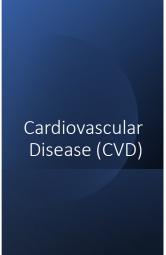
# Cardiovascular Disease: Hypertension to Heart Failure

Gill Dunn Diabetes Specialist Nurse June 2021





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



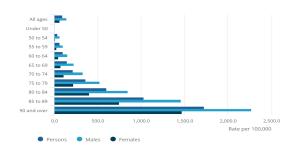
- Coronary Artery Disease (MI/heart failure)
- Cerebrovascular Disease (Strokes TIA's)
- Peripheral Artery Disease (intermittent claudication of lower limbs)
- Aortic Atherosclerosis (thoracic and abdominal aneurysms
- Others: endocarditis, rheumatic heart disease, conduction abnormalities

Cardiovascular Disease Epidemiology:

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



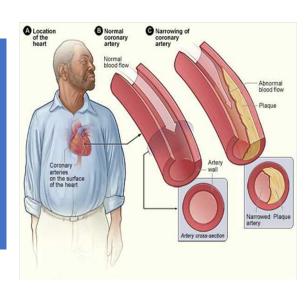
Figure 2: Age-standardised and age-specific mortality rates due to ischaemic heart diseases, England and Wales, deaths registered in 2019



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





- 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

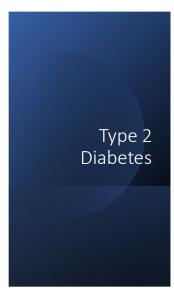


- INTERHEART study1 52 countries
- 9 modifiable risk factors accounted for 90% of the risk having the first MI

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

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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





- 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



- 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

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

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

#### Secondary Primary (essential) hypertension hypertension • Caused by • No identifiable underlying condition cause Hypertension • Tends to appear Can develop suddenly gradually over many • Causes higher blood years pressure than • May be hereditary 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

#### African or Caribbean • ACE -ramipril • CCB eg • ARB - losartan amlodipine Drug Therapy • Thiazide-like • Thiazide-like diuretic diuretic -• Beta blocker indapamide, bisoprolol Aldosterone antagonist spironolactone

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

# 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

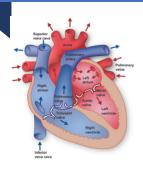


- CHECKING PULSES- It only takes a minute
- CHADS2 CHADS2VASc toolkits
- Diagnosis confirmed with ECG
- Treatment- anticoagulation

What is Heart Failure?

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

#### Heart Failure



#### Impairment of left ventricular filling<sup>2,3</sup>

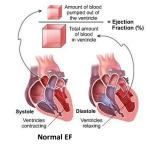
- In diastole, the left ventricle (LV) walls relax allowing for filling of the LV cavity
- Without proper LV relaxation, the volume of blood filling the cavity is reduced, thus reducing the stroke volume, the volume of blood ejected with each contraction

#### 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

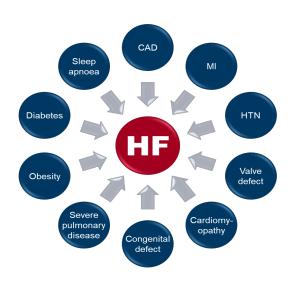
- EF is the percentage of blood that is pumped out of the heart during each beat
- A normal EF is ≥50%
- Heart failure with an EF ≤40% is known as heart failure with reduced ejection fraction (HFrEF)
- Heart failure in the setting of a normal EF is known as heart failure with preserved ejection fraction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

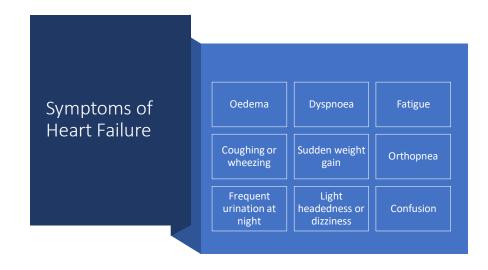




Reduced EF







# Detailed clinical assessment Fluid overload

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



#### **INVESTIGATIONS**



- 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?



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



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