

Systemic Hypertension

The questions signed by * are hard: read their explanation. ● Past Years ● TBL ● Others

This file belongs to the PULSE Cardiology question book: the explanations of the multiple choice answers and the model answers of the essay questions, in the words of the handout.

Answer Key | Multiple Choice Questions

Question no.	1	2	3	4	5	6	7	8	9	10	11	12
Answer	a	c	c	b	d	a	d	d	b	b	b	a

Question no.	13	14	15	16	17	18	19	20	21	22	23	24
Answer	c	a	d	d	d	d	b	c	c	c	c	d

Question no.	25	26	27	28	29	30	31
Answer	c	d	c	d	d	c	d

► Second | Questions with a Note

Question no.	1	2	3
Answer	c	d	a

► Why this answer?

- From the following scenarios, who is NOT suspected to have secondary hypertension?
(a) A 33-year-old obese woman presenting with BP 160/90 and a...
Hereditary and obesity are predisposing factors of essential HPN, so the young obese woman with a family history fits essential HPN. Sudden development, HPN resistant to treatment and onset after 50 years are clues to renal artery stenosis, a secondary cause.
- Which of the following statements regarding the treatment of hypertensive emergencies and urgencies is FALSE?
(c) All patients with marked blood pressure elevation should...
Only patients with acute target organ damage (emergencies) need hospitalization, preferably in ICU. Urgencies have no acute end organ damage and blood pressure is lowered over 1-2 days.
- Regarding severe elevation of blood pressure, which is incorrect?
(c) Needs only reassurance of the patient and relatives.
Severe elevation of blood pressure always needs treatment, never reassurance alone. Without acute end organ damage it is an urgency, lowered over 1-2 days; with acute Lt.v. failure and pulmonary oedema it is an emergency needing hospital and rapid reduction.

- 4 All of the following antihypertensive drugs are safe in pregnancy except:
(b) ACEI
 ACE inhibitors are on the 'Avoid' list of HPN with pregnancy. Alpha methyl dopa and CCBs (not at labour) are on the 'Use' list, and labetalol is a safe combined alpha and beta blocker.
- 5 Which of the following patients can be typically managed as an outpatient?
(d) Patient with blood pressure 200/110 and has no signs of...
 No acute end organ damage means a hypertensive urgency, where blood pressure can be lowered over 1-2 days, so the patient can be treated as an outpatient. Pulmonary oedema and acute chest pain are emergencies that need hospitalization, preferably in ICU.
- 6 Presence of acute chest pain in hypertensive patient is consistent with:
(a) Hypertensive emergency.
 Acute chest pain in a hypertensive patient points to unstable angina, myocardial infarction or a dissecting aortic aneurysm, and these are counted as hypertensive emergencies.
- 7 Paroxysmal hypertension is classically found in:
(d) Pheochromocytoma
 Pheochromocytoma gives paroxysmal HPN.
- 8 A 25-year-old male presented with episodic rise in heart rate and blood pressure with sweating, flushing and...
(d) Pheochromocytoma.
 Attacks of high blood pressure with fast pulse, sweating, flushing and tremors fit pheochromocytoma, which gives paroxysmal HPN and is an endocrinal cause of secondary HPN.
- 9 A 30-year-old pregnant female patient is diagnosed with hypertension. Which of the following is safe for her?
(b) Labetalol.
 ACE inhibitors are on the 'Avoid' list of HPN with pregnancy, while alpha methyl dopa, hydralazine and CCBs are on the 'Use' list; ARBs act on the same angiotensin system. Labetalol, a combined alpha and beta blocker, is a standard safe drug in pregnancy.
- 10 What is the target of blood pressure control for most patients with hypertension according to 2024 ESC...
(b) Systolic BP 120–129 mmHg and diastolic BP 70–79 mmHg.
 For most treated hypertensive patients the target is a systolic pressure of 120-129 mmHg with a diastolic pressure of 70-79 mmHg, as long as the patient tolerates it.
- 11 * The following facts are true regarding hypertension except:
(b) Treatment of hypertension can be stopped once controlled.
 This is inferred from the handout: sudden withdrawal of a drug such as clonidine causes a hypertensive emergency, and clonidine gives rebound hypertension, so treatment is not stopped once controlled. HPN may be asymptomatic, and every drug group has side effects.
- 12 Presence of acute chest pain in hypertensive patient is consistent with:
(a) Hypertensive emergency
 Acute chest pain points to unstable angina, myocardial infarction or a dissecting aortic aneurysm, which are hypertensive emergencies. Hypertensive urgency has no acute end organ damage.
- 13 The antihypertensive drug contraindicated in diabetic patients is:
(c) Thiazide and beta-blocker combination
 In HPN with DM, non-selective B-blockers and thiazides are on the 'Avoid' list, and a thiazide is used only added to ACE inhibitors or ARBs. ACE inhibitors and ARBs are on the 'Use' list, and metformin is not an antihypertensive.
- 14 The antihypertensive drug used in diabetic patients is:
(a) ACEI
 ACE inhibitors ± thiazide come first on the 'Use' list of HPN with DM. Non-selective B-blockers and thiazides are on the 'Avoid' list, and metformin is not an antihypertensive.

