What’s new in Cardiovascular medicine?

Dr Stephen Dorman
Consultant Cardiologist, Morriston Cardiac Centre
Mid & West Cardiac Network Lead
A year in review...

- Primary & secondary Prevention
- IHD & Coronary angioplasty
- Atrial Fibrillation
- Heart Failure & Devices
- New trends in Cardiology
- Cardiac Imaging
Prevention is better than cure..

"The doctor of the future will give no medicine, but will interest his patients in the care of the human frame, in diet and in the cause and prevention of disease."

~ Thomas Edison
Age standardised death rates from CVD – All ages UK 2010/2012

Source: BHF CVD statistics 2014
1. Ischaemic Heart disease
How would you treat a 50 year old lady with a cholesterol of 8 mmol/L and a systolic BP of 180 mmHg?

QRISK2 = 7%  10 year MI risk therefore NO treatment under most guidelines
Relationship between LDL cholesterol & CHD events
Lifetime exposure to LDL

Early investment in risk factor modification should yield cumulative lifetime benefits.

Over a 15 year period a 28% lifetime lowering of LDL resulted in an 88% reduction in coronary heart disease.

Cohen NEJM 2006
JBS3 – “investing in your arteries”

• Personalised lifetime approach to CVD prevention

• Allows a CV risk conversation with the whole population and to empower individuals

www.jbs3risk.com
JBS3 - A hypothetical cardiologist
Your heart age is about **46**

compared to a person of the same age and ethnicity with optimal risk factors.

On average, expect to survive to age 79 without a heart attack or stroke.

Your risk of a heart attack or stroke in the next 10 years is **2.4%**
European & American lipid guidelines

ESC/EAS 2011 lipid guidelines:
LDL-C goals / individual therapy

ACC/AHA 2013 lipid guidelines:
Fixed dose

“Treat to target“ vs “Fire and Forget“
Transatlantic consensus

1. LDL is a true risk factor that causes atherosclerosis
2. Treatment should be based on overall risk assessment
3. High risk includes: Atherosclerotic CVD, Familial hypercholesterolaemia, diabetes
4. Lifestyle interventions are the basis for all treatments
5. Statins as first line therapy for LDL-C and risk reduction
6. When risk is high, treatment should be intensive. When risk is moderately high....
Average LDL-C Lowering by Different Statin Doses - Individual Response Will Vary -

- Rosuvastatin
  - 10 mg
  - 20 mg
  - 40 mg

- Atorvastatin
  - 10 mg
  - 20 mg
  - 40 mg
  - 80 mg

- Pitavastatin
  - 1 mg/d
  - 2 mg
  - 4 mg

- Simvastatin
  - 10 mg
  - 20 mg
  - 40 mg
  - 80 mg

- Pravastatin
  - 10 mg
  - 20 mg
  - 40 mg

Custodis & Laufs, Herz 2012
• QRISK2 score

• Reduces treatment threshold from >20% to a >10% 10 year risk of developing CVD - Upto 4.5 million more eligible

Lipid modification: cardiovascular risk assessment and the modification of blood lipids for the primary and secondary prevention of cardiovascular disease

Issued: July 2014  last modified: January 2015

NICE clinical guideline 181
guidance.nice.org.uk/cg181
NICE 2014 - Lipid modification therapy for the primary and secondary prevention of CVD

• No more fasting lipid profiles – Use Non HDL cholesterol

• For primary prevention offer **Atorvasatin 20 mg** to people with a >10% 10-year risk of developing CVD.

• For secondary prevention offer **Atorvastatin 80 mg** - Lower dose if: potential drug interactions, high risk of adverse effects, patient preference.

