SAHS & NDOH Hypertension Management Lecture Series

Back to Basics in Hypertension Management

Southern African Hypertension Society

SAHS

Know your blood pressure by

SA Hypertension Treatment

Risk Stratification and Special Investigations

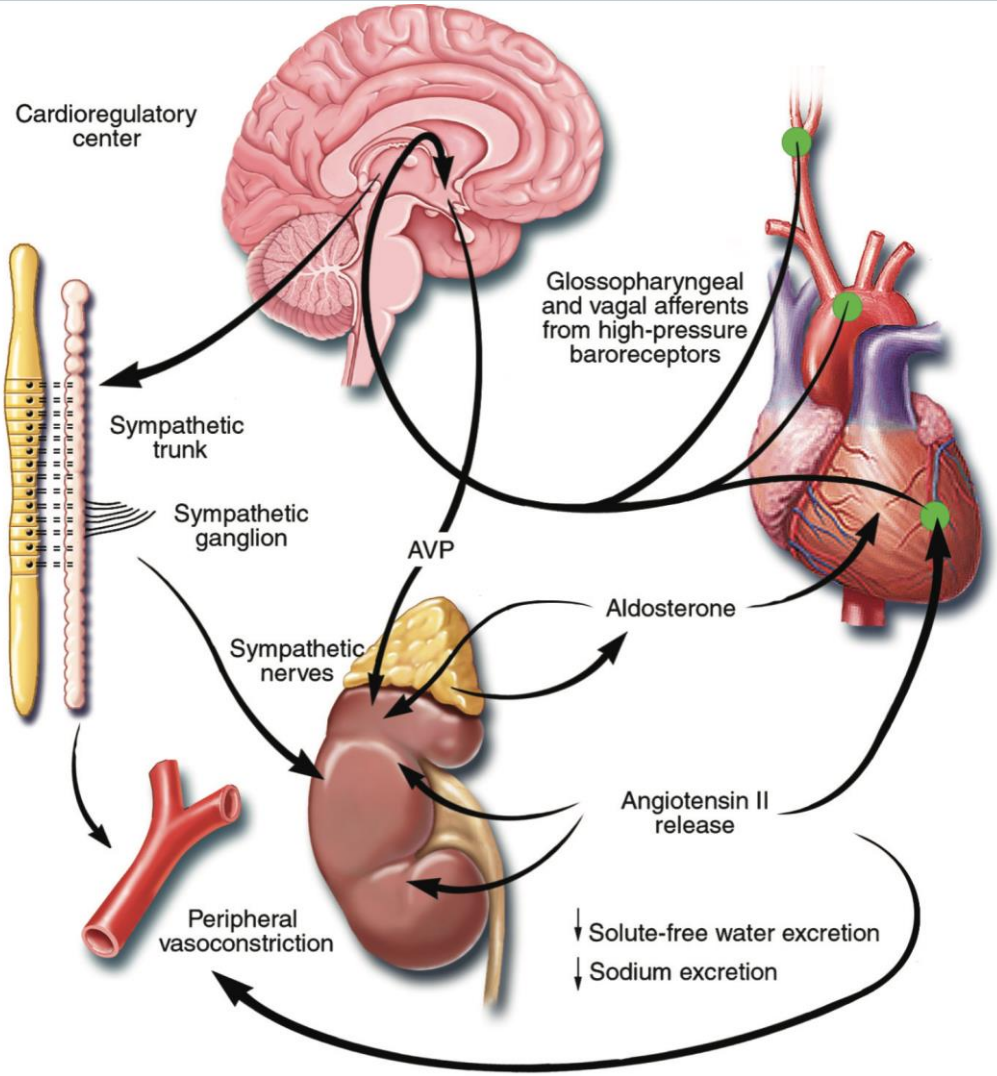
Southern African Hypertension Society

SAHS

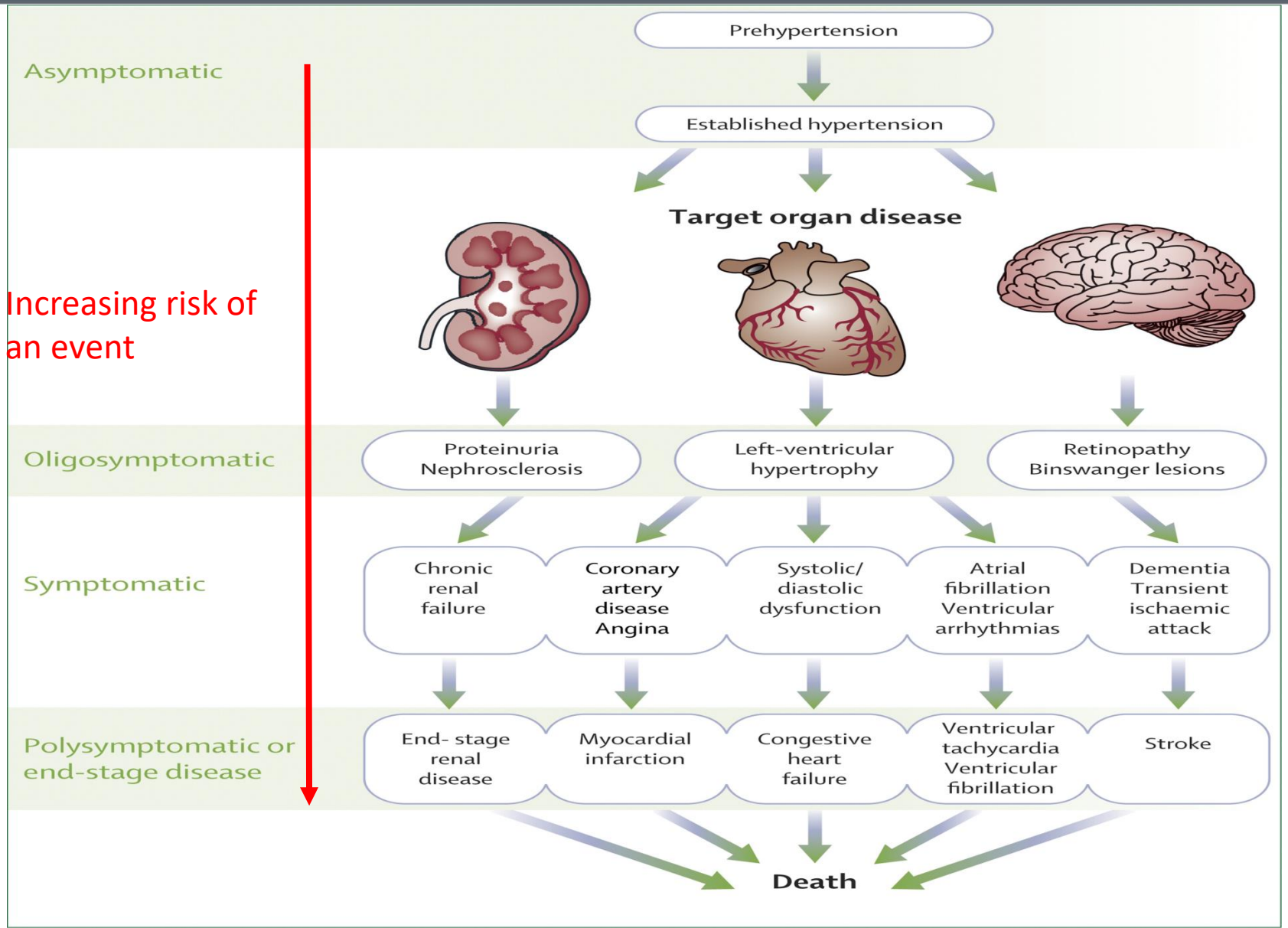
Know your blood pressure by

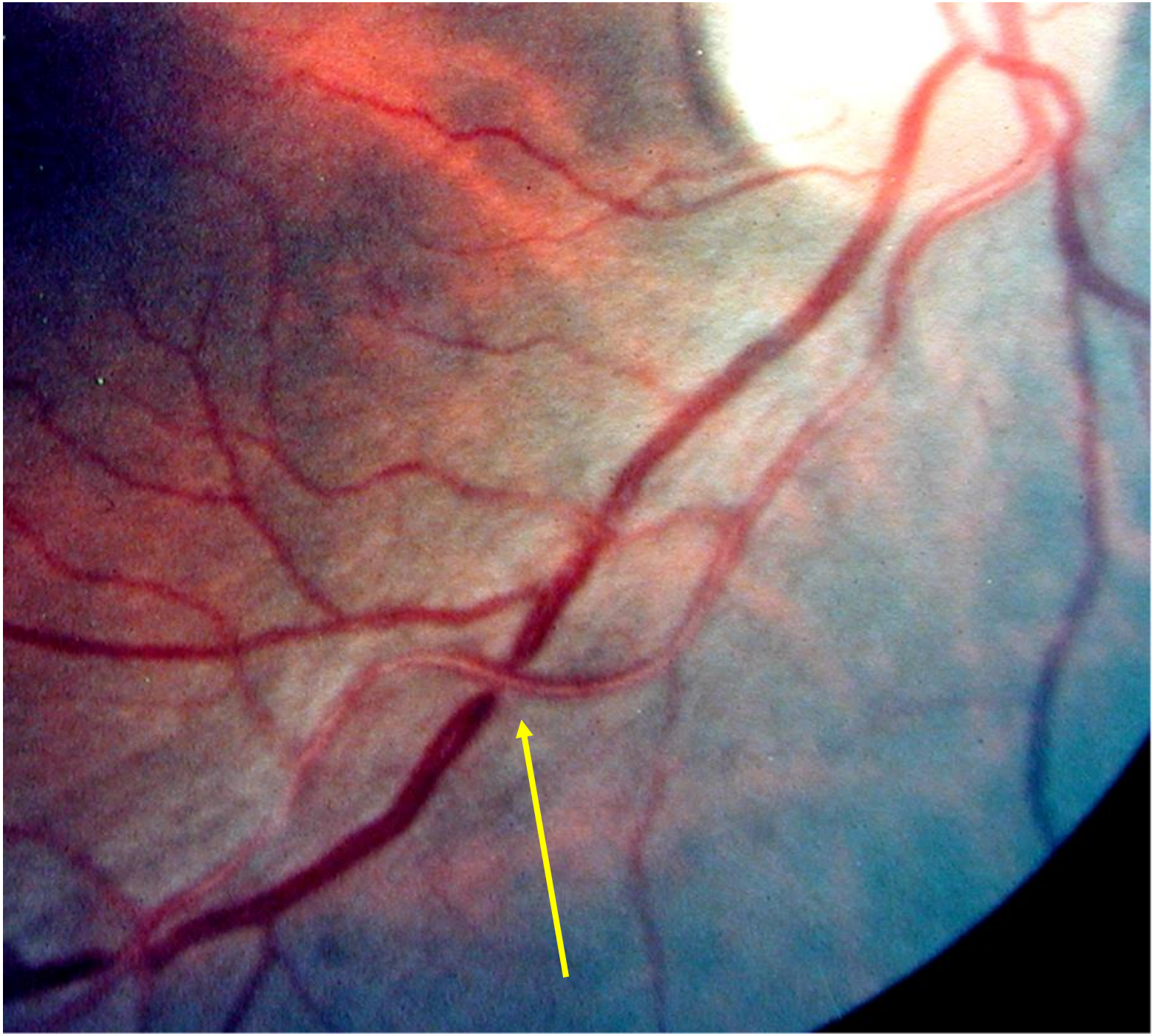
Prepared by Dr Nqoba Tsabedze

Regulation of Blood Pressure



Importance of CV risk





CVD Risk Factors in HPT

Modifiable Risk Factors*	Relatively Fixed Risk Factors†
