Diseases of The Aorta 2017 - 2018
Understanding & Approach

TAA, TAD, AAA, AAR

ACC New York, Dec 9, 2017 - No Disclosures
1). **Classification of Thoracic Aortic Dissection**

(6 people per 100,000 per year)

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**DeBakey**

- **Type I**: Originates in the ascending aorta, propagates at least to the aortic arch and often beyond it distally
- **Type II**: Originates in and is confined to the ascending aorta
- **Type III**: Originates in the descending aorta and extends distally down the aorta or rarely retrograde into the aortic arch and ascending aorta

**Stanford**

- **Type A**: All dissections involving the ascending aorta, regardless of the site of origin
- **Type B**: All dissections not involving the ascending aorta

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VS

VS


## Imaging Modalities In The Diagnosis Of AAS

<table>
<thead>
<tr>
<th>Feature of imaging modality</th>
<th>Angio</th>
<th>CT</th>
<th>MRI</th>
<th>TEE</th>
<th>TTE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advantages</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readily available</td>
<td>+</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>Quickly performed</td>
<td>+</td>
<td>+++</td>
<td>+</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>Performed at bedside</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Noninvasive</td>
<td>−</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>No iodinated contrast</td>
<td>−</td>
<td>−</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>No ionizing radiation</td>
<td>−</td>
<td>−</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Low cost</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+++</td>
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<tr>
<td><strong>Diagnostic performance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
</tr>
<tr>
<td>Specificity</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>Detection of intramural haematoma</td>
<td>−</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>−</td>
</tr>
<tr>
<td>Detection of site of intimal tear</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Detection of aortic regurgitation</td>
<td>+++</td>
<td>−/+</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Detection of coronary artery involvement</td>
<td>+++</td>
<td>+/++</td>
<td>+</td>
<td>++</td>
<td>−</td>
</tr>
<tr>
<td>Detection of pericardial effusion</td>
<td>−</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Detection of branch vessel involvement</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Detection of periaortic haemorrhage</td>
<td>−</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>−</td>
</tr>
</tbody>
</table>

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3). Pathophysiological Features of Marfan’s & Bicuspid Aortopathy

The Aorta - TAA, TAD, AAA, AAR – 2017 - 2018

• **Area & Types** (TAA,TAD,AAA,AAR)

• **Pathogenesis** (Marfan’s, BHA, AAA)

  *Dysfunctional Structure*

  **Hemodynamics**

  **Approach to Hemodynamics**

  **Approach to Dysfunctional Structure**

• **Interventional** (TAA,TAD,AAA,AAR)

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JZ Goldfinger, V Fuster et al., JACC 2014;64:1725
<table>
<thead>
<tr>
<th></th>
<th>1). TAA,</th>
<th>2). TAD,</th>
<th>3). AAA,</th>
<th>4). AAR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2. TAA</td>
<td>1. TAA-Marfan’s a,b,c</td>
<td>3. AAA,</td>
</tr>
<tr>
<td>Prevalence</td>
<td>1.25%</td>
<td>1 in 10,000</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Pathogenesis</td>
<td>Genetic Predisposition Bicuspid Valve Hypertension Atherosclerosis</td>
<td>Genetic Predisposition</td>
<td>Genetic Predisposition Male Hypertension Smoking</td>
<td></td>
</tr>
<tr>
<td>Histology</td>
<td>Cystic medial Necrosis</td>
<td>Cystic medial Necrosis Apoptosis</td>
<td>Inflammatory Infiltrate, VSMC</td>
<td></td>
</tr>
<tr>
<td>Rupt./ Dissect.</td>
<td>+</td>
<td>+++</td>
<td>++</td>
<td></td>
</tr>
</tbody>
</table>

The Aorta - TAA, TAD, AAA, AAR – 2017 - 2018

• Area & Types (TAA,TAD,AAA,AAR)
• Pathogenesis (Marfan’s, BHA, AAA)

Dysfunctional Structure

Hemodynamics

Approach to Hemodynamics

Approach to Dysfunctional Structure

• Interventional (TAA,TAD,AAA,AAR)


