

MCQs in
Cardiovascular Medicine

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Preface

This book has a collection of multiple choice questions in cardiovascular medicine. The questions are categorized according to different subtopics. The correct answers, together with a relevant discussion, are given at the end of each section.

It is hoped that this collection will be of use to medical students and postgraduates preparing for MCQ examinations.

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INDEX

ISCHAEMIC HEART DISEASE	4
Answers for Ischemic Heart Disease questions	11
HEART FAILURE	18
Answers to Heart Failure questions	24
HYPERTENSION	32
Answers to Hypertension questions	39
CARDIOVASCULAR DRUGS	47
Answers to cardiovascular drugs questions	53
CARDIAC ARREST	61
Answers to cardiac arrest questions	68
RHEUMATIC HEART DISEASE	74
Answers to Rhematic Heart Disease questions	81
ARRHYTHMIAS	90
Answers to arrhythmia questions	96
CARDIOMYOPATHIES	103
Answers to Cardiomyopathy questions	109
CEREBROVASCULAR DISEASE	116
Answers to cardiovascular disease questions	122
DIABETES MELLITUS	130
Answers to Diabetes Mellitus questions	136

ISCHAEMIC HEART DISEASE

- 1) A 40 year old executive consults the doctor for a routine medical check. He has no symptoms. He is overweight, blood pressure is 130/70, smokes 5 cigarettes per day, and his serum cholesterol is 250mg/dL. He is a teetotaler. He has no family history of ischaemic heart disease.
 - a) He should reduce weight to achieve a body mass index of 24
 - b) He should start drinking alcohol in moderation
 - c) He should reduce smoking
 - d) He should be immediately started on a statin.
 - e) He should be advised to take regular exercise

- 2) The following symptoms are suggestive of and need further investigation for suspected angina pectoris
 - a) Chest pain on climbing 2 flights of stairs
 - b) Epigastric pain after meals
 - c) Chest pain at night during sleep which causes the patient to wake up
 - d) Shortness of breath and tiredness on moderate exertion
 - e) A tightening sensation in the throat during exertion

- 3) Regarding the risk factors for ischaemic heart disease
 - a) It is commoner in obese people
 - b) The risk from smoking declines to almost normal soon after stopping smoking
 - c) Moderate consumption of alcohol reduces the risk for ischaemic heart disease
 - d) Meditation has been proven to reduce the risk of developing ischaemic heart disease
 - e) Premenopausal diabetic women have almost the same risk as men to develop ischaemic heart disease

Ischaemic heart disease

- 4) Regarding the risk factors for ischaemic heart disease
 - a) Regular aerobic exercise protects against ischaemic heart disease
 - b) Elevated serum homocysteine levels is an independent risk factor
 - c) Blood pressure lowering reduces the risk of ischaemic cardiac events
 - d) A parent with ischaemic heart disease at the age of 70 years is a risk factor for an individual to develop ischaemic heart disease
 - e) Women on hormone replacement therapy are protected against ischaemic heart disease

- 5) The following are of proven value in reducing the risk of ischaemic heart disease
 - a) Treatment with antibiotics
 - b) Treatment with low dose aspirin
 - c) Weight reduction
 - d) Treatment with statins
 - e) Acupuncture

- 6) A 45 year old man is admitted with central chest pain and sweating. His ECG shows T wave inversions in the anterior leads; a previous ECG which he brought is normal. A troponin T test is negative.
 - a) Unstable angina is a likely diagnosis
 - b) He should be given streptokinase
 - c) Intravenous heparin is indicated
 - d) He has a high chance of getting a myocardial infarction within the next few days
 - e) A non-ST elevation myocardial infarction is a possible diagnosis

- 7) A 58 year old woman presents with severe central chest pain and shortness of breath. She is in pulmonary oedema, and her blood pressure is 190/100mmHg. ECG shows a left bundle branch block which has not been present before. A troponin T test is positive.
 - a) An acute anterior myocardial infarction is a likely diagnosis
 - b) Her risk of dying due to this event is greater than 50%
 - c) Blood pressure reduction is beneficial
 - d) Streptokinase is indicated
 - e) Pethidine is suitable for analgesia

Ischaemic heart disease

- 8) A 35 year old woman presents with chest pain on exertion. She has no risk factors.
 - a) A normal resting ECG excludes the presence of ischaemic heart disease
 - b) She should be started on aspirin
 - c) The likelihood of an exercise ECG being positive is very low
 - d) A coronary angiogram should be arranged
 - e) An echocardiogram is warranted

- 9) Differences between the sexes in cardiovascular disease and its treatment include
 - a) cough caused by ACE inhibitors is commoner in women
 - b) isolated systolic hypertension is commoner in men
 - c) women are likely to live longer than men from the date of onset of angina
 - d) prevalence of coronary artery disease in women with chest pain is less than in men with chest pain
 - e) women presenting with coronary artery disease tend to have more severe disease

- 10) A 50 year old man develops acute severe right chest pain. Probable causes include
 - a) Pneumothorax
 - b) Acute myocardial infarction
 - c) Acute cholecystitis
 - d) Pleurisy
 - e) Rheumatic fever

- 11) Causes of increased oxygen demand of the heart include
 - a) Aortic stenosis
 - b) Left ventricular hypertrophy
 - c) Pregnancy
 - d) Treatment with diltiazem
 - e) Treatment with Nifedipine

Ischaemic heart disease

- 12) The following are important risk factors for ischaemic heart disease
- Obesity
 - Smoking
 - High salt intake
 - High glucose intake
 - Hyperlipidaemia
- 13) The following are true regarding ischaemic heart disease
- A male aged 40 years has nearly a 50 percent risk of developing ischaemic heart disease during his lifetime.
 - The majority of men with ischaemic heart disease present with chronic angina rather than myocardial infarction
 - One third of all deaths over the age of 35 years are due to ischaemic heart disease
 - Post menopausal women are at three times the risk of developing ischaemic heart disease than premenopausal women of the same age
 - The use of hormone replacement therapy in postmenopausal women markedly reduces their risk of developing ischaemic heart disease
- 14) Regarding smoking and ischaemic heart disease
- Most smokers are aware that smoking will increase the risk of heart disease
 - Smoking doubles the risk of developing coronary artery disease
 - In women, the risk of myocardial infarction is increased six fold if they smoke
 - Passive smoking increases the risk of coronary artery disease by 20%
 - Cigar smoking does not increase the risk of coronary artery disease
- 15) T wave inversions on the ECG are seen in the following conditions
- Myocardial infarction
 - Mitral valve prolapse
 - Hyperkalaemia
 - Subarachnoid haemorrhage
 - Myocarditis

Ischaemic heart disease

- 16) The following factors contribute to the development of myocardial ischaemia
- Anaemia
 - Polycythaemia
 - Left ventricular hypertrophy
 - Aortic valve stenosis
 - Mitral valve stenosis
- 17) A possible diagnosis of acute myocardial infarction should be considered in the following situations
- Sudden onset severe central chest pain
 - Sudden severe left ventricular failure
 - Sudden death
 - New onset complete heart block
 - Severe burning epigastric pain
- 18) In the presence of chest pain, ECG changes suggestive of an acute myocardial infarction include
- Saddle shaped ST segment elevations in all leads
 - New left bundle branch block
 - New Complete heart block
 - Deep T wave inversions in the anterior leads
 - Ventricular tachycardia
- 19) Regarding events after a acute anterior myocardial infarction
- Ventricular fibrillation occurring within the first 24 hours has a relatively good prognosis
 - Dresslers syndrome occurs within 48 hours
 - If complete heart block occurs, pacing is usually required
 - Multiple ventricular ectopics should be treated with antiarrhythmics
 - Treatment with an ACE inhibitor is indicated