• Current cigarette smoking, secondhand smoking • Diabetes mellitus • Dyslipidemia/hypercholesterolemia • Overweight/obesity • Physical inactivity/low fitness • Unhealthy diet	• CKD • Family history • Increased age • Low socioeconomic/educational status • Male sex • Obstructive sleep apnea • Psychosocial stress

Know your blood pressure by

Whelton et al. *J Am Coll Cardiol.* 2018;71(19):e127-e248

Routine Investigations in Hypertension

Test	*Comment*
Height, weight, BMI	Ideal BMI < 25 kg/m^2, overweight 25–30 kg/m^2, obese > 30 kg/m^2
Waist circumference	Men < 102 cm; women < 88 cm. South Asians and Chinese: men < 90 cm and women < 80 cm
Electrolytes	Low potassium may indicate primary aldosteronism, or effects of diuretics
ECG	S in V1 plus R in V5 or V6 > 35 mm or R in aVL > 11 mm or Cornel product (R in aVL + S in V3 + 6 in females) × QRS duration > 2 440 (mm/ms)
Echocardiogram (if indicated and facilities available)	LVH: men > 115 g/m^2 and women > 95 g/m^2
Fasting glucose	Consider HBA_{1c} or GTT if impaired fasting glucose (6.1–7.1 mmol/l)
Cholesterol	If total cholesterol > 5.1 mmol/l – fasting lipogram
Creatinine	Calculate eGFR
Uric acid	High uric acid is relative contraindication to diuretics
Dipsticks urine	If abnormal, urine microscopy and protein estimation