- 15 Antihypertensive drug not preferred with diabetes mellitus is:
(d) Thiazides and beta-blocker combination
 Non-selective B-blockers and thiazides are on the 'Avoid' list of HPN with DM, while ACE inhibitors, ARBs and non-DHP CCBs are on the 'Use' list.
- 16 Common causes of resistant hypertension are:
(d) All the above
 Salt intake is a predisposing factor of HPN and corticosteroids are a drug cause of secondary HPN, so both keep the blood pressure high in spite of treatment. Not taking the drugs regularly is the commonest cause of apparent resistance.
- 17 Common causes of resistant hypertension are all the following except:
(d) Smoking
 Non-adherence, excess salt and long steroid therapy are common causes of resistant HPN. Smoking is a cardiovascular risk factor, not a usual cause of resistance to treatment.
- 18 Which of the following is considered a referral criterion for a hypertensive patient?
(d) Hypertensive crisis
 A hypertensive crisis needs hospitalization and preferably admission to ICU, so it must be referred. Good response, controlled blood pressure and a family history are managed in the clinic.
- 19 Hypertension increases the risk of the following except:
(b) Asthma
 HPN leads to heart failure from pressure overload on the Lt.v., stroke from cerebral thrombosis or hge, and renal failure from nephrosclerosis. Asthma is not a complication of HPN.
- 20 A 60-year-old woman has persistently elevated blood pressure, with a reading of 155/84 mmHg. Which of the...
(c) Thiazide diuretic
 Persistent blood pressure of 155/84 at age 60 is confirmed hypertension, mainly systolic, and it needs drug treatment together with lifestyle change. The handout recommends diuretics for hypertension in older patients, and a thiazide is a standard first-line drug. Lifestyle change is always advised, but it is not 'enough' on its own here. Alpha blockers and hydralazine are not first-line drugs.
- 21 A 60-year-old man has untreated hypertension (168/106 mmHg; blood pressure has been elevated on at least 3...
(c) Initiate with a 2-agent combination pill.
 168/106 is stage 2, which needs drug therapy in every risk group. A diastolic of 105-114 is moderate HPN, and moderate HPN needs 2 drugs, so treatment starts with a 2-drug combination.
- 22 A woman with chronic hypertension has blood pressure that remains above target despite a daily regimen of...
(c) Resistant hypertension
 Blood pressure above target in spite of three drugs of different classes in full doses, one of them a diuretic, is resistant hypertension. 'HPN resistant to tt' is also a clue to renal artery stenosis.
- 23 Which of the following is an indication for referral of a hypertensive patient?
(c) Continuous abdominal bruit.
 A bruit in the loin or lateral to the umbilicus is a clue to renal artery stenosis, a secondary cause. Gradual onset, good response and onset in middle age fit essential HPN.
- 24 Which of the following is a recommended lifestyle modification?
(d) Maintain normal weight (BMI 18.5-24.9 kg/m²)
 Weight reduction in obese patients is a dietary measure in the treatment of HPN, so keeping a normal weight is recommended. Salt restriction is advised and 10 g/day is not a real restriction; more coffee, tea or meat is not advised.
- 25 All of the following suggest secondary hypertension except:
(c) Presence of end organ damage
 Target organ damage is a complication of any HPN, essential or secondary. Young age at onset and HPN resistant to treatment and long corticosteroid use point to a secondary cause.

26 Secondary hypertension is suspected when:

(d) All of the above.

Onset at a young or old age, sudden development and HPN resistant to treatment are all clues to renal artery stenosis, a secondary cause. The handout gives the ages as below 25 or above 50 years.