JZ Goldfinger, V Fuster et al., JACC 2014;64:1725
1. MARFAN’S / NSTAA & 2. BHA

- FBN1 Mutation
  - ↓ Fibrillin
    - ↓ TGF-β
      - ↓ TIMP
      - ↑ MMP
  - ↑ TGF-β

- Rupture
  - ↓ Collagen
  - ↑ Aneurysm Formation
  - ↑ Stiffness
  - ↓ Elastin
    - ↑ Collagen

- CMD
  - ↑ Proteases

- Degenerative Diseases
  - VSMC

JZ Goldfinger, V Fuster et al., JACC 2014;64:1725
1a. Genotype Impacts Survival In Marfan’s

<table>
<thead>
<tr>
<th></th>
<th>Haploinsufficiency, n = 146</th>
<th>Dominant negative, n = 211</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Q1–Q3 in years)*</td>
<td>33.3 ± 11.5</td>
<td>37.1 ± 14.0</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>74 (50.7%)</td>
<td>110 (52.1%)</td>
</tr>
<tr>
<td>Prior aortic surgery</td>
<td>57 (39.0%)</td>
<td>69 (32.7%)</td>
</tr>
<tr>
<td>Prior aortic dissection</td>
<td>13 (8.9%)</td>
<td>19 (9.0%)</td>
</tr>
<tr>
<td>No aortic complication at inclusion</td>
<td>89 (61.0%)</td>
<td>139 (66.0%)</td>
</tr>
<tr>
<td>Follow-up (Q1–Q3 in years)</td>
<td>8.5 ± 3.4</td>
<td>8.3 ± 3.1</td>
</tr>
</tbody>
</table>

*P = 0.005.
1b. Marfan Syndrome and Quality of Life in the GenTAC Registry

The national registry of GenTAC is a longitudinal observational cohort study of patients with conditions that predispose to thoracic aortic aneurysms and dissections, including MFS. QOL was assessed using the SF-36 approach. In the GenTAC registry, 389 adults with MFS completed the SF-36. Mean age was 41 years, 51% were men, 92% were white, and 65% were college graduates. Health-related QOL was below the population norm. Better QOL was independently associated with socioeconomic factors, not factors related to health or MFS severity.

JZ Goldfinger et al., J Am Coll Cardiol 2017; 69:2821
Factors That Impact Quality of Life in Marfan Syndrome

GenTAC Registry (JZ Goldfinger et. al.) J Am Coll Cardiol 2017;69:2821
Genetic aortopathy (GA) underlies thoracic aortic aneurysms (TAA) in younger adults. Diagnosis of GA was made for 760 patients (NS-TAA, n=311; MFS, n=221; BAV, n=228). The 687 patients surviving > 30 days after presentation were followed for a median of 7 years. Clinical outcomes for MFS and NS-TAA are similar but worse than BAV. Independent predictors of mortality, including family history of aortic dissection and age. Management of NS-TAA, including surgical intervention, should be similar to that of MFS.

AG Sherrah et al., J Am Coll Cardiol 2016; 67:618 (Sydney)
Nonsyndromic Thoracic Aortic Aneurysm and Dissection Outcomes vs Marfan Syndrome vs Bicuspid Aortic Valve

Number of patients at risk:

- **NS-TAAD**: 253 149 81 49 17
- **MFS**: 209 164 115 79 42
- **BAV**: 225 140 91 60 31

AG Sherrah et. al. J Am Coll Cardiol 2016;67:618
2. **Bicuspid Aortic Valve - Morphology Features That Influence the Pattern of Aortopathy**

S Verma et al. *N Engl J Med* 2014;370:1920 – Types 1, 2, 3
R Mahadevia et al. *Circulation*. 2014;129:673 - Detail
3. Abdominal Aortic Aneurysm - MRI Imaging Mouse Model and Nanoparticle PET-CT

M Nahrendorf, Rweissleder et. al. ATVB. 2011;31:750
A Klink, V Fuster, ZA Fayad et. al. J Am Coll Cardiol 2011;58:2522
Aortic Wall Inflammation Predicts AAA Expansion, Rupture, and Need for Surgical Repair

