2017 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease

Developed in Collaboration with the American Association for Thoracic Surgery, American Society of Echocardiography, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Thoracic Surgeons

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Nishimura, RA et al.
2014 AHA/ACC Valvular Heart Disease Guideline

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A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American Association for Thoracic Surgery, American Society of Echocardiography, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Thoracic Surgeons

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General Concepts
A Multiple randomized trials or meta-analysis

B Single randomized trial or non-randomized studies

C Consensus, case reports, standard of care
Class I Benefit >>> risk / Should be

Class IIa Benefit >> risk/ Reasonable

Class IIb Benefit ≥ risk/ Could be

Class C No benefit / harm
Table 1. Applying Class of Recommendation and Level of Evidence to Clinical Strategies, Interventions, Treatments, or Diagnostic Testing in Patient Care* (Updated August 2015) (Used in the 2017 VHD Focused Update)

<table>
<thead>
<tr>
<th>CLASS (STRENGTH) OF RECOMMENDATION</th>
<th>LEVEL (QUALITY) OF EVIDENCE‡</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CLASS I (STRONG)</strong> Benefit &gt;&gt;&gt; Risk</td>
<td><strong>LEVEL A</strong></td>
</tr>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>Is recommended</td>
<td>High-quality evidence‡ from more than 1 RCT</td>
</tr>
<tr>
<td>Is indicated/useful/effective/beneficial</td>
<td>Meta-analyses of high-quality RCTs</td>
</tr>
<tr>
<td>Should be performed/administered/other</td>
<td>One or more RCTs corroborated by high-quality registry studies</td>
</tr>
<tr>
<td>Comparative-Effectiveness Phrases‡:</td>
<td></td>
</tr>
<tr>
<td>Treatment/strategy A is recommended/indicated in preference to treatment B</td>
<td></td>
</tr>
<tr>
<td>Treatment A should be chosen over treatment B</td>
<td></td>
</tr>
</tbody>
</table>

**CLASS IIa (MODERATE)** Benefit >> Risk

Suggested phrases for writing recommendations:
- Is reasonable
- Can be useful/effective/beneficial
- Comparative-Effectiveness Phrases‡:
  - Treatment/strategy A is probably recommended/indicated in preference to treatment B
  - It is reasonable to choose treatment A over treatment B

**CLASS IIb (WEAK)** Benefit ≥ Risk

Suggested phrases for writing recommendations:
- May/might be reasonable
- May/might be considered
- Usefulness/effectiveness is unknown/unclear/uncertain or not well established

**CLASS III: No Benefit (MODERATE)** Benefit = Risk (Generally, LOE A or B use only)

Suggested phrases for writing recommendations:
- Is not recommended
- Is not indicated/useful/effective/beneficial
- Should not be performed/administered/other

**CLASS III: Harm (STRONG)** Risk > Benefit

Suggested phrases for writing recommendations:
- Potentially harmful
- Causes harm
- Associated with excess morbidity/mortality
- Should not be performed/administered/other

**LEVEL B-R** (Randomized)

**LEVEL B-NR** (Nonrandomized)

**LEVEL C-LD** (Limited Data)

**LEVEL C-EO** (Expert Opinion)

Consensus of expert opinion based on clinical experience

COR and LOE are determined independently (any COR may be paired with any LOE).
A recommendation with LOE C does not imply that the recommendation is weak. Many important clinical questions addressed in guidelines do not lend themselves to clinical trials. Although RCTs are unavailable, there may be a very clear clinical consensus that a particular test or therapy is useful or effective.

* The outcome or result of the intervention should be specified (an improved clinical outcome or increased diagnostic accuracy or incremental prognostic information).
† For comparative-effectiveness recommendations (COR I and IIa; LOE A and B only), studies that support the use of comparator verbs should involve direct comparisons of the treatments or strategies being evaluated.
‡ The method of assessing quality is evolving, including the application of standardized, widely used, and preferably validated evidence grading tools; and for systematic reviews, the incorporation of an Evidence Review Committee.