• If a high-intensity statin is not tolerated then treat with the maximum tolerated dose

• Measure a lipid profile at 3 months in all people who have been started on high-intensity statin treatment and aim for a greater than 40% reduction in non-HDL cholesterol
NICE Lipid guidance 2014 – Do not Do’s

Do not offer any of the following:

- Nicotinic acid (niacin)
- Omega 3 Fatty acids
- Fibrates
- Bile acid sequestrants

for the prevention of CVD to any of the following: Primary or secondary prevention, CKD, Type I or II Diabetes
CVD Risk: Future trend Obesity

England – Impact of Rising Trend in Obesity - Predicted Increase in Cardiovascular Disease Prevalence over & above Impact of Ageing

Source: National Heart Forum. A Prediction of Obesity Trends for Adults & their Associated Diseases (NHF. February 2010)

<table>
<thead>
<tr>
<th>Year</th>
<th>Diabetes</th>
<th>Coronary Heart Disease</th>
<th>Hypertension</th>
<th>Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>2020</td>
<td>15%</td>
<td>8%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>2030</td>
<td>38%</td>
<td>20%</td>
<td>13%</td>
<td>11%</td>
</tr>
<tr>
<td>2040</td>
<td>68%</td>
<td>33%</td>
<td>23%</td>
<td>18%</td>
</tr>
<tr>
<td>2050</td>
<td>98%</td>
<td>44%</td>
<td>34%</td>
<td>23%</td>
</tr>
</tbody>
</table>
Bariatric surgery & CVD

- STAMPEDE trial - The Surgical Treatment and Medications Potentially Eradicate Diabetes Effectively – NEJM 2014

- Among obese patients with uncontrolled type 2 diabetes, 3 years of intensive medical therapy plus bariatric surgery resulted in glycemic control in significantly more patients than did medical therapy alone.
Like most cardiology students, Doreen breezes through chapter 9.
Thrombosis & Bleeding balance

Anti platelet & Anti thrombotic

Aspirin, Clopidogrel, Ticagrelor, Prasugrel (po)
Cangrelor (IV)
GPIIbIIIa’s: Tirofiban, Abciximab, Eptifibatide
UFH, LMWH, Bivalirudin
Factor Xa inhibitors.....

Intensity of antiplatelet + antithrombotic therapy

Thrombotic events (MACE)  

Bleeding events
New anti platelet agents

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Clopidogrel</th>
<th>Prasugrel</th>
<th>Ticagrelor</th>
<th>Cangrelor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route</td>
<td>Oral</td>
<td>Oral</td>
<td>Oral</td>
<td>Intravenous</td>
</tr>
<tr>
<td>Frequency</td>
<td>Daily</td>
<td>Daily</td>
<td>Twice daily</td>
<td>Continuous</td>
</tr>
<tr>
<td>Prodrug</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Time to peak platelet inhibition</td>
<td>2–6 h</td>
<td>2 h</td>
<td>2 h</td>
<td>30 min</td>
</tr>
<tr>
<td>Potency</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Reversibility</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time to offset of action</td>
<td>5 days</td>
<td>5 days</td>
<td>3–5 days</td>
<td>&lt;1 h</td>
</tr>
</tbody>
</table>
How long do we need dual antiplatelet therapy after a stent?

### Stent Thrombosis According to the Timing of Permanent DAPT Interruption*

<table>
<thead>
<tr>
<th>Stent thrombosis through the entire 2-year follow-up period:</th>
<th>ST, % No DAPT interruption except possibly after ST</th>
<th>ST, % Permanent DAPT discontinuation in this interval</th>
<th>HR [95% CI]</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between 0 and 1 mos</td>
<td>0.83% (32) (N at risk = 7,152)</td>
<td>4.95% (11) (N at risk = 229)</td>
<td>7.69 [4.00, 14.3]</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Between 1 and 3 mos</td>
<td>0.83% (32) (N at risk = 7,152)</td>
<td>2.78% (2) (N at risk = 76)</td>
<td>5.00 [1.22, 20.0]</td>
<td>0.07</td>
</tr>
<tr>
<td>Between 3 and 6 mos</td>
<td>0.83% (32) (N at risk = 7,152)</td>
<td>0.78% (1) (N at risk = 146)</td>
<td>1.37 [0.19, 10.0]</td>
<td>0.87</td>
</tr>
<tr>
<td>Between 6 and 12 mos</td>
<td>0.83% (32) (N at risk = 7,152)</td>
<td>0.45% (4) (N at risk = 934)</td>
<td>0.86 [0.31, 2.38]</td>
<td>0.20</td>
</tr>
<tr>
<td>Between 12 and 24 mos</td>
<td>0.83% (32) (N at risk = 7,152)</td>
<td>0.16% (3) (N at risk = 1,925)</td>
<td>0.35 [0.11, 1.14]</td>
<td>0.002</td>
</tr>
<tr>
<td>Between 0 and 24 mos</td>
<td>0.83% (32) (N at risk = 7,152)</td>
<td>0.64% (21) (N at risk = 3,310)</td>
<td>0.77 [0.47, 1.27]</td>
<td>0.30</td>
</tr>
</tbody>
</table>