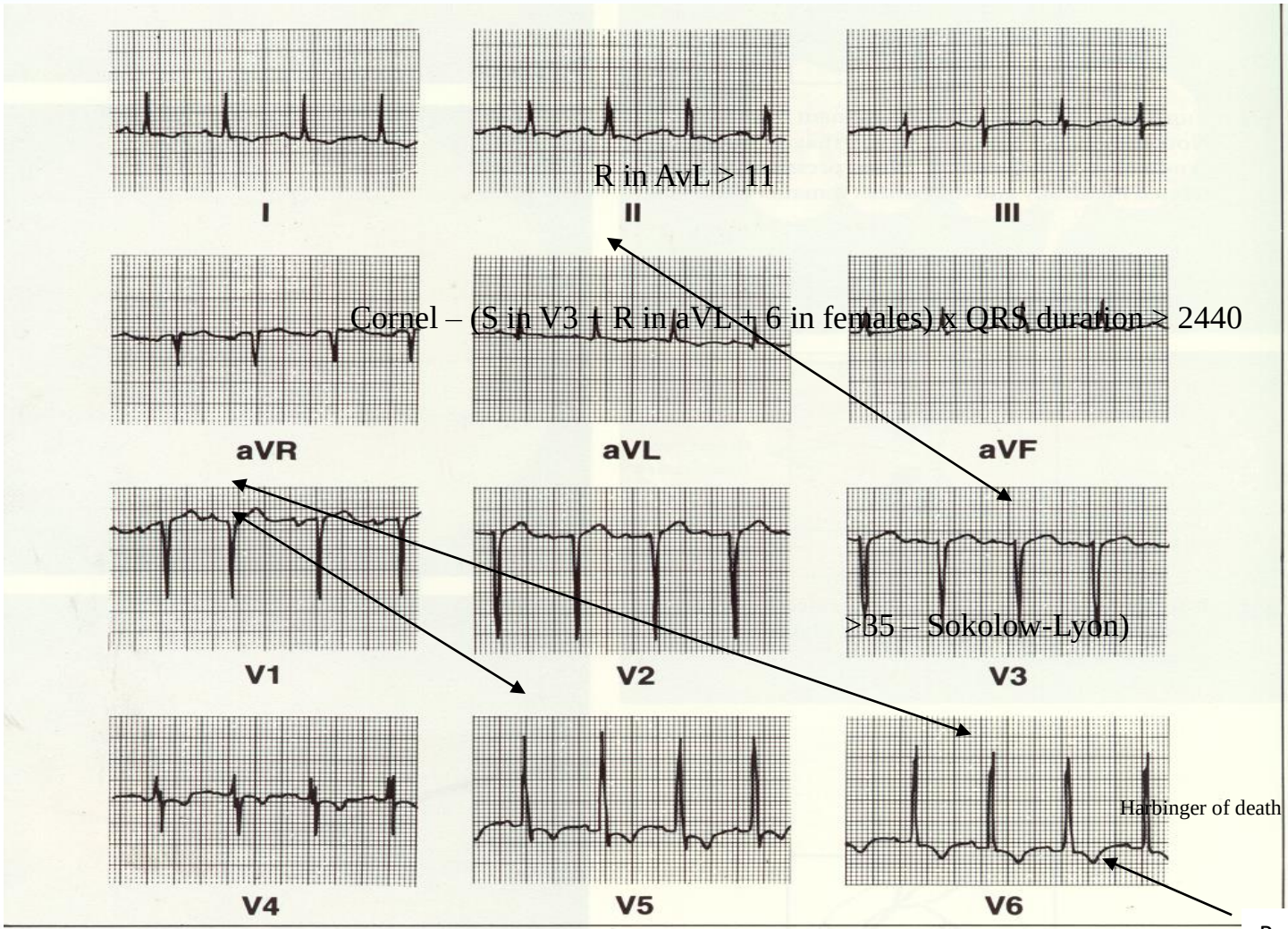
Seedat et al. *Cardiovasc J Afr.* 2014;25(6):288-294.