COR indicates Class of Recommendation; EO, expert opinion; LD, limited data; LOE, Level of Evidence; NR, nonrandomized; R, randomized; and RCT, randomized controlled trial.
## Anticoagulation for Atrial Fibrillation in Patients With VHD (New Section)

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New:</strong> Anticoagulation with a VKA is indicated for patients with rheumatic mitral stenosis and AF</td>
<td>I</td>
<td>B-NR</td>
</tr>
<tr>
<td><strong>New:</strong> Anticoagulation is indicated in patients with AF and a CHA$_2$DS$_2$-VASc score of 2 or greater with native aortic valve disease, tricuspid valve disease, or MR</td>
<td>I</td>
<td>C-LD</td>
</tr>
<tr>
<td><strong>New:</strong> It is reasonable to use a DOAC as an alternative to a VKA in patients with AF and native aortic valve disease, tricuspid valve disease, or MR and a CHA$_2$DS$_2$-VASc score of 2 or greater</td>
<td>Ila</td>
<td>C-LD</td>
</tr>
</tbody>
</table>
## Aortic Stenosis: Choice of Intervention (cont.)

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modified:</strong> <strong>TAVR is recommended for symptomatic severe AS</strong> (Stage D) and a prohibitive risk for surgical AVR who have a predicted post-TAVR survival greater than 12 months</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td><strong>New:</strong> <strong>TAVR</strong> is a reasonable alternative to surgical AVR for symptomatic severe AS (Stage D) and an intermediate surgical risk, depending on patient-specific procedural risks, values, and preferences</td>
<td>Ila</td>
<td>B-R</td>
</tr>
</tbody>
</table>
Choice of TAVR Versus Surgical AVR in the Patient With Severe Symptomatic AS (Modified)

Severe AS Symptomatic (stage D)

- Low surgical risk
  - Surgical AVR (Class I)
- Intermediate surgical risk
  - Surgical AVR (Class I)
- High surgical risk
  - TAVR (Class IIa)
- Prohibitive surgical risk
  - Surgical AVR or TAVR (Class I)

Class I
- Class IIa
- Class IIb
So, what is the evidence??

New: It is reasonable to use a DOAC as an alternative to a VKA in patients with AF and native aortic valve disease, tricuspid valve disease, or MR and a CHA$_2$DS$_2$-VASc score of 2 or greater

Ila  C-LD
Non-Vitamin K Antagonist Oral Anticoagulants in Patients With Atrial Fibrillation and Valvular Heart Disease

Meta-analysis

**CENTRAL ILLUSTRATION** SSEE and Major Bleeding in Patients Without and With VHD, Treated With Higher-Dose NOACs or Warfarin

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Stroke/SEE</th>
<th>Risk Ratio</th>
<th>Major Bleeding</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>IV, Random, 95% CI</td>
<td></td>
<td>IV, Random, 95% CI</td>
</tr>
<tr>
<td><strong>NO VHD</strong></td>
<td></td>
<td>RR (95% CI)</td>
<td>NO VHD</td>
<td>RR (95% CI)</td>
</tr>
<tr>
<td>ARISTOTLE</td>
<td></td>
<td>0.84 (0.75-0.95)</td>
<td>ARISTOTLE</td>
<td>0.85 (0.70-1.02)</td>
</tr>
<tr>
<td>ENGAGE AF-TIMI 48 (Higher Dose)</td>
<td></td>
<td></td>
<td>ENGAGE AF-TIMI 48 (Higher Dose)</td>
<td></td>
</tr>
<tr>
<td>RE-LY (Higher Dose)</td>
<td></td>
<td></td>
<td>RE-LY (Higher Dose)</td>
<td></td>
</tr>
<tr>
<td>ROCKET AF</td>
<td></td>
<td></td>
<td>ROCKET AF</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td>RR=0.81 (0.73-0.89)</td>
<td></td>
<td><strong>Total (95% CI)</strong></td>
<td>RR=0.88 (0.75-1.02)</td>
</tr>
<tr>
<td><strong>VHD</strong></td>
<td></td>
<td>RR (95% CI)</td>
<td>NO VHD</td>
<td>RR (95% CI)</td>
</tr>
<tr>
<td>ARISTOTLE</td>
<td></td>
<td>0.70 (0.58-0.86)</td>
<td>ARISTOTLE</td>
<td>0.93 (0.68-1.27)</td>
</tr>
<tr>
<td>ENGAGE AF-TIMI 48 (Higher Dose)</td>
<td></td>
<td></td>
<td>ENGAGE AF-TIMI 48 (Higher Dose)</td>
<td></td>
</tr>
<tr>
<td>RE-LY (Higher Dose)</td>
<td></td>
<td></td>
<td>RE-LY (Higher Dose)</td>
<td></td>
</tr>
<tr>
<td>ROCKET AF</td>
<td></td>
<td></td>
<td>ROCKET AF</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal RR (95% CI)</strong></td>
<td>0.70 (0.58-0.86)</td>
<td></td>
<td><strong>Subtotal RR (95% CI)</strong></td>
<td>0.93 (0.68-1.27)</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td>RR=0.81 (0.73-0.89)</td>
<td></td>
<td><strong>Total (95% CI)</strong></td>
<td>RR=0.88 (0.75-1.02)</td>
</tr>
</tbody>
</table>

