BELMATT
HEALTHCARE TRAINING

HEART FAILURE TO HYPERTENSION

NADIA DALLSING, CARDIAC SPECIALIST NURSE PRACTITIONER

Nice Guidelines 2011

- HTN is one of the most important preventable causes of premature morbidity and mortality in the UK.
- Major risk for stroke, heart attack, heart failure, CKD, cognitive decline and premature death.
- Untreated HTN can lead to a progressive rise in BP.
- Vascular and renal damage can culminate in treatment resistant state.

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

Stages of HTN

- **Stage 1 hypertension** Clinic blood pressure is 140/90 mmHg or higher **and** subsequent ambulatory blood pressure monitoring (ABPM) daytime average or home blood pressure monitoring (HBPM) average blood pressure is 135/85 mmHg or higher.
- **Stage 2 hypertension** Clinic blood pressure is 160/100 mmHg or higher **and** subsequent ABPM daytime average or HBPM average blood pressure is 150/95 mmHg or higher.
- **Severe hypertension** Clinic systolic blood pressure is 180 mmHg or higher **or** clinic diastolic blood pressure is 110 mmHg or higher.

Underlying Conditions for Secondary Hypertension

- Obstructive sleep apnoea
- Kidney problems
- Adrenal gland tumours
- Thyroid problems
- Certain congenital blood defects
- Medications such as birth control pill, cold remedies, decongestants, analgesia and some prescription drugs
- Illicit drugs such as cocaine and amphetamines
- Alcohol abuse
- Depression, anxiety and stress

Risk Factors for Hypertension

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

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

Normal Values

Systolic 120 to 140 mmHg

Diastolic <85 mmHg

Diagnosis

- Annual health check for population > 40 years
- High risk for blood pressure between 18 to 35 years should be checked annually
- Look for underlying conditions or risk factors which may precipitate HTN
- Check BP in both arms (if difference >20 mmHg, repeat measurement
- Ensure you use the appropriate sized cuff
- If diagnosed with raised BP 140/90 or higher, take the best of three readings
- Offer ABPM and HBPM if 140/90 or higher
- Manage conservatively i.e. lifestyle changes
- Start treatment immediately for severe HTN
- Monitor for control
- Medications

Diagnosis

- Measure in both arms
- If difference in readings > 20 mmHg, repeat measurements
- If the difference in 2nd measurements remain > 20 mmHg, repeat measurement in the arm with the higher reading

- BP 140/90 or higher, take a second measurement during the consultation
- If 2nd measurement substantially different from first BP, take a third measurement
- Offer ABPM to confirm diagnosis (offer HBPM if unable to tolerate ABPM)

- Severe hypertension then consider anti-hypertensive drug therapy and carry out investigation for target organ damage ie CKD, retinopathy, LVH, CVD risk

BP Measurements

- ABPM
- At least two measurements per hour during the patient's waking hours

- HBPM
- Two consecutive measurements taken whilst seated, at least one minute apart
- BP recorded twice daily ie morning and evening
- Measurements for at least four to seven days

Target organ damage

- Urine sample for albumin, creatinine ratio and haematuria
- Blood sample for glucose, electrolytes, creatinine, EGF and cholesterol levels
- Examine fundi for retinopathy
- 12 lead ECG

Lifestyle changes

- Healthy diet
- Low sodium intake
- Lose weight
- Take regular activity
- Reduce alcohol consumption
- Reduce caffeine drinks
- Quit smoking and offer support
- Relaxation therapy

Drug therapy

Age > 55 yrs

- ACE eg Ramipril
- ARB eg losartan
- Thiazide-like diuretic
- Beta blocker eg bisoprolol (not used to treat HTN, but considered for young people with intolerance to ACE and ARB, pregnancy and high sympathetic drive)
- Aldosterone antagonist eg spironolactone

Age > 55 yrs (African or Caribbean)

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

What is Heart Failure?

- Heart failure (HF) can be a very debilitating condition affecting more than 900,000 people in the UK annually. This is due to structural or functional abnormalities which impairs the pumping action of the left ventricle. As a result of this, patients may present with either left ventricular systolic dysfunction (LVSD), or HF with preserved ejection fraction (HFPEF). Evidence suggests that the majority of patients treated for LVSD, are commonly caused by coronary artery disease (CAD) and myocardial infarction.

HTN to HF

- Increase in cardiac afterload in a hypertrophic myocardium together with increased peripheral vascular resistance, has an increased burden on the myocardium. Due to increased workload of the myocardium in HF, hypertension also contributes to ischaemia by increasing myocardial oxygen demand. Also, abnormalities in the electrolyte balance, water and neuro-hormonal activation plays a key role in the process from hypertension to HF. During hypertrophy and HF, there is an increase in activity of the renin-angiotensin-aldosterone system and B-adrenoceptor activity.

What Causes Heart Failure?

- Heart Attack – Damage of the heart muscles
- High blood pressure
- Cardiomyopathy disease of the heart muscle
- Virus Infection in the heart
- Heart Valve problems
- Drinking too much alcohol
- An irregular heart rate (Arrhythmia)
- Anaemia
- Thyroid gland disease

Symptoms of Heart Failure

- Oedema
- Dyspnoea
- Fatigue (feeling unusually tired and weak)
- Coughing or wheezing
- Sudden weight gain
- PND
- Orthopnea
- Frequent urination at night
- Light headedness or dizziness
- Confusion

INVESTIGATIONS

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

BNP and NTproBNP

- B-type natriuretic peptide (BNP) and N-terminal pro b-type natriuretic peptide (NT-proBNP) are substances that are produced in the heart and released when the heart is stretched and working hard to pump blood. Tests for BNP and NT-proBNP measure their levels in the blood in order to detect and evaluate heart failure.

BNP and NTproBNP

- BNP is actually produced primarily by the left ventricle of the heart (the heart's main pumping chamber). It is associated with blood volume and pressure and with the work that the heart must do in pumping blood throughout the body. Small amounts of a precursor protein, pro-BNP, are continuously produced by the heart. Pro-BNP is then cleaved by the enzyme called corin to release the active hormone BNP and an inactive fragment, NT-proBNP, into the blood.

How Do We Manage Heart Failure?

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

HF

- Angiotensin II is an important initiator of extracellular remodelling, which contributes to the pathogenesis of atherosclerosis and cardiac hypertrophy (Georgiopoulou et al, 2012). Early initialisation and titration of ACE inhibitor, together with beta-blockade and neuro-hormonal antagonist are recommended in the treatment of HF.

Main Drugs in Heart Failure

- **ACE inhibitors** – They lighten the workload of your heart and easier for your heart to pump blood around your body . (*Ramipril, Lisinopril Enalapril, Perindopril, Captopril)*

- **Beta blockers** – Prevent the heart from beating too quickly and too forcefully.(*Bisoprolol,* C*arvedilol, Atenolol,Metoprolol)*

Main Drugs in Heart Failure

- **Diuretics (Water pills)** – Help your kidneys get rid of excess fluid by making you pass more urine. (*Frusemide, Bumetanide, Metolazone, Bendrofluazide)*

- **Aldosterone antagonist** – Gets rid of excess fluid by passing more urine. (*Eplerenone, Spironolactone)*

- **Digoxin** – Slows down and strengthens your heartbeat, helps control irregular heart rhythms and helps your heart pump blood around your body efficiently.

Pacemakers

- Biventricular pacemakers (CRT-P)
- Biventricular with ICD (CRT-D)
- ICD

Questions??????????????