*Rates are Kaplan-Meier estimates; excludes pts with temporary DAPT interruption*

G. Stone, TCT 2011
DAPT beyond 1 year?
Choose your complication.... Ischaemic or Bleeding

KEEP CALM
YOU MIGHT
WIN FREE LUNCH!
How long do you need to be on dual antiplatelet therapy after angioplasty?

- Stable Angina or Acute Coronary Syndrome?
- Type of Stent – BMS/DES/Biodegradable/Polymer free?
- Complexity of coronary anatomy?
- Generalised atherosclerotic burden?
- Bleeding risk?
- Concomitant indication for anti coagulation?
DAPT duration – Basic principles

• **For the Stent - 6 Months**
  – Special stents (Biodegradable polymer / polymer free stents) < 1-3 months
  – “Stent fest” > 6 months

• **For the Artery – 12 months for ACS**

• Extending DAPT beyond 12 months
  – Will reduce ischaemic events but with a bleeding penalty (~NNT~NNH)
Where is Coronary stent technology going?

- **Platform** – Steel / Co/Plt Chro
- **Polymer** – Permanent or resorbable
- **Drug** – Antiproliferative (e.g. Limus)

*Figure 1. The Absorb Bioresorbable Vascular Scaffold (BVS) (Abbott).*
FFR – Fractional Flow reserve

Two-Compartment Model of the Coronary Circulation

The coronary angiogram detects only 5% of the total coronary tree
Primary Angioplasty for ST elevation MI

Why Primary Angioplasty and not Lysis?

• More effective than lysis → Mortality reduction
• Reduced Stroke
• Less re-infarction
• Home in 48 hours in uncomplicated cases

• Themes in 2014/15
  • Drugs – Bivalirudin vs Heparin
  • Technique – TAPAS/Total
  • Bystander disease
Primary PCI in South Wales 2009-2013

Crude and adjusted PPCI Nos. for S Wales 2009-2013

PPCI numbers

Number

UHW

09 → 13

Morriston

09 → 13

PPCI/million

0

SE network

360

SW network

487

UK BCIS

380
What are the implications for Primary Care?

• ST elevation MI patients will be leaving hospital 48h after their heart attack.

• There is not time to uptitrate all the cardiac medications in hospital
  • Bisoprolol 2.5mg od → 10mg od
  • Ramipril 2.5mg od → 10mg od

• New anti platelet regimes
  • Aspirin 75mg, Clopidogrel 75mg od, **PRASUGREL** 75mg od, **TICAGRELOR** 90mg bd
  • Triple therapy & WOEST regimes

• No routine follow up of Post MI patients after first clinic visit
  • Secondary prevention in Primary Care / Link in to practice chronic disease nurse
Atrial Fibrillation & Acute Coronary syndrome

- Aspirin + Clopidogrel
- Triple therapy – Warfarin, Aspirin, Clopidogrel
- Warfarin + Clopidogrel (WOEST)
- ESC recomend lower target range INR 2-2.5
- Low dose NOAC & Aspirin & Clopidogrel
Atrial fibrillation
Aspirin 'not best' for preventing heart problem

By Michelle Roberts
Health editor, BBC News online

18 June 2014 | Health

Doctors should use newer medications rather than aspirin to treat a common heart problem, say new guidelines for the NHS in England and Wales.
The new oral anticoagulants

Better than Warfarin?