Mandatory Investigations

Investigation	TOD	Secondary cause	Risk stratification
Dipsticks urine	Yes, usually 1+ protein only in hypertensive nephrosclerosis	2+ or more proteinuria and/or haematuria suggests kidney disease	Yes
ECG	LVH (see ECG criteria)	No	Yes
Creatinine/eGFR	Yes	Yes	Yes
Echocardiogram#	LVH	No	Yes
K^+	No	Low K+ may suggest primary aldosteronism/excess diuretic	No
Fasting glucose	No	No	Yes
Fasting lipogram	No	No	Yes
Urine albumin/creatinine ratio*	Yes	Yes, if markedly elevated	Yes

*mandatory in diabetics, first voided urine specimen, < 3mg – normal, 3-30 microalbuminuria, > 30 macroalbuminuria (spot urines tend to overestimate ratio),
- only if readily available

ECG Criteria for LVH



R in AvL > 11

Cornel – (S in V3 + R in aVL + 6 in females) x QRS duration > 2440

>35 – Sokolow-Lyon)

Harbinger of death

Repolarisation changes – harbinger of death

Electrocardiogram from patient with malignant hypertension. Voltage charges of left ventricular hypertrophy (dec

TABLE: IV: MAJOR RISK FACTORS, TARGET ORGAN DAMAGE (TOD) AND COMPLICATIONS

MAJOR RISK FACTORS.	TOD	Complications

• Levels of systolic and diastolic BP.
• Smoking.
• Dyslipidaemia:
  ○ total cholesterol > 5.1 mmol/L, **OR**
  ○ LDL > 3 mmol/L, **OR**
  ○ HDL men <1 and women <1.2 mmol/L.
• Diabetes mellitus.
• Men > 55 years.
• Women > 65 years.
• Family history of early onset of CVD:
  ○ Men aged <55 years;
  ○ Women aged <65 years.
• Waist circumference- abdominal obesity:
  ○ Men ≥ 102 cm;
  ○ Women ≥ 88 cm.
The exceptions are South Asians and Chinese: Men: >90 cm and Women: >80 cm.
	• LVH: based on ECG
	  ○ Sokolow-Lyons >35mm
	  ○ R in aVL > 11 mm
	  ○ Cornel > 2440 (mm.ms)
	• Microalbuminuria: albumin creatine ratio 3-30 mg/mmol preferably spot morning urine and eGFR > 60ml/min
		• Coronary heart disease
		• Heart failure
		• Chronic kidney disease:
		  ○ macroalbuminuria > 30mg/mmol
		OR eGFR < 60ml/min
		• Stroke or TIA
		• Peripheral arterial disease
		• Advanced retinopathy:
		  ○ haemorrhages OR;
		  ○ exudates;
		  ○ papilloedema.

(Adapted from the ESH/ ESC guidelines) [9]

Risk stratification guides treatment

Cardiovascular Risk Assessment

Very high risk	**People with any of the following:**
	Documented CVD, either clinical or unequivocal on imaging. • **Clinical CVD** includes acute myocardial infarction, acute coronary syndrome, coronary or other arterial revascularization, stroke, TIA, aortic aneurysm, and PAD • **Unequivocal documented CVD on imaging** includes significant plaque (i.e. ≥50% stenosis) on angiography or ultrasound; it does not include increase in carotid intima-media thickness • **Diabetes mellitus with target organ damage**, e.g. proteinuria or a with a major risk factor such as grade 3 hypertension or hypercholesterolaemia • **Severe CKD** (eGFR <30 mL/min/1.73 m^2) • **A calculated 10 year SCORE of ≥10%**
High risk	**People with any of the following:** • **Marked elevation of a single risk factor**, particularly cholesterol >8 mmol/L (>310 mg/dL), e.g. familial hypercholesterolaemia or grade 3 hypertension (BP ≥180/110 mmHg) • **Most other people with diabetes mellitus** (except some young people with type 1 diabetes mellitus and without major risk factors, who may be at moderate-risk)
	Hypertensive LVH
	Moderate CKD eGFR 30-59 mL/min/1.73 m^2)
	A calculated 10 year SCORE of 5-10%
Moderate risk	**People with:** • **A calculated 10 year SCORE of ≥1 to <5%** • **Grade 2 hypertension** • **Many middle-aged people belong to this category**
Low risk	**People with:** • **A calculated 10 year SCORE of <1%**