Ultrasmall superparamagnetic particles of iron oxide (USPIO) detect cellular inflammation (macrophages) on MRI. In a prospective multicenter open-label cohort study, 342 patients with AAA (diameter \( \geq 40 \text{ mm} \)) were classified by the presence of USPIO enhancement and were monitored with serial ultrasound and clinical follow-up for \( \geq 2 \text{ years} \). The primary end point was the composite of aneurysm rupture or repair. USPIO-enhanced MRI predicts the rate of aneurysm growth and clinical outcome. However, it does not provide further information recognized by clinical risk factors.

MA3RS Study Investigators (D Newby et. al) Circulation. 2017;136:787
T2* Map (Blue) Demonstrating Enhancement Of The Posterior Aneurysm Wall With USPIO (Red) By MRI

MA³RS Study Investigators (D Newby et. al) Circulation. 2017;136:787
• **Area & Types (TAA,TAD,AAA,AAR)**

• **Pathogenesis (Marfan’s, BHA, AAA)**
  
  **Dysfunctional Structure**

  **Hemodynamics**

  **Approach to Hemodynamics**

  **Approach to Dysfunctional Structure**

• **Interventional (TAA,TAD,AAA,AAR)**

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*JZ Goldfinger, V Fuster et al., JACC 2014;64:1725*
Hemodynamic Frs - Dilatation To Dissection

1. Arterial Diameter
2. BP
3. dp / dt_{max}

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  Dysfunctional Structure
  Hemodynamics
  Approach to Hemodynamics
  Approach to Dysfunctional Structure
• Interventional (TAA, TAD, AAA, AAR)


JZ Goldfinger, V Fuster et al., JACC 2014;64:1725
Baseline
1) Vasodilator (i.e., Nitroprusside)
(2) Beta blockade
• **Area & Types (TAA, TAD, AAA, AAR)**

• **Pathogenesis (Marfan’s, BHA, AAA)**

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  **Hemodynamics**

  **Approach to Hemodynamics**

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• **Interventional (TAA, TAD, AAA, AAR)**

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_JZ Goldfinger, V Fuster et al., JACC 2014;64:1725_
1) **MFS - IMPACT OF $\beta$ BLOCKERS ON AORTIC ROOT DIAMETER**

- **Control Group:** slope = $1.15 \pm 0.08$
- **Treatment Group:** slope = $1.04 \pm 0.05$

2) 
- M Groenink et al., *EHJ 2013; Aug 21* – Netherlands - ARB ?
- RV Lacro et al., *NEJM 2014; 371:2061* – American Study – ARB Negative
- O Milleron et al., *Eur Heart J 2015; 36:2160* – French Study – ARB Negative
Regulation of membrane type-1 matrix metalloproteinase activity and intracellular localization in clinical thoracic aortic aneurysms

John S. Ikonomidis, MD, PhD, a Elizabeth K. Nadeau, BS, a Adam W. Akerman, MS, a Robert E. Stroud, MS, a Rupak Mukherjee, PhD, a,b and Jeffrey A. Jones, PhD a,b

3) Targeted inhibition of MT1-MMP may have therapeutic relevance as an approach to attenuating the TAA development.

J Thorac Cardiovasc Surg 2017;153:537
<table>
<thead>
<tr>
<th>Topic</th>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td>Definition, Mortality, Imaging, ECM</td>
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<tr>
<td>Area &amp; Types (TAA, TAD, AAA, AAR)</td>
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<tr>
<td>Pathogenesis (Marfan’s, BHA, AAA)</td>
<td>4</td>
</tr>
<tr>
<td>Dysfunctional Structure</td>
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</tr>
<tr>
<td>Hemodynamics</td>
<td>4</td>
</tr>
<tr>
<td>Approach to Hemodynamics</td>
<td>2</td>
</tr>
<tr>
<td>Approach to Dysfunctional Structure</td>
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<td>Interventional (TAA, TAD, AAA, AAR)</td>
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The Aorta - TAA, TAD, AAA, AAR – 2017 - 2018