3 new oral Xa/IIa inhibitors

Rivoroxaban
- Factor Xa inhibitor
- ROCKET AF
- o.d dosing

Apixaban
- Factor Xa inhibitor
- Aristotle
- b.d dosing

Dabigatran
- Factor IIa inhibitor
- RE-LY trial
- b.d dosing
- 85% Renal clearance
## Anticoagulation - NOACs

### Recommendations for prevention of thromboembolism in non-valvular AF - NOACs

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
</table>
| When adjusted-dose VKA (INR 2–3) cannot be used in a patient with AF where an OAC is recommended, due to difficulties in keeping within therapeutic anticoagulation, experiencing side effects of VKAs, or inability to attend or undertake INR monitoring, one of the NOACs, either:  
  - a direct thrombin inhibitor (dabigatran); or  
  - an oral factor Xa inhibitor (e.g., rivaroxaban, apixaban)d  
... is recommended. | I | B |
| Where OAC is recommended, one of the NOACs, either:  
  - a direct thrombin inhibitor (dabigatran); or  
  - an oral factor Xa inhibitor (e.g., rivaroxaban, apixaban)d  
... should be considered rather than adjusted-dose VKA (INR 2–3) for most patients with non-valvular AF, based on their net clinical benefit. | IIA | A |
Should I prescribe a NOAC?

+VE’s
- Ease of administration
- Favourable efficacy/safety profile
- Less drug-drug interactions
- Shorter half life

-VE’s
- Cost
- Antidote
Should I anticoagulate my patient with AF?

Bleeding risk: HAS-BLED

Vs

Ischaemic risk: CHADS2VASC
<table>
<thead>
<tr>
<th>NO THERAPY</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASPIRIN 80-325mg once daily</td>
</tr>
<tr>
<td>ASPIRIN 75-100mg once daily + CLOPIDOGREL 75mg once daily</td>
</tr>
<tr>
<td>WARFARIN INR 2-3</td>
</tr>
<tr>
<td>DABIGATRAN 150mg twice daily</td>
</tr>
<tr>
<td>RIVAROXABAN 20mg once daily</td>
</tr>
<tr>
<td>APIXABAN 5mg twice daily</td>
</tr>
</tbody>
</table>
AF Ablation ? Ready for prime time

Catheter Ablation for Atrial Fibrillation: Ready for prime time?

PRO: Moving to first-line therapeutic alternative

CONTRA: Only for carefully selected cases

30 January 2014
Heart Failure
NICE 2014: Implantable cardioverter defibrillators & Cardiac resynchronisation therapy
This replaces the old NICE guidelines from 2006

ICD (Implantable cardiac defibrillator)

- Post MI
- At least 4 weeks post MI + either
  - LVEF <35% + NSVT + Inducible VT at EPS
  or
  - LVEF <30% and QRS > 120ms

CRT (Cardiac resync therapy)

- LBBB
- NYHA III
- On Maximal medical therapy
- QRS > 120ms
The New NICE ICD & CRT Guidelines
June 2014

QRS width + LBBB

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>No limitation of physical activity. Ordinary physical activity does not cause undue breathlessness, fatigue, or palpitations.</td>
</tr>
<tr>
<td>Class II</td>
<td>Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in undue breathlessness, fatigue, or palpitations.</td>
</tr>
<tr>
<td>Class III</td>
<td>Marked limitation of physical activity. Comfortable at rest, but less than ordinary physical activity results in undue breathlessness, fatigue, or palpitations.</td>
</tr>
<tr>
<td>Class IV</td>
<td>Unable to carry on any physical activity without discomfort. Symptoms at rest can be present. If any physical activity is undertaken, discomfort is increased.</td>
</tr>
</tbody>
</table>
Key points