Edoxaban for the Prevention of Thromboembolism in Patients With Atrial Fibrillation and Bioprosthetic Valves  

Pre-specified subgroup analysis of ENGAGE TIMI 48
191 patients with prior mitral or aortic bioprosthetic valve

---

**A**  Stroke or Systemic Embolic Event

- HDER vs Warfarin: HR 0.37 (95% CI 0.10-1.42); p=0.15
- LDER vs Warfarin: HR 0.53 (95% CI 0.16-1.78); p=0.31

**B**  Major Bleeding

- HDER vs Warfarin: HR 0.50 (95% CI 0.15-1.67); p=0.26
- LDER vs Warfarin: HR 0.12 (95% CI 0.01-0.95); p=0.045

**C**  Primary Net Clinical Outcome

- HDER vs Warfarin: HR 0.46 (95% CI 0.23-0.91); p=0.03
- LDER vs Warfarin: HR 0.43 (95% CI 0.21-0.88); p=0.02

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No. at risk

- Warfarin: 70 68 61 58 56 39 19
- HDER: 63 61 59 58 57 36 20
- LDER: 58 55 54 53 49 39 24

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Helping Cardiovascular Professionals
European Definition of NVAF

AF that occurs in the absence of mechanical prosthetic heart valves and in the absence of moderate to severe mitral stenosis (MS, usually of rheumatic origin)

Updated EHRA practical guide Europace (2015) 17, 1467
US Definition of NVAF

AF in the absence of rheumatic MS, a mechanical or bioprosthetic heart valve, or mitral valve repair