Know your blood pressure by

Eur Heart J. 2018;39(33):3021-104

Total Cardiovascular Risk Stratification

Hypertension disease staging	Other risk factors, HMOD, or disease	BP (mmHg) grading			
		High normal SBP 130-139 DBP 85-89	Grade 1 SBP 140-159 DBP 90-99	Grade 2 SBP 160-179 DBP 100-109	Grade 3 SBP ≥180 or DBP ≥110
Stage 1 (uncomplicated)	No other risk factors	Low risk	Low risk	Moderate risk	High risk
	1 or 2 risk factors	Low risk	Moderate risk	Moderate to high risk	High risk
	≥3 risk factors	Low to Moderate risk	Moderate to high risk	High Risk	High risk
Stage 2 (asymptomatic disease)	HMOD, CKD grade 3, or diabetes mellitus without organ damage	Moderate to high risk	High risk	High risk	High to very high risk
Stage 3 (established disease)	Established CVD, CKD grade ≥4, or diabetes mellitus with organ damage	Very high risk	Very high risk	Very high risk	Very high risk

Know your blood pressure by

Case Study

- Mr. AB, a 54 year old male – blue collar worker
- Metabolic syndrome – hypertensive, dyslipidaemia and type 2 diabetic with central obesity
- Presents to the OPD for his 6 monthly follow-up appointment
- He is on lifestyle & dietary management and taking Medications
- He is a smoker

Clinical Examination

- Blood pressure – 167/98 mmHg at rest (Office BP reading)
- Pulse rate of 88 beats/min
- Respiratory rate of 18 breaths/min
- Grade 2 Pedal oedema (Preserved LVEF – Echocardiogram done 6 months ago)
- Normal Heart Sounds
- NYHA Class II

Medication

- Metformin 850mg po BD, Atorvastatin 40 mg po nocte
- Amlodipine 10mg po daily
- Enalapril 10 mg po daily
- History of sporadic inflammatory arthritis of the small joints of the hand treat with OTC self prescription
- NYHA Class II

What is this patient's 10 year Cardiovascular Risk?

Framingham 10 Yr. CVD Risk

Step 1[1]

In the "points" column enter the appropriate value according to the patient's age, HDL-C, total cholesterol, systolic blood pressure, and if they smoke or have diabetes. Calculate the total points.

Risk Factor		Risk Points				Points
		Men		Women		
Age						
30-34		0		0		
35-39		2		2		
40-44		5		4		
45-49		7		5		
50-54		8		7		
55-59		10		8		
60-64		11		9		
65-69		12		10		
70-74		14		11		
75+		15		12		
HDL-C (mmol/L)						
>1.6		-2		-2		
1.3-1.6		-1		-1		
1.2-1.29		0		0		
0.9-1.19		1		1		
<0.9		2		2		
Total Cholesterol						
<4.1		0		0		
4.1-5.19		1		1		
5.2-6.19		2		3		
6.2-7.2		3		4		
>7.2		4		5		
Systolic Blood Pressure (mmHg)		Not Treated	Treated	Not Treated	Treated	
<120		-2	0	-3	-1	
120-129		0	2	0	2	
130-139		1	3	1	3	
140-149		2	4	2	5	
150-159		2	4	4	6	
160+		3	5	5	7	
Smoker	Yes	4		3		
	No	0		0		
Diabetes	Yes	statin-indicated condition				
	No	0		0		
Total Points						

Adapted from the Canadian Cardiovascular Society

Framingham 10 Yr. CVD Risk

Step 2[1]

Using the total points from Step 1, determine the 10-year CVD risk (%).*

Total Points	10-Year CVD Risk (%)*	
	Men	Women
-3 or less	<1	<1
-2	1.1	<1
-1	1.4	1.0
0	1.6	1.2
1	1.9	1.5
2	2.3	1.7
3	2.8	2.0
4	3.3	2.4
5	3.9	2.8
6	4.7	3.3
7	5.6	3.9
8	6.7	4.5
9	7.9	5.3
10	9.4	6.3
11	11.2	7.3
12	13.3	8.6
13	15.6	10.0
14	18.4	11.7
15	21.6	13.7
16	25.3	15.9
17	29.4	18.51
18	>30	21.5
19	>30	24.8
20	>30	27.5
21+	>30	>30

Adapted from the Canadian Cardiovascular Society

Framingham 10 Yr. CVD Risk

Step 3[1]