- Area & Types (TAA, TAD, AAA, AAR)
- Pathogenesis (Marfan’s, BHA, AAA)

Dysfunctional Structure

Hemodynamics

Approach to Hemodynamics

Approach to Dysfunctional Structure

- Interventional (TAA, TAD, AAA, AAR)


JZ Goldfinger, V Fuster et al., JACC 2014;64:1725
1. TAA - Indications For Surgery

- ≥ 40 mm with indication for elective AVR (BAV)
- ≥ 45 mm in MFS, NSTAA (?)
- ≥ 50 mm in BAV (?)
- ≥ 55 mm for an ascending aortic aneurysm (?)
- ≥ 60 mm for a descending aortic aneurysm;
- ≥ 70 mm in high-risk comorbidities;
- Growth rate ≥ 10 mm per year in <55 mm diameter
- Recurrent symptoms, Evidence of proximal dissect.

L Cozijnsen et al., Circ 2011; 123:924
ACC/AHA Circulation. 2016;133:680
2. Aortic Dissection and/or Rupture, and Composite of Event & Surgery Within 5 Years
3. Dissection in Ascending Aortic Aneurysms: Risk Threshold - Age

![3D Graph showing the relationship between age, maximal aortic diameter, and risk of aortic dissection with surgical threshold highlighted.](image-url)
The Aorta - TAA, TAD, AAA, AAR – 2017 - 2018

• Area & Types (TAA, TAD, AAA, AAR)
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  Dysfunctional Structure
  Hemodynamics
  Approach to Hemodynamics
  Approach to Dysfunctional Structure
• Interventional (TAA, TAD, AAA, AAR)


JZ Goldfinger, V Fuster et al., JACC 2014;64:1725
1. **Contained Acute Aortic Syndrome**

- Aortic dissection
- Intramural haematoma
- Penetrating ulcer

**RE Clough et. al. Nat. Rev. Cardiol. 2015;12:103**

**RR Baliga et. al. J Am Coll Cardiol Img 2014;7:406**

**6-15% - CT / MR Diameter 16 mm, Rupture within 10 days**
No mortality occurred within 3 days of presentation. Mortality with IMH did not differ from typical dissection (10.9% vs 14.7%).
2. A 14-day Mortality In 645 Pts From IRAD Stratified By Medical And Surgical Treatment In TAD Type A & B

IRAD (TT Tsai et. al.) Eur J Vasc Endov Surg 2009;37:149-Av 9h to Surgery
PG Hagan et. al. JAMA 2000;283:897
2a. Long-term Outcome & Quality of Life Post Surgery For AAD Type A, in Young & Elderly Adults

2b. Acute Type A Dissection In Octogenarians
In-hospital Outcome & Long-term Survival

3. Endovascular Repair Of The Asc Aorta In Pts At High Risk For Open Repair

P Vallabhajosyula et. al. JTCS 2015;149:S144
4. TAA - Indications For Surgery

- $\geq 40$ mm with indication for elective AVR (BAV?)
- $\geq 45$ mm in MFS, NSTAA?
- $\geq 50$ mm in BAV (?)
- $\geq 55$ mm for an ascending aortic aneurysm,
- $\geq 60$ mm for a descending aortic aneurysm;
- $\geq 70$ mm in high-risk comorbidities;
- Growth rate $\geq 10$ mm per year in $<60$ mm diameter
- Recurrent symptoms, Evidence of proximal dissect.

L Cozijnsen et al., Circ 2011; 123:924
ACC/AHA Circulation. 2016;133:680
4a). Type B Dissection – Survival Curve (N=300)

Survival rate (%)

Hospital Mortality

- Surgical (11%)
- Endovascular (11%)
- Medical (18%)

Log rank $P = .61$

Worst Prognosis: Hypotension, Pleural Effusion, Renal Failure, Refractory Pain & Hypertension

IRAD (Tsai TT et al.) Circulation 2006; 114:2226
IRAD (S Trimarchi et al.) Circulation 2010; 122:1283
4b). Site of TEVAR Implementation

RP Cambria. Advances at Mass General. 2015
The Aorta - TAA, TAD, AAA, AAR – 2017 - 2018