Ischaemic heart disease

- 20) Regarding the treatment of myocardial infarction
- Streptokinase is indicated in Non ST Elevation myocardial infarction
 - Heparin is indicated in patients given streptokinase
 - tenolol will reduce the risk of sudden death
 - Aspirin will reduce mortality by 25%
 - An ACE inhibitor will reduce the risk of developing heart failure later on
- 21) The following are instances of unstable angina
- Anginal pain occurring for the first time
 - Anginal pain occurring after meals
 - A sudden reduction in the distance the patient can walk without chest pain
 - Chest pain on walking to the toilet on the 4th day after myocardial infarction
 - Angina at rest
- 22) A patient who developed an acute inferior myocardial infarction is being discharged. The following are true
- He should have a limited exercise ECG prior to discharge
 - He should abstain from sex for 3 months
 - He cannot drive a car for 6 months
 - He should be referred for coronary angiography in 6 weeks time
 - He should be advised to take sublingual glyceryl trinitrate in case he develops angina again
- 23) In a patient who has had a recent myocardial infarction and whose total cholesterol 5.5 - 8.0 mmol/l the introduction of HMG CoA reductase inhibitor would
- decrease the reinfarction rate
 - increase incidence non-cardiac deaths
 - slows the rate of atherosclerosis
 - reduce the risk of sudden death
 - is a recognised cause of rhabdomyolysis

Ischaemic heart disease

- 24) A 31 year old woman complains of palpitations, breathlessness and chest pain, radiating to the left arm. She had been well, and developed symptoms six weeks ago when her father died of a heart attack. She has no risk factors. She complains of difficulty in falling asleep at night. She has had abdominal pain, backache, headache, and numbness of the limbs for several years, for which she has taken treatment repeatedly. Which of the following diagnoses are likely
- a) Depression
 - b) Factitious disorder
 - c) Somatization disorder
 - d) Gastritis
 - e) Attention seeking
- 25) Which of the following statements concerning the treatment of acute myocardial infarction is correct?
- a) A pansystolic murmur developing within the first 24 hours does not require further investigation.
 - b) Dipyridamole therapy reduces reinfarction within the first year.
 - c) Heparin is beneficial if given with streptokinase.
 - d) Prophylactic lignocaine given in the first 48 hours is effective in preventing ventricular fibrillation
 - e) Treatment with a dihydropyridine calcium antagonist is associated with increased cardiovascular mortality.

Answers to Ischemic Heart Disease Questions

1) TFFFT

Overweight, smoking, elevated serum lipids are all important risk factors, but this individual has no symptoms of ischaemic heart disease at present. He should stop, not reduce, smoking. Weight reduction to ideal body mass index of 24 is recommended. Diet control should be tried out for at least 3 months to lower his lipids. If it fails, lipid lowering therapy should be started – statins have benefits in primary prevention, and are the preferred drugs. Alcohol in moderation reduces cardiovascular mortality by beneficial effects on lipids, but a person who does not drink should not be advised to start drinking to reduce coronary risk. It may lead to his drinking above the safe limit. Regular exercise helps in maintaining body weight and increases cardiovascular fitness.

2) TTTTT

All of these could be manifestations of angina. Epigastric pain after meals could be due to a gastric ulcer, but could also occur in ischaemia of the inferior wall of the heart. Nocturnal angina characteristically wakes the patient up from his sleep. A tightening sensation in the throat during exertion is very suggestive of angina.

3) TFTFT

Obesity is an independent risk factor for ischaemic heart disease. The risk from smoking declines to normal 10 years after stopping smoking. Moderate alcohol consumption (3 units per day) has beneficial effects on serum lipids, and there is some evidence that it may reduce cardiovascular and overall mortality. In spite of this, the other risks, both social and medical, of asking people to start drinking are high. People who already drink in moderation should be told that it is alright to continue, but those whose don't drink should never be asked to start drinking. Meditation, though widely touted as being good for your heart, has no proven benefit. Post menopausal women have almost the same risk of developing ischaemic heart disease as men, but premenopausal women are protected. This protection is lost in diabetic women.

4) TTTFT

Regular aerobic exercise is protective against ischaemic heart disease. Elevated homocysteine levels are thought to induce a prothrombotic state, and increase the risk of ischaemic heart disease and stroke. Hypertension is one of the most important risk factors for ischaemic heart disease, and blood pressure lowering reduces cardiovascular risk. A significant family history is present if a parent developed ischaemic heart disease below the age of 50 years. Family history of ischaemic heart disease developing at the age of 70 years does not confer any additional risk. Although since premenopausal women are protected against ischaemic heart disease it was thought that hormone replacement therapy would give the same benefit, evidence from trials is to the contrary. Hormone replacement therapy may actually increase cardiovascular risk, and is no longer recommended to patients with a high likelihood of developing ischaemic heart disease.

5) FTTTF

Although there is some evidence that infections, especially with Chlamydia, may play a causative role in atheroma, there is no evidence yet that antibiotics are beneficial. Low dose aspirin, weight reduction and treatment with statins are of proven value, both in primary and secondary prevention. There is no evidence that acupuncture is of any use.

6) TFTTF

A negative troponin T makes a myocardial infarction less likely. The symptoms and ischaemic ECG changes make this unstable angina by definition. Streptokinase is therefore not indicated. A patient with unstable angina pathologically has a ruptured atheromatous plaque without an occlusive coronary thrombosis. He has a very high chance of developing an occlusive coronary thrombosis resulting in a myocardial infarction in the next few days. Intravenous heparin or subcutaneous low molecular weight heparin are useful in preventing this.

7) TFTTF

In view of the typical history and positive troponin T test, this is an acute myocardial infarction by definition. New left bundle branch block is suggestive, in this setting, of an acute anterior myocardial infarction, and this is an indication for streptokinase. Her risk of dying is about 35 to 40 percent, in view of the presence of left ventricular failure. Blood pressure reduction is beneficial as it will reduce the afterload, and reduce myocardial oxygen

consumption. Pethidine is unsuitable for analgesia as it causes pulmonary venoconstriction and increases venous return. Morphine given intramuscularly is the drug of choice.

8) FTTFF

The resting ECG can be normal in ischaemic heart disease. However, in a premenopausal women with no risk factors, the chances of the chest pain being due to ischaemic heart disease is very low. Her pretest probability of the exercise ECG being positive is very low. Aspirin is not indicated. A coronary angiogram is indicated only in the presence of a positive exercise ECG test. There is no real indication for an echocardiogram either.

9) TTTTT

ACE inhibitor induced occurs a few weeks after commencing the drug, and disappears a few days after stopping it. It is commoner in women. Women with coronary artery disease generally have more diffuse disease, involving smaller vessels. Men with chest pain are more likely to have ischaemic heart disease than women.

10) TTTTF

Rheumatic fever can cause chest pain due to pericarditis, but it is more often on the left, and a man of 50 years is less likely to have rheumatic fever. The pain of myocardial infarction is known to manifest as right sided chest pain.

11) TTTFF

Conditions where there is volume overload (aortic regurgitation, mitral regurgitation, pregnancy, thyrotoxicosis and other high output states) as well as those causing pressure overload (aortic stenosis and systemic hypertension) will increase myocardial oxygen demand. Diltiazem and atenolol are negative inotropes and chronotropes and will reduce myocardial oxygen demand. Nifedipine is primarily a vasodilator, and will cause reflex tachycardia, which will increase myocardial oxygen demand. This is postulated to be one mechanism by which short acting nifedipine increases mortality when used in the treatment of hypertension.

12) TTTFT

Obesity, smoking, diabetes mellitus, hyperlipidaemia, hypertension, high salt intake are all important risk factors for ischaemic heart disease. High glucose intake may result in obesity, but it is not, by itself and independent risk factor.

13) TFTTT

Ischaemic heart disease is a common disease. Most men present for the first time with a myocardial infarction than with chronic angina. Post menopausal women are much more likely to develop ischaemic heart disease, but contrary to expectations, hormone replacement therapy does not reduce this risk. In fact there is evidence that hormone replacement therapy may increase the risk.