2014 AHA/ACC/HRS Guideline Circulation. 2014;130:e199
So, what is the evidence??

| New: **TAVR** is a reasonable alternative to surgical AVR for symptomatic severe AS (Stage D) and an intermediate surgical risk, depending on patient-specific procedural risks, values, and preferences | Ila | B-R |
Table 1. Characteristics of the Patients at Baseline.*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>TAVR (N=1011)</th>
<th>Surgery (N=1021)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age — yr</td>
<td>81.5±6.7</td>
<td>81.7±6.7</td>
</tr>
<tr>
<td>Male sex — no. (%)</td>
<td>548 (54.2%)</td>
<td>560 (54.8%)</td>
</tr>
<tr>
<td>Body-mass index†</td>
<td>28.6±6.2</td>
<td>28.3±6.2</td>
</tr>
<tr>
<td>STS risk score‡</td>
<td>5.8±2.1</td>
<td>5.8±1.9</td>
</tr>
<tr>
<td>NYHA class III or IV — no./total no. (%)</td>
<td>782/1011 (77.3)</td>
<td>776/1020 (76.1)</td>
</tr>
<tr>
<td>Coronary artery disease — no. (%)</td>
<td>700 (69.2%)</td>
<td>679 (66.5%)</td>
</tr>
<tr>
<td>Previous myocardial infarction — no. (%)</td>
<td>185 (18.3%)</td>
<td>179 (17.5%)</td>
</tr>
<tr>
<td>Previous CABG — no. (%)</td>
<td>239 (23.6%)</td>
<td>261 (25.6%)</td>
</tr>
<tr>
<td>Previous PCI — no. (%)</td>
<td>274 (27.1%)</td>
<td>282 (27.6%)</td>
</tr>
<tr>
<td>Previous balloon aortic valvuloplasty — no. (%)</td>
<td>51 (5.0%)</td>
<td>50 (4.9%)</td>
</tr>
<tr>
<td>Cerebral vascular disease — no. (%)</td>
<td>325 (32.1%)</td>
<td>317 (31.0%)</td>
</tr>
<tr>
<td>Peripheral vascular disease — no. (%)</td>
<td>282 (27.9%)</td>
<td>336 (32.9%)</td>
</tr>
<tr>
<td>Diabetes mellitus — no. (%)</td>
<td>381 (37.7%)</td>
<td>349 (34.2%)</td>
</tr>
<tr>
<td>COPD — no. (%)</td>
<td>321 (31.8%)</td>
<td>306 (30.0%)</td>
</tr>
<tr>
<td>Oxygen-dependent</td>
<td>34 (3.4%)</td>
<td>32 (3.1%)</td>
</tr>
<tr>
<td>Creatinine &gt;2 mg/dl — no. (%)</td>
<td>51 (5.0%)</td>
<td>53 (5.2%)</td>
</tr>
<tr>
<td>Atrial fibrillation — no. (%)</td>
<td>313 (31.0%)</td>
<td>359 (35.2%)</td>
</tr>
<tr>
<td>Permanent pacemaker — no. (%)</td>
<td>118 (11.7%)</td>
<td>123 (12.0%)</td>
</tr>
<tr>
<td>Frail condition — no./total no. (%)</td>
<td>416/936 (44.4)</td>
<td>418/901 (46.4)</td>
</tr>
<tr>
<td>5-Meter walk-test time &gt;7 sec</td>
<td>150/988 (15.2)</td>
<td>140/951 (14.7)</td>
</tr>
<tr>
<td>Serum albumin &lt;3.5 g/dl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liver disease — no. (%)</td>
<td>19 (1.9%)</td>
<td>26 (2.5%)</td>
</tr>
<tr>
<td>Aortic-valve area — cm²</td>
<td>0.7±0.2</td>
<td>0.7±0.2</td>
</tr>
<tr>
<td>Mean gradient — mm Hg</td>
<td>44.9±13.4</td>
<td>44.6±12.5</td>
</tr>
<tr>
<td>Left ventricular ejection fraction — %</td>
<td>56.2±10.8</td>
<td>55.3±11.9</td>
</tr>
<tr>
<td>Left ventricular mass index — g/m²</td>
<td>119.8±31.5</td>
<td>120.6±32.6</td>
</tr>
<tr>
<td>Moderate or severe mitral regurgitation — no./total no. (%)</td>
<td>151/899 (16.8)</td>
<td>171/894 (19.1)</td>
</tr>
</tbody>
</table>
Table 2. Clinical End Points at 30 Days, 1 Year, and 2 Years.*

<table>
<thead>
<tr>
<th>End Point</th>
<th>At 30 Days</th>
<th>At 1 Year</th>
<th>At 2 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TAVR (N=1011)</td>
<td>Surgery (N=1021)</td>
<td>P Value</td>
</tr>
<tr>
<td>Death from any cause or disabling stroke</td>
<td>62 (6.1)</td>
<td>80 (8.0)</td>
<td>0.11</td>
</tr>
<tr>
<td>Death: From any cause</td>
<td>39 (3.9)</td>
<td>41 (4.1)</td>
<td>0.78</td>
</tr>
<tr>
<td>From cardiac causes</td>
<td>33 (3.3)</td>
<td>32 (3.2)</td>
<td>0.92</td>
</tr>
<tr>
<td>Not from cardiac causes</td>
<td>6 (0.6)</td>
<td>9 (0.9)</td>
<td>0.41</td>
</tr>
<tr>
<td>Neurologic event</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any event</td>
<td>64 (6.4)</td>
<td>65 (6.5)</td>
<td>0.94</td>
</tr>
<tr>
<td>Transient ischemic attack</td>
<td>9 (0.9)</td>
<td>4 (0.4)</td>
<td>0.17</td>
</tr>
<tr>
<td>Any stroke</td>
<td>55 (5.5)</td>
<td>61 (6.1)</td>
<td>0.57</td>
</tr>
<tr>
<td>Disabling stroke</td>
<td>32 (3.2)</td>
<td>43 (4.3)</td>
<td>0.20</td>
</tr>
<tr>
<td>Nondisabling stroke</td>
<td>23 (2.3)</td>
<td>18 (1.8)</td>
<td>0.43</td>
</tr>
<tr>
<td>Major vascular complication</td>
<td>80 (7.9)</td>
<td>51 (5.0)</td>
<td>0.008</td>
</tr>
<tr>
<td>Life-threatening or disabling bleeding</td>
<td>105 (10.4)</td>
<td>442 (43.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Acute kidney injury</td>
<td>13 (1.3)</td>
<td>31 (3.1)</td>
<td>0.006</td>
</tr>
<tr>
<td>New atrial fibrillation</td>
<td>91 (9.1)</td>
<td>265 (26.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>New permanent pacemaker</td>
<td>85 (8.5)</td>
<td>68 (6.9)</td>
<td>0.17</td>
</tr>
<tr>
<td>Endocarditis</td>
<td>0</td>
<td>0</td>
<td>—</td>
</tr>
<tr>
<td>Aortic-valve reintervention</td>
<td>4 (0.4)</td>
<td>0</td>
<td>0.05</td>
</tr>
<tr>
<td>Coronary obstruction</td>
<td>4 (0.4)</td>
<td>6 (0.6)</td>
<td>0.53</td>
</tr>
</tbody>
</table>
Transcatheter or Surgical Aortic-Valve Replacement in Intermediate-Risk Patients