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Hemodynamics

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JZ Goldfinger, V Fuster et al., JACC 2014;64:1725
1. Screening for AAA: U.S. Preventive Services Task Force Recommendation Statement

- The USPSTF recommends 1-time screening for AAA with ultrasonography in men aged 65 to 75 years who have ever smoked. (B recommendation)
- The USPSTF recommends that clinicians selectively offer screening for AAA in men aged 65 to 75 years who have never smoked (C recommendation)
- The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for AAA in women aged 65 to 75 years who have ever smoked. (1 statement)
- The USPSTF recommends against routine screening for AAA in women who have never smoked. (D recommendation)

ML LeFevre et al., Ann Intern Med 2014; 161:281
In this randomized controlled trial, we randomly allocated (1:1) all men aged 65-74 years living in the Central Denmark Region to screening for AAA, PAD, and hypertension, or to no screening. We invited participants who were found to have AAA, PAD or hypertension to the most appropriate treatment. The primary outcome was all-cause mortality, assessed 5 years after randomisation. Between Oct 8, 2008, and Jan 11, 2011, we randomly allocated 50,156 participants, with 25,078 (50%) each in the screening and non-screening groups. AAA was detected in 3.3% of patients, PAD in 10.9%, and unknown potential hypertension in 10.5%. There was a reduction of mortality risk from AAA, PAD and hypertension that can be linked to therapy. The number needed to invite to save one life was 169 people.

2. Growth Rate for Small AAA – Meta-Analysis

Small AAAs of 3.0 cm – 5.4 cm in diameter are monitored by ultrasound surveillance. The intervals between surveillance scans should be chosen to detect an expanding aneurysm prior to rupture. Studies were identified for inclusion through a systematic literature search through December 2010. Study authors were contacted, which yielded 18 data sets providing repeated ultrasound measurements of AAA diameter over time in 15,471 patients. Predictions of the risk of exceeding 5.5-cm diameter and of rupture within given time intervals were estimated. Growth rates increased on average by 0.59 mm per year. In contrast to the commonly adopted surveillance intervals in current AAA screening programs, surveillance intervals of several years may be clinically acceptable for the majority of patients with small AAA.

## 3. Annual Risk of Rupture of AAA

<table>
<thead>
<tr>
<th>Aneurysm Size</th>
<th>1-yr Incidence of Rupture</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5.5 cm</td>
<td>≤1.0</td>
</tr>
<tr>
<td>5.5–5.9 cm</td>
<td>9.4</td>
</tr>
<tr>
<td>6.0–6.9 cm</td>
<td>10.2</td>
</tr>
<tr>
<td>≥7.0 cm</td>
<td>32.5</td>
</tr>
</tbody>
</table>

Aneurysm Diameter Related To EVAR And Healthcare Reimbursement Model

Correlation coefficient = 0.51
p = 0.13

Diameter of AAA at the Time of Repair in England in 2014 and in the United States in 2013

4. Annual Proportion of Elective Endovascular & Open Repairs for AAA in the US

Pts (%) EVAR For Intact (A) & Ruptured (B) AAA.

**A** Intact

<table>
<thead>
<tr>
<th>Country</th>
<th>N patients</th>
<th>% EVAR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hungary</td>
<td>849</td>
<td>27.8% (24.8%-30.8%)</td>
</tr>
<tr>
<td>Norway</td>
<td>2095</td>
<td>32.0% (30.0%-34.0%)</td>
</tr>
<tr>
<td>Denmark</td>
<td>2239</td>
<td>33.9% (31.9%-35.9%)</td>
</tr>
<tr>
<td>Finland</td>
<td>461</td>
<td>46.2% (41.7%-50.8%)</td>
</tr>
<tr>
<td>Switzerland</td>
<td>2174</td>
<td>50.3% (48.2%-52.4%)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1214</td>
<td>51.7% (48.9%-54.5%)</td>
</tr>
<tr>
<td>Iceland</td>
<td>76</td>
<td>53.9% (42.7%-65.2%)</td>
</tr>
<tr>
<td>Sweden</td>
<td>3893</td>
<td>56.8% (55.3%-58.4%)</td>
</tr>
<tr>
<td>Germany</td>
<td>12572</td>
<td>68.2% (67.4%-69.0%)</td>
</tr>
<tr>
<td>Australia</td>
<td>6306</td>
<td>73.7% (72.6%-74.8%)</td>
</tr>
<tr>
<td>United States</td>
<td>11819</td>
<td>79.4% (78.7%-80.2%)</td>
</tr>
</tbody>
</table>

