Cardiovascular Disease: Hypertension to Heart Failure

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BELMATT
HEALTHCARE TRAINING

Objectives:

- Overview of cardiovascular disease (CVD)
- Overview of hypertension (HTN)
- Explore national guidelines
- Importance of lifestyle interventions
- Overview of heart failure and atrial fibrillation

Cardiovascular Disease (CVD)

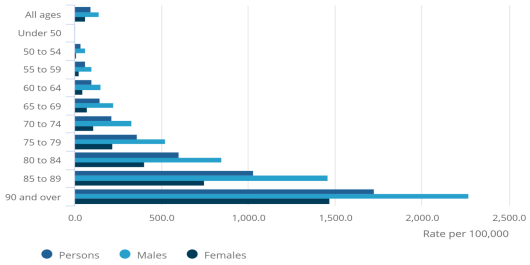
- Coronary Artery Disease (MI/heart failure)
- Cerebrovascular Disease (Strokes TIA's)
- Peripheral Artery Disease (intermittent claudication of lower limbs)
- Aortic Atherosclerosis (thoracic and abdominal aneurysms
- Others: endocarditis, rheumatic heart disease, conduction abnormalities

Cardiovascular Disease Epidemiology:

- CVD number 1 cause of death globally
- Second cause of death in UK
- Most common contributing cause is diabetes
- I,500 premature deaths each year
- £140million NHS spend each year
- Over 5million in UK living with undiagnosed hypertension
- 5million with diabetes
- 850,000 undiagnosed diabetes

Age-specific Mortality Rates in UK 2019:

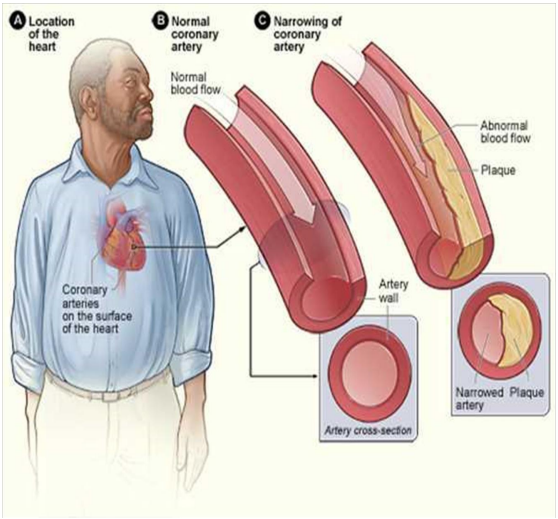
Figure 2: Age-standardised and age-specific mortality rates due to ischaemic heart diseases, England and Wales, deaths registered in 2019



Office of National Statistics Ischaemic Heart Diseases Deaths England and Wales:2019

Atherosclerosis

- Dyslipidemia-plaque buildup in the wall of the arteries
- Inflammatory pathways
- Endothelial damage
- Calcification



Risk Factors for CVD

- Age
- Race
- Family history
- Chronic conditions (CKD, diabetes and lung disease)
- Overweight or obesity
- Lack of exercise
- Smoking
- Salt intake
- Vitamin D deficiency
- Alcohol abuse
- Stress

Risk Factors for CVD

- INTERHEART study1 52 countries
- 9 modifiable risk factors accounted for 90% of the risk having the first MI

Smoking, Dyslipidaemia, hypertension, diabetes, obesity, psychosocial factors, consumption of fruit and vegetables, alcohol, physical activity

- Framingham Heart Study2
  60-90% of CVD events had at least one risk factor

1.Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, McQueen M, Budaj A, Pais P, Varigos J, Lisheng L, INTERHEART Study Investigators. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Lancet. 2004 Sep 11-17;364(9438):937-52.

2.Fox CS, Pencina MJ, Wilson PW, Paynter NP, Vasan RS, D'Agostino RB. Lifetime risk of cardiovascular disease among individuals with and without diabetes stratified by obesity status in the Framingham heart study. Diabetes Care. 2008 Aug;31(8):1582-4.

