You are working as a Clinical Officer. Suddenly a patient has registered and is now ready to enter you consultancy room…

Case 1 – Male 42 years

Previously healthy. 3-4 weeks with fatigue, headache. Works fulltime in office. Stressful work. No previous medication. Father a heart attack at the age of 68.

BP 152/94 mmHg. Pulse 76/min. Weight 105 kg, length 172 cm.

Is there anything else you would like to know about this patient?

Are there any lab tests you would like to run?

Case 1 – Male 42 years

You ask for:

• Hb, LPK, TPK	142 g/l, LPK, TPK normal
• fP-Glu	6.0 mmol/L
• Creatinine, K, Na	60 umol/L, K, Na normal
• Urine analysis	normal
• Cholesterols/lipids	normal
• ECG	normal
• BMI	35 kg/m2

Case 1 – Male 42 years

The patient tells you that his wife complains about snoring and sometimes apnea during sleep. He uses alcohol 1-2 bottles of wine every week to relax from work.

- You decide to refer him to the physiotherapist and nutritionist for training and weight reduction (inc alcohol use).
- Appointment for update within 1-2 months (BP and P-Glu).
- You do not start any medical treatment for the moment.
- If weight reduction does not help snoring and apnea, you are prepared to refer him for further investigation at the ÖNH(ear, nose, throat)-specialist.

Case 2 – Female 82 years

Diabetes II, hypertonia.

Metformin 850 mg x3. Enalapril 20 mg. Furosemid 40 mg.

BP 170/100 mmHg. Pulse 85/min. Weight 75 kg, length 165 cm.

Is there anything else you would like to know about the patient?

Are there any lab tests you would like to run?

Case 2 – Female 82 years

You ask for:

• Hb, LPK, TPK	112 g/L, LPK, TPK normal
• fP-Glu, HbA1c	7.4 mmol/L, 65 mmol/mol
• Creatinine, K, Na	160 umol/L, 5.4 mmol/L, Na normal
• Urine analysis	Proteins +
• Cholesterols/lipids	normal
• ECG	Non specific changes
• BMI	27.5 kg/m2
• NT-ProBNP	1200 ng/L

Case 2 – Female 82 years

The patient complains about dyspnea and edema on feet and lower limbs bilaterally. You listen to the lungs that sound normal. You observe pitting edema on lower limbs.

You use a GFR calculator on the internet – GFR 28 ml/min/1.73m2

You diagnose heart and kidney failure and decide to adjust medication.

- Kidneys: Lower dosage of Metformin and Enalapril.
- Heart and BP: Add Eplerenon 25 mg and Bisoprolol 2,5 mg
- Diabetes: Add SGLT2-inhibitor (e.g. dapaglifozin)

TCA 3-4 weeks.

Case 3 – Female 59 years

2 days with severe headache. Some chest pain. Feeling of difficulty to breath and a pulsating heart. Dizzy. Previously healthy, no medication.

BP 235/140 mmHg. Pulse 95/min. Weight 70 kg, length 170 cm.

Is there anything else you would like to know about the patient?

Are there any lab tests you would like to run?

Case 3 – Female 59 years

You ask for:

• Hb, LPK, TPK	132 g/L, LPK, TPK normal
• fP-Glu	4.4 mmol/L
• Creatinine, K, Na	76 umol/L, K, Na normal
• Urine analysis	normal
• ECG	Non specific changes
• BMI	24 kg/m2
• NT-ProBNP	240 ng/L
• CRP	3 mg/L

Case 3 – Female 59 years

The patient has very high BP but no obvious organ failure. You think of referring, but then you decide to try to intervene.

You give 10 mg Amlodipine and let the patient rest 1-2 hours. The BP goes down to 150/90 and the patient is feeling better.

You prescribe Amlodipine 10 mg x1

TCA within 1 week for check-up and testing for other risk factors (physical activity, alcohol, smoking, psychological stress, lipids)

Hypertension

Treatment – Swedish recommendations

Dr L Salmi, 2023

Background

- Hypertension: Single treatable cause of disease. Stroke, kidney failure, ischemic heart disease, atrial fibrillation, other arrhythmias, arterial vascular disasters, dementia.
- Increase with age.
- Genetic factors contribute.
- Treatment that starts early is of great value.
- Reduction systolic blood pressure by 10 mmHg or diastolic blood pressure by 5 mmHg reduces risk of various cardiovascular events by 20–50 % and cardiovascular death by approximately 20 %.
- Large number of patients with undetected or untreated or discontinued hypertension.