14) FTTTF

Many smokers do not believe that smoking is harmful. In one study, up to 60 percent of smokers were did not believe that they were at increased risk for ischaemic heart disease. Smoking doubles the risk of ischaemic heart disease, and women who smoke are six times more likely to develop ischaemic heart disease compared to those who do not smoke. Passive smoking increases the risk of ischaemic heart disease by about 20 percent. Although cigar smoking is generally perceived as being safer than cigarette smoking, it too increases the risk of myocardial infarction.

15) TTFTT

Tall tented T waves are seen in hyperkalaemia. Ischaemia and myocarditis can both cause t wave inversions. Patients with mitral valve prolapse often have T wave inversions on the ECG, but their significance is not known. Patients with intracranial events, subarachnoid haemorrhage in particular, can have ischaemic changes on the ECG. These are postulated to be due to a increased catecholamine release.

16) TTTTF

Anaemia can worsen ischaemia by reducing oxygen delivery. In polycythaemia, hyperviscosity of blood can cause coronary and cerebral ischaemia. In left ventricular hypertrophy myocardial oxygen demand is greater, and in the presence of coronary artery disease, myocardial ischaemia can develop. The oxygen supply to the subendocardial regions of the left ventricle is particularly compromised. In aortic stenosis, coronary artery blood flow is reduced due to reduced effective cardiac output. Coronary

artery disease may coexist. In addition, left ventricular hypertrophy is often present. In mitral valve stenosis, the left ventricle is usually small and myocardial oxygen demand is low.

17) TTTTT

All of these can be presentations of an acute MI. In the elderly, in diabetics, patients in renal failure, hyper and hyperthyroid patients, silent myocardial infarction can occur. These may present as left ventricular failure, or dysrhythmias. An inferior myocardial infarction can present with epigastric burning pain mimicking peptic ulcer disease.

18) FTTTT

Saddle shaped ST segment elevations are seen in pericarditis. They are often widespread. The ST elevations in myocardial infarction are dome shaped, and are usually confined to specific leads reflecting the area of infarction. New left bundle branch block is diagnostic of an MI. New complete heart block may be the presenting feature of a silent myocardial infarction. Deep symmetrical T wave inversions are seen in non-ST elevation myocardial infarction. An acute MI may present with ventricular tachycardia.

19) TFFT

Primary VF or VF occurring within the first 24 hours generally does not denote a worse prognosis, and does not affect outcome. If it occurs during or soon after streptokinase, it may be a reperfusion arrhythmia. Dresslers syndrome usually occurs about a week to 10 days after the MI. Complete heart block, when it occurs in an anterior MI, needs pacing as it is unlikely to recover spontaneously. If it occurs with an inferior MI, it reverts spontaneously in most cases. Multiple ectopics which do not cause haemodynamic compromise do not require treatment – in fact treatment can be harmful because antiarrhythmic agents themselves can cause dangerous arrhythmias. Anterior MIs are usually large, and ACE inhibitors will be of particular benefit in modifying ventricular remodeling.

20) FTTTT

Streptokinase is indicated in ST elevation MI. There is no place for its use in non-ST elevation MI, as it has not shown benefit in that situation. Heparin is usually not necessary after streptokinase is given, except for prevention of deep vein thrombosis. Atenolol has been shown to reduce the risk of sudden cardiac death within the first year after myocardial infarction, and is probably

beneficial if used for longer periods. The main mechanism by which atenolol prevents deaths is postulated to be the reduction of life threatening arrhythmias. Aspirin reduces mortality after myocardial infarction by 25 percent and streptokinase by 25 percent. The combination of aspirin and streptokinase reduces mortality by 43 percent. ACE inhibitors have complex beneficial effects on ventricular remodeling and will reduce the risk of heart failure later on.

21) TFTTT

Recent onset angina, a change in the pattern of angina, angina at rest and post myocardial infarction angina are all types of unstable angina. They are due to plaque rupture, and need to be managed intensively because the likelihood of developing a myocardial infarction is high

22) TFFFF

Ideally a modified exercise ECG should be performed prior to discharge, in order to stratify immediate risk. The patient can resume sexual activity after about 2 weeks. He should avoid driving a car for about 6 weeks, but the regulations vary from country to country. Most patients would have an echocardiogram and an exercise ECG at 6 weeks. Coronary angiogram is performed only if the exercise ECG is positive. After a myocardial infarction, most patients would be free of pain, because the ischaemic area is now dead. The presence of anginal pain indicates there are other areas with critical ischaemia. Post myocardial infarction angina is a type of unstable angina and should be managed aggressively. The patient should be told to report back to hospital rather than simply use glyceryl trinitrate tablets if he develops significant chest pain.

23) TFTFT

Statins are useful in secondary prevention. They reduce the rate of reinfarction, possibly by slowing the rate of atherosclerosis. There is no evidence of increase in non cardiac deaths. There is no definite that it reduces the risk of sudden death. Statins are known to cause rhabdomyolysis, especially if combined with fibrates.

24) TFFFF

Somatization disorder is characterized by multiple recurring pains and gastrointestinal, sexual, and pseudo-neurologic symptoms that occur over a period of years. To meet the diagnostic criteria for somatization disorder, the patients' physical complaints must not be intentionally induced and must result in medical attention or significant impairment in social, occupational, or other important areas of functioning. By definition, the first symptoms appear in adolescence and the full criteria are met by 30 years of age. Of all the other disorders "factitious disorder" would seem the least likely. Depression due to the father's death can cause some degree of somatization.

25) FFFFT

The occurrence of a pansystolic murmur suggest the dangerous possibilities of either an acquired VSD or a ruptured chorda tendinae leading to mitral regurgitation. The former is more likely because acute mitral regurgitation will present with left ventricular failure rather than a murmur. The mortality is very high in both these conditions. Urgent echocardiography and referral for surgery is indicated. There is no evidence that dipyridamole is useful after an MI. Patients given streptokinase do not need heparin except in a few selected situations. There is no place for prophylactic lignocaine. Treatment with dihydropyridine calcium channel antagonists is associated with increased mortality after myocardial infarction.

HEART FAILURE

- 1) Regarding heart failure
 - a) The prevalence increases with age
 - b) It accounts for about 5% of hospital admissions
 - c) About 30% of patients die within 3 months of the onset of heart failure
 - d) The majority of patients have systolic heart failure
 - e) Valvular heart disease is an important cause in the developing world

- 2) The following are known to result in chronic heart failure
 - a) Ischaemic heart disease
 - b) Alcohol abuse
 - c) Thyrotoxicosis
 - d) Vitamin deficiency
 - e) Rhythm disturbances

- 3) The following are true
 - a) A high systolic blood pressure excludes a diagnosis of heart failure
 - b) The heart rate is usually high due to increased adrenergic activity
 - c) Production of pink frothy sputum is a common feature
 - d) Dyspnoea is commonly due to arterial hypoxia
 - e) the peripheries are warm

- 4) The following may be early symptoms of heart failure
 - a) Dyspnoea on walking 2 flights of stairs
 - b) Nocturnal cough
 - c) Waking up in the night with dyspnoea
 - d) A sense of epigastric fullness
 - e) Wheezing on exertion

- 5) In a patient with heart failure
 - a) Coarse basal crackles can be heard in the lungs
 - b) The heart sounds may be normal
 - c) A palpable tender liver may be present
 - d) The presence of a pan systolic murmur usually indicates rheumatic mitral valve disease
 - e) A wheeze may be present

Heart failure

- 6) The following are true regarding the ECG in heart failure
 - a) Old changes of myocardial infarction must be looked for
 - b) Left bundle branch block suggests that there is significant ventricular damage
 - c) A P-pulmonale indicates the presence of left heart failure
 - d) Sinus tachycardia is a feature
 - e) The presence of U waves suggests hypokalaemia due to treatment

- 7) Regarding the chest radiograph in heart failure
 - a) A normal size heart excludes heart failure
 - b) Upper lobe diversion of blood is seen
 - c) A large unilateral pleural effusion suggests a pathology other than heart failure
 - d) Pleural effusions are commoner on the left
 - e) Calcification of the valves is seen