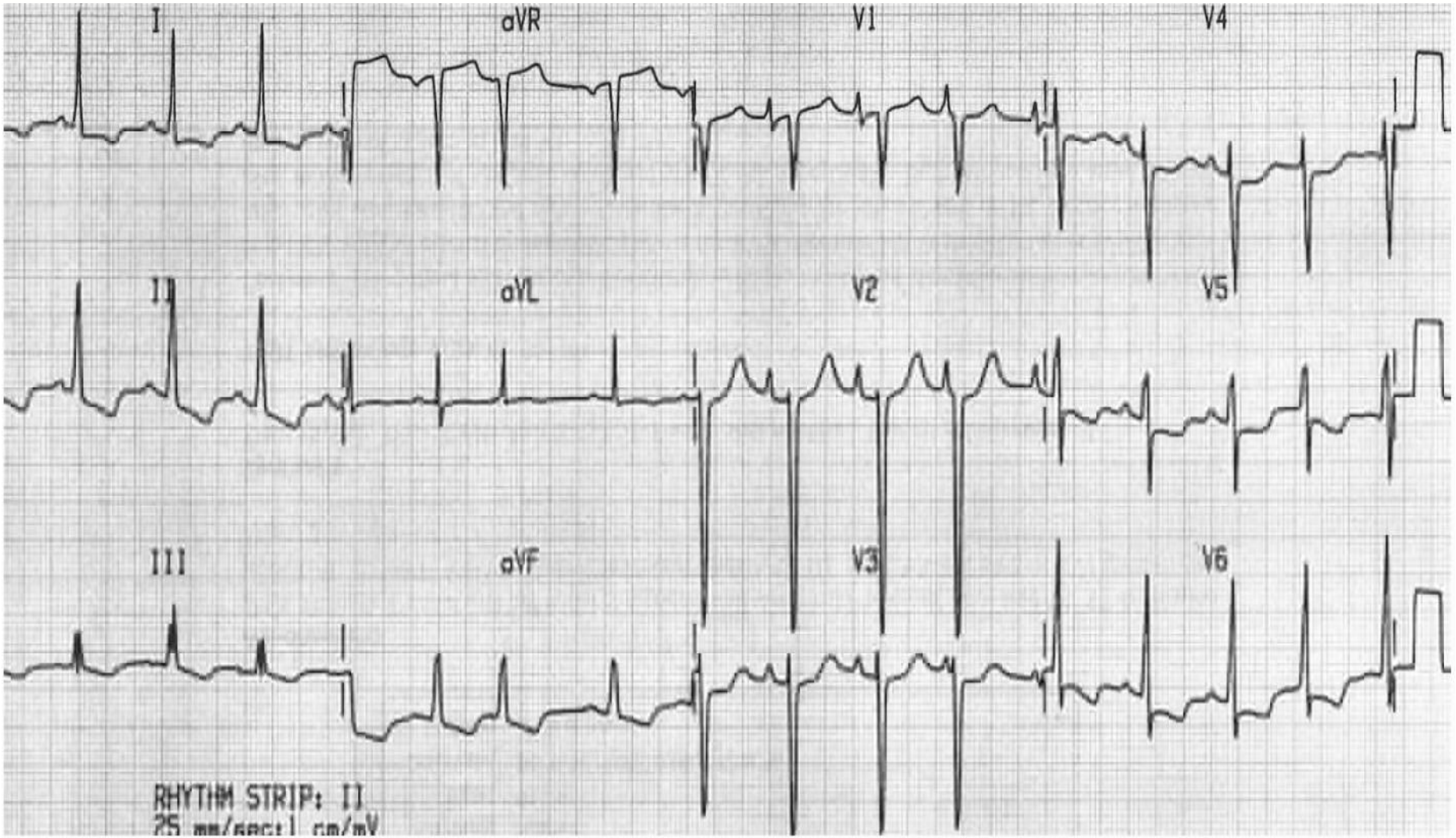
Using the total points from Step 1, determine heart age (in years).

Heart Age, *y*	Men	Women
<30	<0	<1
30	0	
31		1
32	1	
34	2	2
36	3	3
38	4	
39		4
40	5	
42	6	5
45	7	6
48	8	7
51	9	8
54	10	
55		9
57	11	
59		10
60	12	
64	13	11
68	14	12
72	15	
73		13
76	16	
79		14
>80	≥17	15+

Adapted from the Canadian Cardiovascular Society

What other clinical investigations would you perform?