4% withdrawal after surgical randomization

TF TAVR superior to surgery?

C & D were pre-specified but not powered for analysis...
CONCLUSIONS

In intermediate-risk patients, TAVR was similar to surgical aortic-valve replacement with respect to the primary end point of death or disabling stroke. (Funded by Edwards Life-sciences; PARTNER 2 ClinicalTrials.gov number, NCT01314313.)
New: TAVR is a reasonable alternative to surgical AVR for symptomatic severe AS (Stage D) and an intermediate surgical risk, depending on patient-specific procedural risks, values, and preferences.

| IIa | B-R |
**Antithrombotic Therapy for Prosthetic Valves (cont.)**

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New:</strong> A lower target INR of 1.5 to 2.0 may be reasonable in patients with mechanical On-X AVR and no thromboembolic risk factors</td>
<td>IIb</td>
<td>B-R</td>
</tr>
<tr>
<td><strong>New:</strong> Anticoagulation with a VKA to achieve an INR of 2.5 may be reasonable for at least 3 months after TAVR in patients at low risk of bleeding</td>
<td>IIb</td>
<td>B-NR</td>
</tr>
<tr>
<td>Clopidogrel 75 mg daily may be reasonable for the first 6 months after TAVR in addition to life-long aspirin 75 mg to 100 mg daily</td>
<td>IIb</td>
<td>C</td>
</tr>
<tr>
<td>Anticoagulant therapy with oral direct thrombin inhibitors or anti-Xa agents should not be used in patients with mechanical valve prostheses</td>
<td>III: Harm</td>
<td>B</td>
</tr>
</tbody>
</table>

*Helping Cardiovascular Professionals
Learn. Advance. Heal.*
# Prosthetic Valve Stenosis: Intervention

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeat valve replacement is indicated for severe symptomatic prosthetic valve stenosis</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td><strong>New:</strong> In patients with suspected or confirmed bioprosthetic valve thrombosis who are hemodynamically stable and have no contraindications to anticoagulation, initial treatment with a VKA is reasonable</td>
<td>IIa</td>
<td>C-LD</td>
</tr>
<tr>
<td><strong>New:</strong> For severely symptomatic patients with bioprosthetic aortic valve stenosis judged by the heart team to be at high or prohibitive risk of reoperation, and in whom improvement in hemodynamics is anticipated, a transcatheter valve-in-valve procedure is reasonable</td>
<td>IIa</td>
<td>B-NR</td>
</tr>
</tbody>
</table>
35 yo girl

- Congenital tricuspid dysplasia, severe TR
- S/P tricuspid bioprosthesis & mitral annuloplasty 2010
- Endocarditis MSSA 2010 post-surgery
- S/P re-do tricuspid & mitral bioprotheses 2010

- **Something happened 2012**
- **Something happened last week 2017**
35 yo girl

- Congenital tricuspid dysplasia, severe TR
- S/P tricuspid bioprosthesis & mitral annuloplasty 2010
- Endocarditis MSSA 2010 post-surgery
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- **Something happened 2012**
- **Something happened last week 2017**
Bioprosthetic Valve Thrombosis
Does It Exist?
Patient A

Gradient 40 mmHg (baseline 12 mmHg)

3 mo

Patient B

Gradient 42 mmHg (baseline 15 mmHg)

2 years
Patient A

Normal LV size
EF 70%

Patient B

Normal LV size
EF 70-75%
Differential diagnosis of increased bioprosthetic gradient

- Early prosthetic valve degeneration
- Pannus ingrowth
- Pressure recovery
- Unrecognized regurgitation
- Patient-prosthesis mismatch
- High cardiac output
- *Prosthetic valve thrombosis*
Patient A