- 8) Regarding the echocardiogram in heart failure
 - a) It is an essential investigation prior to commencing treatment
 - b) It is a reliable investigation to diagnose left ventricular diastolic dysfunction
 - c) An ejection fraction below 40% is compatible with heart failure
 - d) In mitral regurgitation, the ejection fraction can be high
 - e) Left atrial thrombi can be detected

- 9) Regarding diastolic heart failure
 - a) It occurs in patients with longstanding hypertension
 - b) The ejection fraction can be normal
 - c) Pulmonary oedema can occur
 - d) ACE inhibitors are useful in treatment
 - e) Can be differentiated from systolic failure based on the response to diuretics

- 10) The following are causes of right heart failure
 - a) Chronic left heart failure
 - b) Emphysema
 - c) Primary pulmonary hypertension
 - d) Atrial septal defect
 - e) Pneumothorax

Heart failure

- 11) High output failure occurs in
 - a) Thyrotoxicosis
 - b) Septic shock
 - c) Paget's disease
 - d) Beri beri
 - e) Aortic regurgitation

- 12) Regarding right heart failure
 - a) It occurs secondary to pulmonary hypertension
 - b) Emphysema is a known cause
 - c) The prognosis is better than for left heart failure
 - d) It may result in tricuspid regurgitation
 - e) Sildenafil improves survival in patients with pulmonary hypertension

- 13) A 65 year old patient is admitted with severe shortness of breath. His blood pressure is 130/90mmHg, heart rate 120 beats per minute, and he has bilateral basal crackles. His ECG is normal. He has a past history of chronic heart failure due to ischaemic heart disease
 - a) The patient should be placed in the head low position to improve cerebral perfusion
 - b) Morphine is useful in reducing pulmonary oedema
 - c) Frusemide should be given orally
 - d) Intravenous ACE inhibitors are effective in treatment
 - e) A nitrate infusion can be used to relieve symptoms

- 14) Regarding cardiogenic shock
 - a) Warm extremities with a bounding pulse is a clinical feature
 - b) confusion and restlessness occurs
 - c) elevated central venous pressure is present
 - d) colloids are used to expand circulatory volume
 - e) intra-arterial blood pressure monitoring is recommended

- 15) Regarding cardiac failure
 - a) Left ventricular end diastolic volume is increased
 - b) Bradycardia is usually present
 - c) Syncope is a symptom
 - d) Hypertension is a cause
 - e) A tender enlarged liver indicates the presence of right heart failure

Heart failure

- 16) In the management of acute left ventricular failure
- the patient is kept supine in the head low position
 - thiazide diuretics are indicated
 - oxygen is given via a face mask
 - morphine is given intramuscularly
 - Ventilation is required in severe cases
- 17) A 35 year old woman pregnant woman presents with acute dyspnoea. The following are likely causes
- Mitral stenosis
 - Pulmonary embolism
 - Asthma
 - Acute myocardial infarction
 - Pneumonia
- 18) The following drugs when given in therapeutic dosage may cause cardiac failure
- phenylbutazone
 - carbimazole
 - daunorubicin
 - propranolol
 - pioglitazone
- 19) The following lifestyle measures are effective in the treatment of heart failure
- Weight reduction
 - Reduction of salt in diet
 - Adequate rest
 - Avoidance of exercise
 - Moderate consumption of alcohol
- 20) Regarding the treatment of heart failure
- There is no benefit in giving frusemide by the intravenous route compared to the oral route
 - Large meals should be avoided
 - Bed rest is beneficial
 - Frusemide is better given at night
 - Oral nitrates are usually given at 8 hourly intervals

Heart failure

- 21) The following are true regarding the treatment of heart failure
- a) ACE inhibitors reduce mortality
 - b) Digoxin improves symptoms but worsens mortality
 - c) Spironolactone improves survival
 - d) Beta blockers are contraindicated
 - e) Cardiac inotropes like dobutamine improve survival
- 22) The following are true of right ventricular failure?
- a) It results in ankle oedema
 - b) emphysema is a rare cause
 - c) primary pulmonary hypertension is a cause
 - d) central venous pressure is usually greater than 4mmHg
 - e) the prognosis is better than that for left ventricular failure
- 23) The following drugs are of proven benefit in improving prognosis in chronic heart failure
- a) enalapril in mild heart failure
 - b) digoxin
 - c) nitrates and prazosin combination
 - d) nitrates and hydralazine combination
 - e) dobutamine infusion
- 24) In left ventricular failure
- a) The development of pulmonary hypertension results in oligoemic lung fields
 - b) Breathlessness is usually due to hypoxaemia
 - c) the PaCO₂ is increased in pulmonary oedema
 - d) effort dyspnoea always precedes orthopnoea and paroxysmal nocturnal dyspnoea
 - e) the X-ray picture may be mistaken for solid lung tumour

Heart failure

- 25) A 70-year-old man with dilated cardiomyopathy remains symptomatic in NYHA class 2 due to chronic heart failure. On examination his pulse is 90 regular, BP 140/90, heart sounds normal, chest auscultation did not reveal any abnormalities. He is currently taking enalapril 10mg bd and Frusemide 40 mg bd. Which of the following drugs could be considered to optimize his therapy
- a) Amiodarone
 - b) Carvedilol
 - c) Digoxin
 - d) Spironolactone
 - e) Candesarten

Answers to Heart Failure questions

1) TTTT

The prevalence of heart failure increases with age and affects 8% of those aged over 65 years. The prevalence of heart failure caused by left ventricular (LV) systolic dysfunction is about 1% overall. Although systolic failure is probably commoner, a significant number of patients may have heart failure without systolic dysfunction; either diastolic failure or valvular Heart failure accounts for 5% of acute hospital admissions, placing a large burden on the health care system. Approximately 30% of patients with heart failure are admitted each year. 30% of patients die within 3 months of the onset of heart failure, and the annual mortality is about 10% thereafter. Valvular heart disease is an important cause of heart failure in the developing world, while effective treatment of rheumatic fever and better overall living conditions have resulted in a marked decrease in developed countries

2) TTTTF

Ischaemic heart disease, valvular heart disease, cardiomyopathies, toxins like alcohol, drugs, vitamin deficiency states like Beri Beri are all causes of heart failure. Thyrotoxicosis causes high output heart failure. Rhythm disturbances can result in transient heart failure; tachycardias can shorten diastolic filling time, resulting in a reduction in cardiac output. Bradycardias can result in a drop in cardiac output simply because of the slow rate, though this is not common. Tachycardias can cause transient cardiomyopathy which can persist for some time. These conditions are not often implicated as causes of chronic heart failure, and reversal of the arrhythmia results in reversal of the cardiac dysfunction. Arrhythmias can however worsen symptoms in patients with preexisting heart failure.

3) FTFFF

The systolic blood pressure is usually on the low side in heart failure. However, if systolic function is preserved, the blood pressure can be high. A high blood pressure will worsen heart failure by increasing afterload. Lowering of the blood pressure is often beneficial. As a compensatory mechanism there is activation of the adrenergic system in heart failure, and this often results in tachycardia. Activation of the cholinergic sympathetics results in sweating of the palms and peripheral vasoconstriction. Cold clammy extremities are a feature. Pink frothy sputum is a feature of acute alveolar

oedema which occurs if the heart failure is very acute. In most patients with chronic heart failure, pulmonary arterial vasoconstriction protects against a rapid rise in pulmonary venous pressure. Interstitial oedema occurs first, resulting in stiffness of the lung and increased work of breathing. This is the usual cause of dyspnoea. In acute heart failure, the pulmonary venous pressure rises dramatically, and alveolar oedema ensues, resulting in alveolar oedema. Arterial hypoxia occurs only in very severe heart failure and cardiogenic shock.

4) TTTT

All these may be features of heart failure, including nocturnal cough. A sense of epigastric fullness can occur in congestive or right heart failure because of congestion of the liver, and sometimes due to gut oedema. Wheezing on exertion can occur in heart failure but is also a feature of exercise induced asthma. Echocardiography and lung function testing are useful to differentiate the two.