27 * To diagnose hypertension, repeated measures are required except if:

(c) a and b

This is inferred from the handout: a diastolic above 130 mmHg with retinal hges is accelerated or malignant HPN, a severe form treated at once. Otherwise the measurement should be done at least twice on at least two visits.

28 To diagnose hypertension-induced end organ damage, we need all the following investigations except:

(d) Lipid profile.

A lipid profile looks for an associated risk factor of atherosclerosis, not for target organ damage. Echo shows Lt.v. hypertrophy and fundus examination shows retinopathy, and carotid Doppler shows vascular damage.

29 * When discussing facts regarding hypertension during patient education, which of the following is true?

(d) Hypertension requires life-long monitoring at 3 to 6...

This is inferred from the handout: sudden withdrawal of a drug such as clonidine causes a hypertensive emergency, so treatment is continuous with life-long follow-up. HPN may be asymptomatic, so symptoms cannot be relied on.

30 All of the following produce systemic hypertension except:

(c) Addison's disease

Polycystic kidney, pheochromocytoma and Conn's syndrome are listed causes of secondary HPN. Addison's disease is adrenal failure with loss of cortisol and aldosterone, so it lowers the blood pressure.

31 Accelerated hypertension should not have:

(d) Papilledema

Papilloedema is grade IV retinopathy and the mark of malignant HPN. Accelerated HPN has retinal hges and exudates (grade III), which include silver wiring and kinking of veins at AV crossing.

► Second | Questions with a Note: why this answer?

1 All of the following are correct regarding management of severe elevation of blood pressure except:

(c) Sublingual captopril is used in hypertensive urgency

Urgency has no acute end organ damage and blood pressure is lowered over 1-2 days without admission, emergencies need hospitalization, and B-blockers act by decreasing the cardiac output. A quick sublingual drop is not needed in urgency, so (c) is the expected false statement.

2 * A 49-year-old postmenopausal obese woman has type 2 diabetes mellitus. Her blood pressure readings average...

(d) Recommend lifestyle changes and revisit in 3 months

This is inferred from the risk table: 136/86 is pre-hypertension and DM puts her in Risk Group C, where life style modification is the base of treatment. Both drugs offered are unsuitable, because thiazides and non-selective B-blockers are on the 'Avoid' list of HPN with DM.

3 Which of the following features does NOT suggest secondary hypertension?

(a) Age <30 years and >55 years

Sudden development of HPN and HPN resistant to treatment suggest a secondary cause, and so does a sudden severe rise in a controlled patient. Option (a) fits as the key only if read as onset between 30 and 55 years, the middle age of essential HPN.

1 List the risk factors of essential hypertension and outline the causes of secondary hypertension.

Essential (primary) hypertension (more than 90% of cases)

- * It is of unknown aetiology and occurs in middle and old ages.
- * **Predisposing factors:** heredity; obesity; salt intake; stress.

Factors that may play a role in the etiology:

- ① **Sympathetic overactivity:** excessive stimulation of sympathetic nervous system produces V.C. and increases peripheral vascular resistance.
- ② **Renin secretion:** increased renal secretion of renin, due to unknown cause, which converts angiotensinogen into angiotensin I, which is then converted to angiotensin II, leading to V.C. and secretion of aldosterone, which leads in turn to salt and water retention.
- ③ **Hormonal factors:** increased secretion of a mineralocorticoid from the supra-renal cortex causing salt and water retention.
- ④ **Multifactorial theory:** combination of the above.

Secondary HPN (5-10% of patients)

① Renal causes

- Renal parenchymal (75% of renal causes)
 - Acute and chronic GN.
 - Chronic pyelonephritis.
 - Hydronephrosis.
 - Polycystic kidney.
 - Diabetic nephropathy.
 - Collagen diseases e.g. SLE, PAN, scleroderma.
 - Gout nephropathy, nephrocalcinosis, amyloidosis.
- Reno-vascular (renal artery stenosis) (25% of renal causes)
 - Atherosclerosis of renal artery.
 - Fibromuscular dysplasia.
 - Vasculitis e.g. PAN.
 - Renal artery thrombosis and embolism.

② Endocrinal causes

- Cushing syndrome, Conn's syndrome and CAH.
- Pheochromocytoma.
- Myxoedema.
- Hyperparathyroidism.
- Acromegaly.

③ Neurological causes

- Increased I.C.T.
- Lesions of the medulla e.g. bulbar poliomyelitis.
- Lesions of hypothalamus.
- Polyneuritis: acute porphyria, chronic lead poisoning.