Background

- Primary hypertension: A complex multifactorial disease in which age, heredity, lifestyle factors, atherosclerosis, kidney, endocrine and neurohormonal systems play a role.
- Secondary hypertension: 15–20 % of all hypertension. Identifiable etiological cause.
  - Primary aldosteronism
  - Renal artery stenosis or parenchymal disease
  - Obstructive sleep apnea
  - Alcohol, NSAIDs, contraceptives/hormonal preparations, central stimulant drugs, cortisone, etc

Risk assessment

Riskbedömning Andra riskfaktorer, organskada eller sjukdom	**Högt** normalt SBT 130–139 mmHg och/eller DBT 85–89 mmHg	**Grad 1** hypertoni SBT 140–159 mmHg och/eller DBT 90–99 mmHg	**Grad 2** hypertoni SBT 160–179 mmHg och/eller DBT 100–109 mmHg	**Grad 3** hypertoni SBT ≥180 mmHg och/eller DBT ≥110 mmHg
Inga andra riskfaktorer	Låg risk	Låg risk	Måtlig risk	Hög risk
1–2 riskfaktorer	Låg risk	Måtlig risk	Måtlig risk	Hög risk
≥3 riskfaktorer	Låg risk	Måtlig risk	Hög risk	Hög risk
Hypertoniorsakad organskada, njursvikt stadium 3 (eGFR 30–59 ml/min/1,73 m²) eller diabetes mellitus utan organskada	Måtlig risk	Hög risk	Hög risk	Mycket hög risk
Etablerad aterosklerotisk hjärt-kärlsjukdom, njursvikt stadium ≥4 (eGFR<30ml/min/1,73 m²) eller diabetes mellitus med organskada	Mycket hög risk	Mycket hög risk	Mycket hög risk	Mycket hög risk

Matris modifierad efter Läkemedelsverkets behandlingsrekommendationer 2014 och uppdaterad och modifierad efter ESC/ESH guidelines 2018

Ungefärlig risk för död i hjärt-kärlsjukdom inom 10 år*

Låg risk <1 %	Måttlig risk 1–4 %	Hög risk 5–9 %	Mycket hög risk ≥10 %

*Modifierat utifrån SCORE

Risk factors:

- Male
- Age >55 men, >65 women
- Hyperlipidemia
- Diabetes
- Heritage
- BMI >30 kg/m2
- Inactivity

Goal

Treatment goals (provided the treatment is well tolerated):

<70 years: 120–129/70–79 mmHg

>70 years: 130–139/70–79 mmHg

- The same target values apply to the vast majority of patients with concurrent diabetes, kidney disease or other cardiovascular disease.
- Prioritize reaching target systolic blood pressure over target diastolic blood pressure in patients 50 years of age or older.
- The blood pressure target should be reached within 3 months after starting treatment.

Treatment mechanisms

1. **Calcium blocker**: Inhibiting calcium channels and allow blood vessels to relax.
2. **Angiotensin II blocker (ARB)**: Angiotensin II causes vasoconstriction via the type 1 receptor.
3. **ACE inhibitor**: Prevent an enzyme in the body from producing angiotensin II.
4. **Diuretic**: They act by diminishing sodium reabsorption at different sites in the nephron, thereby increasing urinary sodium and water losses.
5. **Beta blocker**: Blocking the effects of epinephrine/adrenaline and cause the heart to beat more slowly and with less force.
6. **Alpha blocker**: Preventing norepinephrine from tightening the muscles in the walls of smaller arteries and veins.
7. **Aldosterone inhibitor**: Causes increased amounts of sodium and water to be excreted, while potassium is retained.

Treatment strategy

1a. ACE-inhibitor or **ARB**	Enalapril
1b. (ACE-inhibitor or **ARB)** AND **(Calcium blocker** or **Thiazide)**	Amlodipine
2. (ACE-inhibitor or **ARB)** AND **Calcium blocker** AND **Thiazide**	HCTZ
3. As 2 AND **(Aldosterone antagonist** or **loop diuretic** or **beta blocker** or **alpha blocker)**	Eplerenon Furosemid Metoprolol

Treatment strategy

- A combination of two different drug classes is recommended right from the start. Fixed combinations exist.
- Factors that influence the choice of preparation are risk factors, co-morbidity, the patient's previous experience and wishes.
- If eGFR <30 ml/min/m2, thiazides are replaced with loop diuretics.
- When starting ACE inhibitors, ARBs or diuretics, electrolytes and creatinine should be checked after about 2 weeks.

Treatment strategy

Very high blood pressure without signs of acute organ involvement

- Let the patient rest and check the blood pressure again.
- If blood pressure remains elevated, give drugs per oz with a relatively fast onset of action, for example felodipin, furosemid or enalapril.
- Observe the patient for 2–3 h, consider increased treatment intensity by increasing the dose and/or adding additional drugs and follow up within 1–3 days.

Treatment strategy - Hypertensive crisis

- Defined as very high blood pressure (usually >240 mmHg systolic and/or >130 mmHg diastolic) *and* signs of acute organ failure.
- Signs of acute failure: e.g. new symptoms from heart (angina, arrhythmia), kidneys or CNS (dizziness, visual disturbances, headache, nausea, vomiting, impaired consciousness, convulsions).

Refer to emergency department