5) FTFT

Fine rather than coarse crackles are heard in heart failure. The heart sounds can be normal. A loud pulmonary second heart sound is heard if pulmonary hypertension is present. The aortic second sound can be loud if the aetiology of heart failure is hypertension. A loud first heart sound generally indicates that mitral stenosis is the likely cause of symptoms. A palpable tender liver is often felt in congestive heart failure, and is due to congestion. If tricuspid regurgitation is present, the liver may be tender. A pan systolic murmur is often heard in a dilated heart due dilatation of the mitral valve ring, resulting in functional mitral regurgitation. Oedema of the bronchial mucosa can occur in heart failure and give rise to a wheeze.

6) TTFT

Often in patients with heart failure, changes of old myocardial infarction (Q waves, left bundle branch block) are seen. Left bundle branch is often pathological, and indicates significant damage to the ventricle. A p pulmonale indicates that there is right atrial enlargement. Sinus tachycardia is often seen in heart failure due to a compensatory increase in sympathetic activity. Diuretics often result in hypokalaemia, and the presence of U waves suggests that potassium supplementation must be given.

7) FTTF

Usually the heart is enlarged due to chamber dilatation. However in certain conditions the heart may be normal size. In HOCM, restrictive cardiomyopathy and aortic stenosis the heart size is normal. Pulmonary oedema occurs mainly due to diastolic heart failure. In this condition cardiac systolic function is normal, but inadequate relaxation of the left ventricle results in increased left atrial pressure. Upper lobe diversion of blood is usually seen in the chest radiograph, and is due to increased pulmonary venous pressure. The caliber of the blood vessels in the upper and lower zones of the lung are equal. Pleural effusions are seen in heart failure and are usually small. They may be unilateral. Large effusions can occur. However a large unilateral effusion often prompts the clinician to look for other, particularly infective, pathologies. Calcification of the valves takes place in valvular heart disease.

8) FTTF

The echocardiogram is not essential prior to starting treatment. However it is useful in identifying the following; to determine systolic function, to determine whether the heart failure is due to ischaemic heart disease or dilated cardiomyopathy (regional wall motion abnormalities vs global dilatation), to identify valvular lesions, and to identify intracardiac thrombi. It is not a very reliable investigation to diagnose diastolic dysfunction. In mitral regurgitation, the ejection fraction is high, due to large left ventricular end diastolic diameter as a result of a large return of regurgitated blood from the atrium.

9) TTTTF

Diastolic dysfunction is a syndrome in which the predominant cause of symptoms is increased ventricular stiffness and atrial fibrillation rather than reduced contraction. It is often present and often underdiagnosed. It may account for a significant proportion of patients with heart failure. Left ventricular hypertrophy is often present; therefore it is common in patients prone to LVH, such as longstanding hypertension and aortic stenosis. Pulmonary oedema due to both systolic and diastolic failure responds to diuretics, which act mainly through pulmonary venodilatation

10) TTTTF

Chronic left heart failure results in pulmonary hypertension which eventually results in right ventricular hypertrophy and right heart failure. Emphysema

commonly causes pulmonary hypertension and right heart failure. Eisenmengers syndrome in an ASD results in pulmonary hypertension and right heart failure. Primary pulmonary hypertension, where pulmonary hypertension occurs without significant left heart disease, valvular heart disease or lung disease eventually causes the right heart to fail. Chronic subclinical pulmonary embolism is thought to be a cause. A pneumothorax is usually an acute event, and although in the acute stage it can cause cardiac compromise, it is not a cause of right heart failure per se.

11) TTTTF

In most patients with heart failure the cardiac output is low. In certain circumstances the cardiac output is elevated and the systemic vascular resistance is very low. This is known as high output failure and is characterized by an elevated resting cardiac index beyond the normal range of 2.5 to 4.0 L/min per m². Ineffective blood volume and pressure, chronic activation of the sympathetic nervous system and renin-angiotensin-aldosterone axis, increased serum ADH, and chronic volume overload gradually cause ventricular enlargement, remodeling, and heart failure. Several characteristic findings help to differentiate high output failure from standard low output failure. The heart rate is typically between 85 and 105 beats per minute, but it may be higher with some causes, in particular thyrotoxicosis. A cervical venous hum maybe heard over the internal jugular veins, more marked on the right side. The arterial pulse is usually bounding, and the pulse pressure is wide. Pistol shot sounds may be heard over the femoral arteries, and may cause confusion with aortic regurgitation or patent ductus arteriosus. A mid systolic murmur due to increased ventricular filling, and a third heart sound may be heard. Pulmonary oedema also occurs in spite of the high cardiac output. High output states may be physiological and can occur during excitement or exercise, in pregnancy and fever. Pathological causes include arteriovenous fistulas, thyrotoxicosis. Anemia, beriberi (vitamin B1 or thiamine deficiency), psoriasis and exfoliative dermatitis, Pagets disease etc. In septic shock, the peripheral vascular resistance is low and the cardiac output is normal or high; it is a high output state by definition, although the term 'failure' is not always used unless features of heart failure are present.

12) TTFTF

Right heart failure often occurs secondary to pulmonary hypertension. Pulmonary hypertension could be primary, or secondary to left heart failure,

mitral stenosis, or chronic lung disease such as emphysema, chronic lung fibrosis or bronchiectasis. Its prognosis is poorer than left heart failure, as the right ventricle wall is thinner and less capable of withstanding dilatation. Dilatation of the tricuspid valve ring results in tricuspid regurgitation, which manifests with prominent V waves in the jugular venous pulse, and a tender pulsatile liver. Sildenafil has been used in some patients with pulmonary hypertension, and has been demonstrated to reduce pulmonary arterial pressures, but its survival benefit has not been established yet.

13) FTFTT

This patient has an exacerbation of chronic heart failure, and is in pulmonary oedema evidenced by the fine crackles in his lung bases and tachycardia. He is not in cardiogenic shock since his blood pressure is maintained. He has primarily backward failure, and no forward failure. The possibility of an acute myocardial infarction could be considered, giving rise to acute left ventricular dysfunction. However the normal ECG makes this unlikely. A patient is placed in the head down position to improve cerebral perfusion in shock. This patient is in left ventricular failure and not in shock – he should be propped up to reduce venous return, and also to reduce the pressure of the abdominal contents on the diaphragm. Morphine is useful in acute left ventricular failure – it reduces pulmonary oedema by causing pulmonary venodilatation, and also relieves anxiety, and slows the respiratory rate; this results in reducing the workload of the heart. Frusemide can be given orally or intravenously. In patients with chronic heart failure can have oedema of the gut wall, resulting in decreased absorption of oral drugs. In acute left ventricular failure, intravenous frusemide acts more rapidly and is generally preferred. Intravenous ACE inhibitors cause peripheral vasodilatation, reduce the afterload, and offload the heart. Nitrates given by infusion cause systemic and pulmonary venodilatation and reduce preload.

14) FTFTT

Cardiogenic shock is due to pump failure, or inability of the heart to pump blood to maintain adequate perfusion of the tissues. It is manifested by a low blood pressure (systolic blood pressure below 90 mmHg or mean arterial pressure below 70mmHg). As a result there is activation of the sympathetic system, resulting in tachycardia & peripheral vasoconstriction leading to a rapid thready pulse. Activation of the cholinergic sympathetics results in sweating of the palms. Similar features are seen in hypovolaemic shock, i.e., shock due to bleeding or fluid depletion. In contrast, in septic shock there is

marked peripheral vasodilatation. The pulse volume is good, and the extremities are warm. Cerebral hypoperfusion results in confusion and restlessness. The central venous pressure may or may not be elevated. Colloids are generally not used, in fact excess fluids can be dangerous as it can worsen pulmonary oedema. Intra-arterial blood pressure monitoring is preferred in order to titrate inotropes.