Type 2 Diabetes

Type 2 Diabetes is a cardiovascular disease

- Metabolic Syndrome
  Hypertension, dyslipidaemia and insulin resistance
- Obesity-visceral fat/free fatty acids/glycerol
- Inflammatory response-cytokinines
- Atherosclerosis

Primary Prevention

- NHS Long Term Plan- CVD biggest cause of preventable death and ill-health
- Public Health England: Cardiovascular Prevention Packs
- Quality Outcome Frameworks
- National Diabetes Audit
- Local incentives- enhanced service payments

Call to Action

National Guidelines:

- NICE: Hypertension in Adults NG136 2019 (covers diabetes)
- NICE: Hypertension in Pregnancy NG133
- NICE: Lipid modification CG181 2016
- NICE: Chronic Heart Failure in Adults NG106 2018
- NICE: Atrial Fibrillation: management CG180 2021

What Can We Do?: Find

- Opportunistic surveillance- BP/pulse checks
- Routine screening- NHS checks/ mental health checks
- Clinical history-signs and symptoms
- QRisk Score3- toolkit
- Family history
- Identifying risk factors
- Investigations

What Can We Do?: Treat Manage

- Promote awareness- ask if patients know their numbers
- Support behaviour change – sign posting
- Education and advice
- Surveillance and monitoring
- Optimise therapies
- Audit/registers/coding
- HCP training to support identification and managing CVD

Lifestyle

- Smoking cessation
- Weight management
- Physical activity
  'Get Moving Campaign'
- Salt reduction
- Alcohol
- Wellbeing

The 'S' Sins

Smoking
Sitting/sedentary/sarcopenia
Sick Fat (visceral)
Sugar/ Snacking
Salad dodging/ Sandwich culture
Stress
Social deprivation/Solitude/Sadness
Sleep deprivation

Hypertension

- Cardiac output
- Systemic vascular resistance
- Renin-angiotensin-aldosterone system
- Autonomic nervous system

Hypertension

Primary (essential) hypertension

- No identifiable cause
- Can develop gradually over many years
- May be hereditary

Secondary hypertension

- Caused by underlying condition
- Tends to appear suddenly
- Causes higher blood pressure than primary hypertension
- Various medications

Risks of Hypertension

- Aneurysms
- Metabolic syndrome
- Stroke
- Cognitive difficulties/ dementia
- Heart attack
- Heart failure
- Vascular eye problems
- Chronic kidney disease

Symptoms

- Used to be known as the “silent killer”
- Often no signs or symptoms of the underlying hypertension, even at high level readings.
- May sometimes present as headaches, SOB and nosebleeds.
- Symptoms are not specific and can vary from person to person

Diagnosis

- **Stage 1:**
- BP140/90 to 159/99 or HBPM average 135/85 to 149/94
- **Stage 2:**
- BP 160/100 to 180/120 or HBPM average>150/95
- **Stage 3:**
- BP systolic >180 or diastolic>120
- Accelerated hypertension: severe increase>180/120 and retinal haemorrhage

Drug Therapy

- ACE -ramipril
- ARB - losartan
- Thiazide-like diuretic
- Beta blocker - bisoprolol
- Aldosterone antagonist - spironolactone

African or Caribbean

- CCB eg amlodipine
- Thiazide-like diuretic - indapamide,

Dyslipidaemia

Abnormal amounts of lipids in the blood

- **LDL cholesterol** causes plaques to form in the blood vessels
- **HDL cholesterol** can help to remove LDL from the blood.
- **Triglycerides** stored in fat cells.

Lipid Management

- Full lipid profile= total cholesterol, non-HDL cholesterol
  HDL- high density lipoprotein and triglyceride
- Establish risk using QRisk3 score- treat if >10%
- Atorvastatin 20mg for primary prevention
  80mg for secondary prevention
- Aim for > 40% reduction in non-HDL cholesterol

NICE CG181 Lipid Management

Atrial Fibrillation(AF)

- Disorder of electrical impulses
- Abnormal heart rhythm or arrhythmia
- Heart's two chambers beat irregularly
- Do not coordinate with ventricles
- Caused by high BP , valve disease, pericarditis, cardiomyopathy

Atrial Fibrillation(AF)

- Up to 90% of AF events may be asymptomatic
- Accounts for 1:6 strokes
- Complications of AF include heart failure and thromboembolism
- If 100 people with AF are treated an average of 4 strokes are prevented

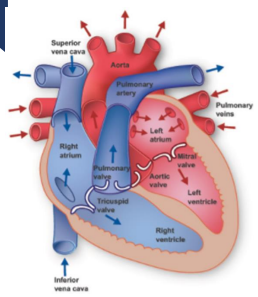
Atrial Fibrillation

- CHECKING PULSES- It only takes a minute
- CHADS2 CHADS2VASc toolkits
- Diagnosis confirmed with ECG
- Treatment- anticoagulation

What is Heart Failure?