• Merges ischaemic and dilated cardiomyopathy together

• No mention of AF

• Broadens indications for both CRT and ICD therapy

• Simple table to aid decision making

• “Probably a reasonable compromise” Professor Martin Cowie, EP and Devices, Cardiff meeting, January 2015
### The New NICE Guidelines – June 2014

<table>
<thead>
<tr>
<th>QRS interval</th>
<th>NYHA class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td>&lt;120 milliseconds</td>
<td>ICD if there is a high risk of sudden cardiac death</td>
</tr>
<tr>
<td>≥120–149 milliseconds without LBBB</td>
<td>ICD</td>
</tr>
<tr>
<td>≥120–149 milliseconds with LBBB</td>
<td>ICD</td>
</tr>
<tr>
<td>≥150 milliseconds without LBBB</td>
<td>CRT-D</td>
</tr>
<tr>
<td>≥150 milliseconds with LBBB</td>
<td>CRT-D</td>
</tr>
</tbody>
</table>

LBBB, left bundle branch block
New “blockbuster” heart failure drugs...

PARADIGM-HF: Cardiovascular Death or Heart Failure Hospitalization (Primary Endpoint)

11.9.14 Angiotensin-neprilysin Inhibition vs Enalapril in Heart Failure
McMurray et al. nejm.org
New trends in Cardiology...

The good, the bad and the ugly.
The good – “TAVI”

Inoperable or High risk for conventional Aortic valve replacement
Frailty scoring in interventional cardiology

**Clinical Frailty Scale**

1. **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2. **Well** – People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally; e.g., seasonally.

3. **Managing Well** – People whose medical problems are well controlled, but are not regularly active beyond routine walking.

4. **Vulnerable** – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being “slowed up”; and/or being tired during the day.

5. **Mildly Frail** – These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6. **Moderately Frail** – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standing) with dressing.

7. **Severely Frail** – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~6 months).

8. **Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. **Terminally Ill** – Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.

**Table 1 – Katz Index (Independence in Activities of Daily Living)**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bath</td>
<td>Does not receive help or only help for a part of the body</td>
</tr>
<tr>
<td>2. Dress</td>
<td>Pick up clothes and dresses without any help, except for tying shoes</td>
</tr>
<tr>
<td>3. Personal hygiene</td>
<td>Goes to the bathroom, uses the bathroom, dresses and returns without any help (may use a cane or walker)</td>
</tr>
<tr>
<td>4. Mobility</td>
<td>Manages to lie down in the bed, sit in the chair and get up without help (may use a cane or walker)</td>
</tr>
<tr>
<td>5. Continence</td>
<td>Completely controls urine and feces</td>
</tr>
<tr>
<td>6. Food</td>
<td>Eats without help (except for cutting meat or buttering)</td>
</tr>
</tbody>
</table>

The number of points is the sum of “yes”. Independence: 6 points; Partial dependence: 4 points; Important dependence: 2 points.
The bad – “Renal Denervation”

- Renal denervation for resistant hypertension
  - Promising early results
  - Long term outcome data needed
  - MDT approach

- SIMPLICITY HTN-3 - Large Negative RCT
The Ugly “Beta blockers before non cardiac surgery”

How Could 800,000 Die in Europe From Doctors’ Mistakes?
Cardiac Imaging
New tests for diagnosis & risk stratification

**NICE guidance**

The exercise test should **NOT** be used to diagnose Angina

Greater emphasis on Cardiac CT to **RULE OUT** CAD in low risk populations

Increased used of functional testing
Cardiac CT

• Excellent “RULE OUT” test for significant Coronary artery disease

• Low radiation dose

• Non invasive & safe

• Endorsed by the NICE guidelines
Thank you – Any questions?
### Oral anti platelets

#### Periprocedural anti thrombotic medication in primary PCI

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antiplatelet therapy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspirin oral or i.v. (if unable to swallow) is recommended</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>• Prasugrel in clopidogrel-naive patients, if no history of prior stroke/TIA, age &lt;75 years.</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>• Ticagrelor</td>
<td>I</td>
<td>B</td>
</tr>
</tbody>
</table>

ADP = adenosine diphosphate;