15) TFTTT

Generally, in heart failure, there is dilatation of the ventricles. The left ventricular end diastolic volume is increased. As a compensatory mechanism there is often increased adrenergic activity which causes tachycardia. This is detrimental to the patient because it increases myocardial work. Beta blockers are used in heart failure based on this hypothesis. The presence of bradycardia suggests either heart block or hypothyroidism. Syncope occurs in heart failure often on exertion, when the heart cannot increase its output to maintain cerebral perfusion. Long standing hypertension leads to left ventricular hypertrophy and eventually dilatation resulting in heart failure. A tender enlarged liver is seen in right heart failure, where hepatic congestion causes stretching of the liver capsule, which is pain sensitive. In tricuspid regurgitation the liver can be pulsatile.

16) FFTFT

The head low position is used for patients with cardiogenic shock, to improve cerebral perfusion. In acute LVF the patient is kept propped up, to reduce venous return and preload, and also to reduce the compression of the diaphragm by the abdominal contents. Thiazide diuretics are mild diuretics, and while they have an important place in the treatment of hypertension, they are inadequate in the management of acute LVF. Oxygen is usually given by a face mask. Morphine reduces pulmonary oedema by causing pulmonary venodilatation. It is given intravenously, as intramuscular absorption is erratic. In severe cases of pulmonary oedema, the patient may need ventilation. Careful application of PEEP helps to augment cardiac output.

17) TTTFT

The haemodynamic changes in pregnancy, in particular the increased plasma volume, can precipitate pulmonary oedema in LVF. There is an increased risk of pulmonary embolism during pregnancy. Asthma and pneumonia are all causes of acute dyspnoea. Acute myocardial infarction is uncommon in young women in the reproductive age group.

18) TFTTT

NSAIDs cause fluid retention and can precipitate heart failure. Daunorubicin, a cytotoxic drug, has direct cardiotoxic effects, and can cause an acute cardiomyopathy. Propranolol, due to its negative inotropic and chronotropic effects, can worsen heart failure; however beta blockers are used in heart failure, and have survival benefit. Pioglitazone causes fluid retention, and can worsen heart failure, especially in combination with sulphonylureas or insulin.

19) TTTFF

Achieving ideal body weight and reduction of salt in the diet is useful in the treatment of heart failure. At times of exacerbations, bed rest is useful because redistribution of blood flow improves diuresis. Moderate exercise is a valuable in improving cardiovascular fitness. Alcohol in any amount is best avoided, as alcohol depresses myocardial function.

20) FTFFF

In patients with heart failure, gut oedema may limit the absorption of oral drugs. Intravenous frusemide is more effective in this situation. Small meals at more frequent intervals are preferred. Bed rest improves renal perfusion and diuresis. When frusemide is given at night it will make the patient have to get up many times to pass urine – in addition to being simply inconvenient, it will result in inadequate rest, which will be detrimental to a patient in heart failure. Nitrates given at regular intervals cause tolerance, in that their action will be ineffective at a given dose. They are given at staggered intervals, allowing for a nitrate free interval.

21) TFTFF

Many studies have shown that ACE inhibitors reduce symptoms, hospital admissions and mortality in patients with heart failure. Digoxin has been used for ages for heart failure. However there were concerns about whether digoxin has an adverse effect on survival in spite of alleviating symptoms. A large study, the Digitalis Investigation Group trial demonstrated that while digoxin improves symptoms and reduces hospital admissions, it has neither a positive nor negative effect on survival. Spironolactone, a potassium sparing diuretic has been shown to reduce mortality when used in patients with heart failure. Although beta blockers would be expected to make heart failure worse because of their negative inotropic and chronotropic properties, Carvedilol, and subsequently other beta blockers, have been shown to reduce

mortality in heart failure. Dobutamine is often used in patient with cardiogenic shock. However prolonged use of these drugs has not been shown to improve survival, and in fact may increase mortality.

22) FFFFF

Chronic right heart failure results in increased systemic venous pressures, and causes ankle oedema, elevated jugular venous pressure and hepatic congestion. Emphysema and primary pulmonary hypertension are important causes. Since the myocardium of the right heart is thinner, it dilates earlier and the prognosis once right heart failure develops is very poor.

23) TFFTF

ACE inhibitors improve survival and outcome in patients with all degrees of heart failure. Digoxin has neither a negative nor a positive effect on survival, although it helps reduce symptoms and hospital admissions. While nitrates alone are of no survival benefit, the combination of nitrates and hydralazine improves survival in heart failure. Dobutamine probably worsens outcome in heart failure.

24) TFFFT

Dilated proximal pulmonary arteries with pruning of the peripheral vessels is seen on the chest radiograph in pulmonary hypertension. Breathlessness in LVF is due to pulmonary interstitial oedema and increased stiffness of the lungs. Hypoxia occurs only in very severe pulmonary oedema, when alveolar oedema develops and compromises gas transfer. Hyperventilation in LVF results in CO₂ washout, and low PaCO₂. Orthopnoea and paroxysmal nocturnal dyspnoea may precede effort dyspnoea, and the presence of these symptoms alone with a normal exercise tolerance warrants investigation. Fluid in the oblique fissure may mimic a solid tumour on the chest radiograph.

25) FTTTT

Antiarrhythmics have no place in the treatment of chronic heart failure in the absence of any arrhythmias. Carvedilol reduces mortality and improves symptoms. Digoxin will improve symptoms without affecting survival. Spironolactone reduces mortality. Candesarten improves survival in heart failure.

HYPERTENSION

- 1) The following are true regarding hypertension
 - a) A sustained blood pressure of 150/85 mmHg in a 65 year old man is indicative that he is hypertensive.
 - b) In a 20 year old male, a blood pressure of 135/85 is optimal
 - c) In a diabetic with nephropathy, the target blood pressure is below 120/70mmHg
 - d) In a hypertensive patient with a history of ischaemic stroke 6 months ago, a blood pressure of 140/90 mmHg indicates adequate control
 - e) In a patient who has sustained an ischaemic stroke 24 hours ago, a blood pressure of 170/95mmHg requires antihypertensive treatment

- 2) The following are true regarding thiazide diuretics in the management of hypertension
 - a) They are usually administered once daily in the morning
 - b) The antihypertensive effect is due to sustained reduction in plasma volume
 - c) Combination with other antihypertensives is not recommended due to drug interactions
 - d) There are no recent clinical trials showing efficacy of thiazides in hypertension
 - e) They should be avoided in patients with diabetes

- 3) A 56 year old diabetic man is seen by his general practitioner. He is found to have a blood pressure of 180/110mmHg. He is not obese, and is a non smoker. His serum cholesterol and renal function are normal.
 - a) He should be given sublingual nifedipine to reduce the blood pressure
 - b) He should be tried on lifestyle modification alone for 3 months
 - c) Ramipril is an appropriate first line antihypertensive
 - d) Thiazide diuretics are contraindicated
 - e) His target blood pressure is 140/90mmHg

Hypertension

- 4) The following non pharmacological methods have been shown to reduce the blood pressure in subjects with hypertension
 - a) Weight reduction
 - b) Increased fruit and vegetable intake
 - c) Regular aerobic exercise
 - d) Cessation of smoking
 - e) Reduced alcohol consumption

- 5) Hypertension is caused by
 - a) Renal artery stenosis
 - b) Coarctation of the aorta
 - c) porphyria
 - d) Oral contraception
 - e) Renin secreting tumours

- 6) A 45 year old man is found to have a blood pressure of 150/90. He is overweight, and smokes a pack of cigarettes a day, but has no other risk factors. The following are true
 - a) He should be started on a thiazide diuretic
 - b) He should be advised to reduce weight
 - c) Meditation is an effective method of reducing his blood pressure
 - d) He should reduce smoking
 - e) He should reduce the amount of salt in his diet

- 7) The following non-pharmacological measures are useful in the treatment of hypertension
 - a) moderate dietary sodium restriction
 - b) weight reduction in the obese
 - c) meditation
 - d) avoidance of excess alcohol intake
 - e) regular aerobic exercise