Electrocardiogram



Monitoring (1)

At every visit:

- Weight
- Blood pressure

Baseline:

- Urine protein by dipstix.
  - If dipstix positive send blood for serum creatinine concentration (and eGFR)
- BMI for cardiovascular risk assessment (See Section 4.1: Prevention of ischaemic heart disease and atherosclerosis).
- Abdominal circumference.
- Serum potassium concentration, if on ACE-inhibitor or eGFR < 30 mL/min. (See Section 9.2.2: Type 2 Diabetes Mellitus, Adults).

Monitoring (2)

Six monthly:

» Serum potassium concentration in patients on spironolactone or eGFR < 30 mL/min.

Annually:

» Fingerprick blood glucose (see Section 9.2.2: Type 2 Diabetes Mellitus, Adults).
» Urine protein by dipstix (see Section 8.1: Chronic Kidney Disease (CKD)).
» Serum creatinine concentration (and eGFR) in patients who have:
  – proteinuria 1+ or more
  – existing cardiovascular disease
  – hypertension present for 10 years or more (annually if uncontrolled)
  – chronic kidney disease (eGFR < 60 mL/min)

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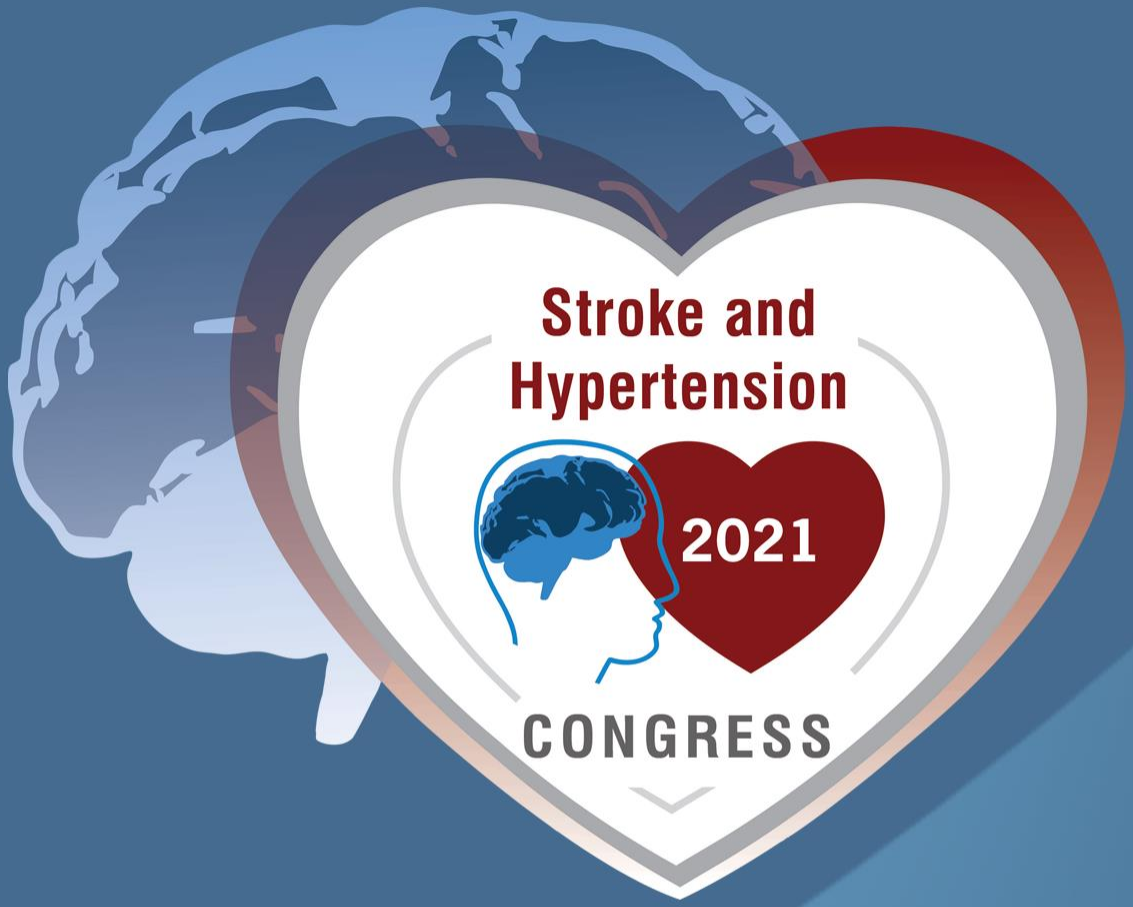

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