④ Drugs

- Contraceptive pills.
- Corticosteroids and ACTH.
- Carbenoxolone.
- Liquorice.
- MAOI.

⑤ Miscellaneous causes

- Coarctation of aorta.
- Toxaemia of pregnancy.
- PRV.
- Hypercalcaemia.
- PAN.

2 Define the term hypertensive emergency and explain how this differs from hypertensive urgency.

Hypertensive emergencies

- * Hypertensive encephalopathy.
- * Subarachnoid and cerebral hge.
- * Acute Lt.v. failure and pulmonary oedema.
- * Dissecting aortic aneurysm.
- * Acute renal failure.

N.B. Unstable angina, myocardial infarction and toxaemia of pregnancy can be considered in the item of hypertensive emergencies.

Treatment of hypertensive emergencies

- ① Hospitalization and preferably admission to ICU.
- ② Rapid reduction of blood pressure to approximately **100 mmHg** diastolic within **one hour** using rapidly acting drugs.

Hypertensive urgencies

- * No acute end organ damage.
- * Blood pressure can be lowered over **1-2 days**.

Time frames in treatment of HPN

Situation	What is done	Time
Hypertensive emergencies	Rapid reduction of blood pressure to approximately 100 mmHg diastolic	Within one hour
Hypertensive urgencies	No acute end organ damage; blood pressure can be lowered	Over 1-2 days

Note The handout lists the hypertensive emergencies but gives no worded definition, answer incomplete.

3 Define hypertensive emergency, mention "4" causes of secondary hypertension in young adults, and treatment of hypertensive crises.

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⑤ Miscellaneous causes

- Coarctation of aorta.
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- PRV.
- Hypercalcaemia.
- PAN.

Treatment of hypertensive emergencies

① Hospitalization and preferably admission to ICU.

② Rapid reduction of blood pressure to approximately **100 mmHg** diastolic within **one hour** using rapidly acting drugs e.g.:

Drug	Dose
Tridil	0.6 mg/h.
Na nitroprusside	0.5-10 ug/kg/min I.V.
Nifedipine	10-20 mg sublingually.
Diazoxide	50-100 mg/5-10 min I.V.
Hydralazine	10-20 mg repeated every 30 min I.V.
Alpha methyl dopa	250-500 mg/6 h. I.V.

- ① I.V. frusemide: is better given with these drugs to assist in control of blood pressure and prevent fluid retention.
- ② Venesection is rarely needed in resistant cases.
- ③ Following control of blood pressure, oral antihypertensive treatment should be started usually with a diuretic, B-blocker and vasodilator.
- ④ Further treatment according to the emergency:
 - In hypertensive encephalopathy:
 - Cerebral dehydrating measures: I.V. mannitol or conc. glucose; Mg. sulphate per rectum.
 - Anticonvulsants: I.V. diazepam and phenytoin.
 - Lumbar puncture is rarely required.
 - In subarachnoid and cerebral hge: see neurology.
 - In acute Lt.v. failure: see treatment of acute pulmonary oedema.
 - In dissecting aortic aneurysm: see later.
 - In renal failure: refer to nephrology.

N.B. Urgent enquiry into the cause of hypertensive emergency e.g. acute GN, pheochromocytoma, malignant HPN, sudden withdrawal of drug e.g. clonidine, and eclampsia.

Note The handout gives no worded definition of hypertensive emergency and does not separate the causes of secondary HPN in young adults, answer incomplete.

4 What is the definition and clinical presentation of hypertensive emergencies?

Hypertensive emergencies

- * Hypertensive encephalopathy.
- * Subarachnoid and cerebral hge.
- * Acute Lt.v. failure and pulmonary oedema.
- * Dissecting aortic aneurysm.
- * Acute renal failure.

N.B. Unstable angina, myocardial infarction and toxemia of pregnancy can be considered in the item of hypertensive emergencies.

N.B. Hypertensive urgencies: no acute end organ damage; blood pressure can be lowered over **1-2 days**.

Hypertensive encephalopathy

Pathogenesis: sudden severe rise of blood pressure leading to rush of blood into the cerebral circulation due to failure of autoregulation and causing cerebral oedema and petechial hge.

Clinical picture:

- * Severe headache.
- * Vomiting, blurring of vision.
- * Drowsiness, convulsions and lastly coma (usually without signs of lateralization).

Note The handout gives no worded definition and describes the clinical picture of hypertensive encephalopathy only, answer incomplete.