Hypertension

- 8) The following are true
 - a) Hypertension is defined as a sustained blood pressure above 140/90mmHg
 - b) A blood pressure of 138/85mmHg is defined as normal
 - c) A patient with a diastolic blood pressure above 100mmHg is considered to have stage 2 hypertension
 - d) A patient with a systolic blood pressure of 150mmHg has stage 2 hypertension
 - e) To stage hypertension, both systolic and diastolic values must be above the defined level

- 9) The following are true
 - a) Hypertension is the most important cause of stroke
 - b) The prevalence of hypertension is on the increase
 - c) Control of hypertension is achieved in only 50 percent of people worldwide
 - d) Hypertension is commoner in poorer socioeconomic classes
 - e) Hypertension is commoner in the elderly

- 10) The following people are more likely to be lacking in awareness of high blood pressure
 - a) Patients over the age of 65 years
 - b) Males
 - c) White women
 - d) Those who have not visited a doctor within the last year
 - e) Smokers

- 11) Regarding blood pressure measurement
 - a) A single blood pressure reading of 180/110mmHg is adequate to diagnose hypertension
 - b) Strenuous exercise can result in a falsely low blood pressure
 - c) Drinking coffee just before checking the blood pressure can result in a falsely high reading
 - d) To measure the blood pressure in a regular smoker, he should not have smoked for the past 30 minutes
 - e) Patients should be asked to skip their regular dose of antihypertensive medications prior to coming to check their blood pressure

Hypertension

- 12) Regarding measurement of blood pressure
 - a) Aneroid sphygmomanometers are as accurate as mercury sphygmomanometers
 - b) The length of the bladder should be 75 percent of the circumference of the upper arm
 - c) The width of the bladder should be more than 50 percent of the length of the upper arm
 - d) The use of a cuff which is too small will result in a falsely low blood pressure reading
 - e) In pregnancy, the blood pressure should be measured in the lateral recumbent position

- 13) Regarding the measurement of blood pressure
 - a) The cuff should be inflated to 10mmHg above the systolic pressure detected by palpation of the brachial artery
 - b) The arm must be supported so that the brachial artery is at the level of the heart
 - c) The diastolic pressure is the point at which the Korotkov sounds disappear
 - d) The point of muffling of the Korotkov sounds is taken in high output states
 - e) The blood pressure apparatus must be placed at the level of the heart

- 14) Regarding 'White Coat' hypertension
 - a) is present in less than 5 percent of people with elevated blood pressure
 - b) is less likely if the diastolic blood pressure measured by the doctor is >105mmHg
 - c) ambulatory blood pressure monitoring is useful in diagnosis
 - d) it does not cause any abnormalities on echocardiography
 - e) it does not give rise to sustained hypertension

- 15) Risk factors for the development of preeclampsia include
 - a) Multiparity
 - b) diabetes mellitus
 - c) a past history of renal disease
 - d) a history of chronic hypertension
 - e) age below 15 years

Hypertension

- 16) Pre-eclampsia
- a) Is associated with increased perinatal morbidity and mortality
 - b) Is diagnosed by measurement of two elevated blood pressures, at least 6 h apart
 - c) When associated with proteinuria, denotes a worse prognosis
 - d) Is reduced by the use of aspirin
 - e) Oedema is a feature
- 17) Regarding severe pre-eclampsia
- a) Renal failure occurs
 - b) The presence of thrombocytopenia, hemolysis, and elevated livers enzymes indicates a poor prognosis
 - c) intracranial haemorrhage is a complication
 - d) it does not occur after delivery
 - e) fits occur only in the presence of very high blood pressure
- 18) Regarding the management of pre-eclampsia
- a) In severe pre-eclampsia delivery of the baby is recommended after 32 weeks of gestation
 - b) control of blood pressure to below 160/110 mmHg reduces the risk of stroke
 - c) rapid reduction of blood pressure is indicated
 - d) intravenous labetalol is used
 - e) intravenous phenytoin is the preferred drug in seizures
- 19) Regarding the drug management of hypertension
- a) An angiotensin converting enzyme inhibitor is the preferred first line drug
 - b) Prazocin improves survival
 - c) Short acting calcium channel blockers are associated with increased mortality
 - d) Beta blockers reduce mortality
 - e) Angiotensin receptor blockers are safe in pregnancy

Hypertension

- 20) Regarding hypertension due to endocrine causes
- Hyperparathyroidism is a known cause
 - In renal artery stenosis, hyperkalaemia is a feature
 - In ectopic ACTH syndrome, marked proximal muscle weakness is seen
 - Retinal haemorrhages without other hypertensive changes in the retina suggests the possibility of phaeochromocytoma
 - Carcinoid syndrome is a recognized cause
- 21) The following antihypertensive drugs are appropriate choices in the conditions named
- Hydrochlorothiazide → benign prostatic hypertrophy
 - Losarten → advanced renal failure
 - Ramipril → diabetes mellitus
 - Metoprolol → congestive heart failure
 - Methyldopa → elderly
- 22) In a patient with moderate chronic renal failure
- Tight blood pressure control is beneficial
 - Diltiazem reduces proteinuria in diabetic nephropathy
 - Angiotensin receptor blockers are the preferred drug for blood pressure control
 - Dietary sodium restriction is helpful in reducing the blood pressure
 - Hyperkalaemia may occur with ACE inhibitors
- 23) Regarding renovascular hypertension
- It is commoner in blacks
 - A low serum potassium is seen
 - The presence of asymmetry in renal sizes is suggestive of the diagnosis
 - Renal arteriography is the gold standard in diagnosis
 - Plasma renin activity is reduced

Hypertension

- 24) Regarding hypertensive emergency
- a) The blood pressure must be reduced within 5 minutes to prevent hypertensive encephalopathy
 - b) Intravenous labetalol is the drug of choice
 - c) Sublingual nifedipine is indicated
 - d) Mannitol is indicated to reduce cerebral oedema
 - e) Aortic dissection is a complication
- 25) Hypertension increases the risk of developing the following
- a) Renal failure
 - b) Asthma
 - c) Congestive cardiac failure
 - d) Stroke
 - e) Angina

Answers to Hypertension questions

1) TFFFF

Both the JNC VIII and WHO guidelines on hypertension define hypertension as a blood pressure higher than 140/90 mmHg, at any age. There is no difference in the level of blood pressure cut offs at different ages, and anyone with a blood pressure over this value is hypertensive. If only one value (systolic or diastolic) is greater than the upper limit, the higher value is taken. While the diagnosis of hypertension is based on these cut-offs, the optimal blood pressure is defined as a blood pressure of 120/70. Evidence from the HOT trial indicated that the lower the blood pressure, the lower the risk of cardiovascular events. The lowest point below which lowering the blood pressure can be detrimental, has not been determined yet. In an uncomplicated patient, the target would be to reduce blood pressure below 140/90; however in patients with diabetic nephropathy, the target blood pressure is much lower. Similarly, lower blood pressure targets are necessary for secondary prevention of stroke. However, soon after an ischaemic stroke, blood pressure reduction is not indicated, and can be dangerous, unless the blood pressure is over 220/120.

2) TFFFT

Thiazides are usually administered in the morning as a single dose. Their antihypertensive effects are not primarily due to a reduction in plasma volume. Although plasma volume does fall initially, compensatory mechanisms bring plasma volume back to normal within a few days. Thiazides show the maximum benefit in hypertension, and are the first line treatment of most hypertensives. They can be safely combined with most other antihypertensives. Lower doses of two antihypertensives in combination are better than one antihypertensive in high dose. Several trials including the large ALLHAT trial, the largest antihypertensive treatment trial, showed that thiazides are the most effective and beneficial drugs in hypertension. The beneficial effects of thiazides override any adverse effects they might have in diabetics.