- Structural or functional abnormalities which impairs the pumping action of the left ventricle

Heart Failure



Impairment of left ventricular filling[2,3]

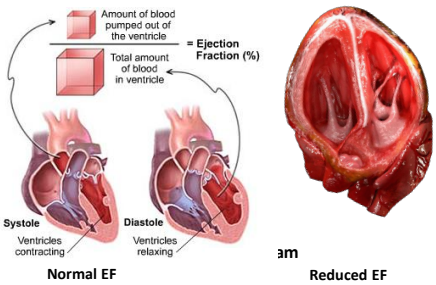
- In diastole, the left ventricle (LV) walls relax allowing for filling of the LV cavity
- Without proper LV relaxation, the volume of blood filling the cavity is reduced, thus reducing the stroke volume, the volume of blood ejected with each contraction

Impaired ejection of blood

- Due to LV wall damage, the LV may have reduced ability to pump or eject the blood

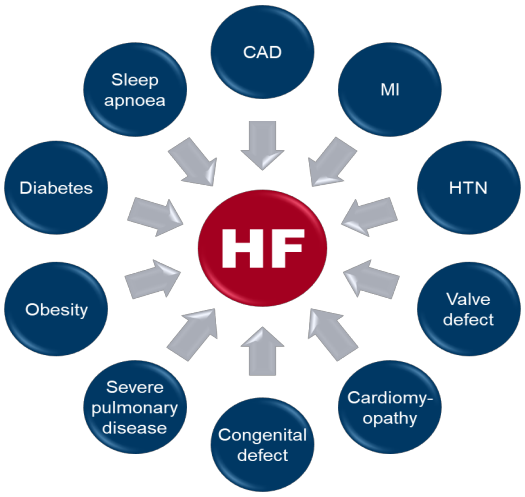
Ejection fraction (EF) is a key criteria in heart failure management

- **EF** is the percentage of blood that is pumped out of the heart during each beat
- A normal EF is ≥50%
- Heart failure with an EF ≤40% is known as **heart failure with reduced ejection fraction** (HFrEF)
- Heart failure in the setting of a normal EF is known as **heart failure with preserved ejection fraction** (HFpEF)



Yancy CW, et al. *Circulation.* 2013;128:e240-e327.

Causes of Heart Failure?



Symptoms of Heart Failure

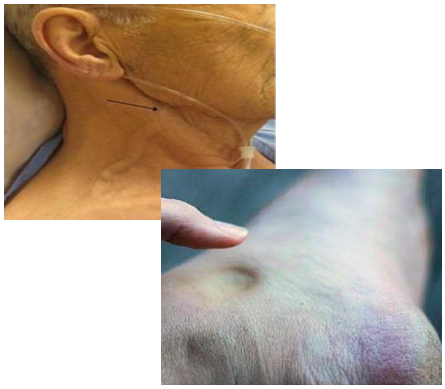
Oedema	Dyspnoea	Fatigue
Coughing or wheezing	Sudden weight gain	Orthopnea
Frequent urination at night	Light headedness or dizziness	Confusion

INVESTIGATIONS

Detailed clinical assessment

Fluid overload

- NTproBNP
- FBC
- ELECTROLYTES
- ECG
- ECHOCARDIOGRAM
- CHEST XRAY
- Cardiac MRI



Main Drugs in Heart Failure

- ACE inhibitors –*ramipril, lisinopril*
- ARB - entresto
- Beta blockers –*bisoprolol*
- *SGLT2- dapagliflozin*
- Diuretics –*Frusemide*
- Aldosterone antagonist – *spironolactone*
- Digoxin

- Adjusting medications to suit the patient and treat heart failure effectively to manage symptoms
- Teaching the patient to self-manage the condition by:
  - *Eating a healthy heart diet – (low salt and fat)*
  - *Managing fluid balance including monitoring weight*
  - *Stop smoking*
  - *Limiting alcohol intake*
  - *Take regular activity*

How Do We Manage Heart Failure?

Key Learning Points

- CVD is largely preventable
- Early identification and management saves lives
- Opportunistic screening
- Ask Assess Action
- Referral to specialist care

Resources

- Diabetes UK: Information prescriptions- Hypertension/Cholesterol www.diabetes.org
- Blood Pressure UK www.bloodpressureuk.org
- British heart Foundation: www.bhf.org