Normal LV size
EF 70%

Patient B

Normal LV size
EF 70-75%

Bioprosthetic Valve Thrombosis
Patient A

Patient B

Gradients on VKA

1 mo: 32 mmHg
3 mo: 24 mmHg
1 year: 14 mmHg
Bioprosthetic Valve Thrombosis Versus Structural Failure
Clinical and Echocardiographic Predictors

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ABSTRACT

BACKGROUND Bioprosthetic valve thrombosis (BPVT) is considered uncommon; this may be related to the fact that it is often unrecognized. Recent data suggest that BPVT responds to vitamin K antagonists, emphasizing the need for reliable diagnosis.

OBJECTIVES This study sought to determine the diagnostic features of BPVT and to formulate a diagnostic model for BPVT.
BPVT: Mayo Surgical Experience

• All bioprosthetic re-operations 1994-2014

• 46 BPVT (11.6% of all reoperations)
Bioprosthetic Degeneration

Free of failure (%)

Log-rank p < 0.001

Degeneration

Thrombosis

Bioprosthetic Thrombosis

Time (years)
Misconceptions in BPVT
BPVT is not easy diagnosis

• TTE

The eyes will not see what the mind does not know

– Retrospective (blinded) look: thrombus seen in majority of mitral / tricuspid bioprostheses
– Challenging imaging for aortic BPV
Proposed Echo Criteria

1. Increased gradient > 50% over baseline within first 5 years post-implant
2. Thickened, non-calcified leaflets
3. Restricted leaflet mobility

All 3 parameters: 72% sensitivity, 90% specificity for BPVT
BPVT

Degeneration
Bioprosthetic Valve Thrombosis
Guideline Therapy

• ACC/ AHA, ESC guidelines
  – no specific therapy for BPVT
  – recommendations for “prosthetic thrombosis”
• ACC/AHA 2014
  – Left-sided, hemodynamic instability: favor surgery
  – Right-sided, small thrombi (<0.8 cm2): favor lytics
• ESC 2012
  – “optimal AC” if small thrombus
This is all retrospective…..

• January 2014: Shared BPVT results with Cardiology and Cardiac Surgery

• Prospective registry of suspected BPVT
  – Direct communication with physician with expertise in BPVT diagnosis / management
  – TEE / CT recommended, but at discretion of primary cardiologist
  – Trial of warfarin unless hemodynamically unstable
Outcomes of Warfarin Therapy for Bioprosthetic Valve Thrombosis of Surgically Implanted Valves

A Prospective Study

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ABSTRACT

OBJECTIVES The aim of this study was to assess the efficacy of warfarin in the treatment of bioprosthetic valve thrombosis (BPVT) of surgically implanted valves.

BACKGROUND There are limited data about treatment outcomes for BPVT.
Prospective Registry

• January 2014 – May 2016
• 55 cases suspected BPVT
  – 43 responders (gradient decrease >50%)
  – 9 non-responders
  – 3 lost to f/u
• Echo: 48 (92%) with adequate data
  – 3 criteria: response to VKA 38/39
  – 2 echo criteria: response to VKA 4/9

Egbe, Pislaru et al. JACC Interventions 2017.
Prospective Registry

• BPVT is more common than previously reported

• Echo criteria: excellent prediction of response to VKA

• Suggest yearly echo within first 3 years post-implantation

Egbe, Pislaru et al. JACC Interventions 2017.
# Prosthetic Valve Stenosis: Intervention

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
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<tr>
<td>Repeat valve replacement is indicated for severe symptomatic prosthetic valve stenosis</td>
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<td>C</td>
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<tr>
<td><strong>New:</strong> In patients with suspected or confirmed bioprosthetic valve thrombosis who are hemodynamically stable and have no contraindications to anticoagulation, initial treatment with a VKA is reasonable</td>
<td>Ila</td>
<td>C-LD</td>
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<td><strong>New:</strong> For severely symptomatic patients with bioprosthetic aortic valve stenosis judged by the heart team to be at high or prohibitive risk of reoperation, and in whom improvement in hemodynamics is anticipated, a transcatheter valve-in-valve procedure is reasonable</td>
<td>Ila</td>
<td>B-NR</td>
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2017 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease

Developed in Collaboration with the American Association for Thoracic Surgery, American Society of Echocardiography, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Thoracic Surgeons

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Helping Cardiovascular Professionals Learn. Advance. Heal.