operative course

• These patients can have subtle signs of progressive low output state (minor increases in BUN/creatinine).

• Have a low threshold for right heart catheterization to re-assess hemodynamics.
SUMMARY

• Pre-operative hemodynamic assessment for patient selection and optimisation critical.

• Knowing when to say “No”.

• Patients high risk for low cardiac output- better to think of them as advanced heart failure patients instead of “valve” patients.
Thank You

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