**B** Ruptured

<table>
<thead>
<tr>
<th>Country</th>
<th>N patients</th>
<th>% EVAR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>748</td>
<td>5.1% (3.5%-6.7%)</td>
</tr>
<tr>
<td>Hungary</td>
<td>187</td>
<td>7.5% (3.7%-11.3%)</td>
</tr>
<tr>
<td>Finland</td>
<td>192</td>
<td>9.9% (5.7%-14.1%)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>220</td>
<td>10.9% (6.8%-15.0%)</td>
</tr>
<tr>
<td>Norway</td>
<td>334</td>
<td>11.7% (8.2%-15.1%)</td>
</tr>
<tr>
<td>Iceland</td>
<td>21</td>
<td>19.0% (2.3%-35.8%)</td>
</tr>
<tr>
<td>Switzerland</td>
<td>342</td>
<td>24.9% (20.3%-29.4%)</td>
</tr>
<tr>
<td>Sweden</td>
<td>1038</td>
<td>29.3% (26.5%-32.1%)</td>
</tr>
<tr>
<td>Germany</td>
<td>1444</td>
<td>31.2% (28.8%-33.6%)</td>
</tr>
<tr>
<td>Australia</td>
<td>1444</td>
<td>39.8% (37.2%-42.3%)</td>
</tr>
<tr>
<td>United States</td>
<td>1075</td>
<td>51.8% (48.8%-54.8%)</td>
</tr>
</tbody>
</table>

4a. Time To First Re-intervention In The EVAR Open Repair Groups During 15 Years (5.5 cm)

Log-rank p = 0.0001
Endovascular-repair life-threatening re-intervention 15-year survival 78.1% (95% CI 71.5–83.3)
Open-repair life-threatening re-intervention 15-year survival 87.6% (95% CI 81.1–92.0)
4b. Open And Endovascular Repair Showing Survival After Intact AAA Repair

Ruptured AAA incidence for men >65 years has declined by nearly 30% in Finland, likely because of the decrease in AAA prevalence. The treatment results have improved as well for both elective and emergency repair. Increased use of EVAR has resulted in a decrease of mortality after elective AAA repair, but results of open repair have improved as well. However, late mortality from elective EVAR is surprisingly high in comparison with open repair, which may have been exaggerated by patient selection.

MT Laine et al., Circulation 2017; 136:1726
• **Area & Types (TAA, TAD, AAA, AAR)**

• **Pathogenesis (Marfan’s, BHA, AAA)**

  *Dysfunctional Structure*

  *Hemodynamics*

  *Approach to Hemodynamics*

  *Approach to Dysfunctional Structure*

• **Interventional (TAA, TAD, AAA, AAR)**

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JZ Goldfinger, V Fuster et al., JACC 2014;64:1725
Endovascular or Open Repair
For Ruptured AAA One-year Outcomes

This pragmatic multicentre (29 UK and 1 Canada) trial randomized 613 patients with a clinical diagnosis of ruptured aneurysm; 316 to an endovascular first strategy and 297 to open repair. The principal 1-year outcome was mortality; secondary outcomes were reinterventions, hospital discharge, health-related quality-of-life (Qol) (EQ-5D), costs. An endovascular first strategy does not offer a survival benefit over 1 year but offers patients faster discharge with better Qol and is cost-effective.

IMPROVE Trial (R Grieve et. al.) Eur Heart J. 2015;36:2061
Diseases of The Aorta 2017
Understanding & Approach

TAA, TAD, AAA, AAR

ACC New York, Dec 9, 2017 - No Disclosures