3) FFTFF

There is no urgency to reduce the blood pressure unless there is evidence of hypertensive encephalopathy. Sublingual nifedipine can cause a drastic reduction in blood pressure and can even cause a stroke. In a diabetic patient

Hypertension-Answers

with this degree of blood pressure, lifestyle modification alone is inadequate, and he should be started on treatment. ACE inhibitors are appropriate drugs for the treatment of diabetic patients. Thiazides are also safe and effective in diabetics, and their supposed adverse effects on lipids are not of much prognostic significance. The target blood pressure is 130/80mmHg in a diabetic patient.

4) TTTTT

All these measures are helpful in reducing blood pressure. Smoking causes a transient rise in blood pressure which may not contribute to sustained hypertension, but in view of the other increased cardiovascular risk, is best avoided. Heavy alcohol consumption increases blood pressure.

5) TTTFT

Oral contraception is not associated with hypertension, although it may increase cardiovascular risk in certain patients. Porphyria causes abdominal pain and hypertension. Blood pressure rise is usually transient, and it may not be a cause of chronic hypertension.

6) FTFFT

Initially lifestyle measures such as weight reduction, reduced salt in the diet, regular exercise can be tried out since this patient has stage I hypertension. Drug therapy is not urgently indicated, but thiazides would be the drugs of first choice. There is no proof that meditation is useful in reducing his blood pressure. He should stop, not reduce, smoking.

7) TTFTT

There is no convincing evidence that meditation results in a sustained lowering of blood pressure, although transient reduction in blood pressure has been observed during the time of meditation.

8) TFTFF

Hypertension is defined as a blood pressure over 140/90mmHg in a patient who is not on antihypertensive medication. However, a blood pressure of 138/85mmHg falls into the pre-hypertension range. The definitions based on the JNC VII report are;

- Normal blood pressure: systolic <120 mmHg and diastolic <80
- Prehypertension: systolic 120-139 or diastolic 80-89
- Hypertension:

Hypertension-Answers

Stage 1: systolic 140-159 or diastolic 90-99

Stage 2: systolic \geq 160 or diastolic \geq 100

In the case of a disparity in category between the systolic and diastolic pressures, the higher value determines the severity of the hypertension. The systolic pressure is the greater predictor of risk in patients over the age of 50 to 60.

9) TFFFT

Hypertension is on the increase. It is the most important risk factor for stroke. Only 25 percent of people with hypertension worldwide are properly controlled. Hypertension is commoner in the affluent classes, but control and compliance may be poorer among poorer people. The incidence increases with increasing age.

10) TTFTF

The following are independent predictors of a lack of awareness of high blood pressure; age greater than 65 years (most important variable), male sex, non-Hispanic black race, and lack of a physician visit within the last year. There is no evidence that smoking predicts lack of awareness of hypertension.

11) FTTF

A single blood pressure reading is never adequate to diagnose blood pressure. Multiple readings are essential, and if the first measurement is high, the patient should be rested for some time and the blood pressure rechecked. To diagnose hypertension, 3 readings at least one week apart must be elevated. Strenuous exercise is more likely to cause an erroneously low blood pressure and not, as would be expected, a falsely high reading. Especially in non-habitual coffee drinkers, ingestion of caffeine within the last 1 hour can raise the blood pressure. Smoking transiently raises the blood pressure, and smokers should be asked not to smoke for 30 minutes before checking their blood pressure. In patients who smoke heavily, however, this means that the blood pressure measured will be falsely low. Patients should take their regular medications before coming for blood pressure measurement. A common problem in clinical practice is where patients skip the morning dose of drugs to "see if the pressure is controlled now"!

12) FTTF

Mercury sphygmomanometers are much more accurate than aneroid sphygmomanometers. Aneroid sphygmomanometers must be calibrated against a mercury apparatus every six months. The length of the bladder must be 75-80 percent of the circumference of the upper arm, and the width of the bladder must be more than 50 percent of the length of the upper arm. If too small a cuff is used, the pressure generated by inflating the cuff may not be fully transmitted to the brachial artery, and the pressure in the cuff may be considerably higher than the intraarterial pressure. This can lead to overestimation of the systolic pressure by 10 to as much as 50 mmHg in obese patients.

13) FTTTF

The cuff should be inflated to 30mmHg above the systolic pressure detected by palpation. Auscultation alone is not sufficient to determine systolic pressure, as the Korotkov sounds may disappear transiently as the cuff is inflated; this is known as the 'auscultatory gap'. The arm must be supported so that the brachial artery is at the level of the heart. If the arm is allowed to hang down, the brachial artery will be about 10-15 cm below the level of the heart, resulting in false elevation of the measured blood pressure by 10-12mmHg because of hydrostatic pressure. The diastolic pressure is usually taken as the point where the Korotkov sounds disappear; however in high output states there can be a gap of more than 10mmHg between the point of muffling and the point of disappearance of the sounds. In this situation the point of muffling is taken as the diastolic pressure. The blood pressure apparatus does not need to be kept at heart level; only the cuff must be at heart level. This is a common misconception which has been handed down through generations of medical students.

14) FTTF

White coat hypertension or isolated office hypertension is a situation where blood pressure is elevated when measured by the doctor, but is repeatedly normal when measured at home, at work, or by ambulatory BP monitoring. It is seen in as much as 20-25 percent of patients with elevated blood pressure, and is more common in the elderly and in children. It is unlikely in patients with office diastolic pressures $>$ or \approx 105 mmHg. Ambulatory monitoring is useful in diagnosis. White coat hypertension is not necessarily normal. Patients with white coat hypertension are more likely to be overweight, have higher plasma insulin and triglyceride levels, and are more likely to have a family history of hypertension. They are more likely to develop sustained

hypertension, and are more likely to have left ventricular hypertrophy on echocardiography.

15) FTTT

Risk factors for the development of preeclampsia include nulliparity, diabetes mellitus, a history of renal disease or chronic hypertension, a prior history of preeclampsia, extremes of maternal age (>35 years or <15 years), obesity, antiphospholipid antibody syndrome, and multiple gestation.

16) TTTFT

Pre-eclampsia is the new onset of hypertension (blood pressure >140/90 mmHg), proteinuria (>300 mg per 24 h), and pathologic oedema in pregnancy. The precise cause of preeclampsia is not known, but it is thought to be due to factors of placental origin; the end result is vasospasm and endothelial injury in multiple organs. Preeclampsia is associated with abnormalities of cerebral circulatory autoregulation, which increase the risk of stroke at near-normal blood pressures. When associated with proteinuria, the prognosis is worse, and correlates with greater degrees of proteinuria. There is no evidence that aspirin is beneficial, although it was earlier thought to be so.

17) TTTFF

The clinical features of severe preeclampsia include headaches, blurred vision, seizures, coma, marked elevations of blood pressure (>160/110 mmHg), severe proteinuria (>5 g per 24 h), oliguria or renal failure, pulmonary edema, hepatocellular injury (ALT > 2' the upper limits of normal), thrombocytopenia (platelet count < 100,000/uL), or disseminated intravascular coagulation. The most serious complication is intracranial haemorrhage. Hemolysis, elevated liver enzymes and low platelets comprises the HELLP syndrome, a special subgroup of severe preeclampsia. It is a major cause of morbidity and mortality in this disease. The presence of platelet dysfunction and coagulation disorders further increases the risk of stroke. Pre-eclampsia is known to occur before, during and soon after delivery. Fits can occur at relatively in patients with blood pressures which are only slightly elevated.

18) TTFTF

Delivery of the baby is the definitive treatment for pre-eclampsia, and delivery is generally recommended in severe pre-eclampsia after 32 weeks of gestation. Lowering the blood pressure to below 160/110 reduces the risk of complications; however blood pressure lowering below this has not been

shown to improve outcome, and may impair placental perfusion. Blood pressure reduction should be gradual except in severe pre-eclampsia. Intravenous labetalol is safe and effective. Intravenous magnesium sulphate is superior to phenytoin in the treatment of seizures, and is the treatment of choice.

19) FTTF

Given the mortality benefits seen with the use of thiazide diuretics in hypertension, these drugs should be the preferred first line therapy. Although there is no definite evidence for or against prazosin, in the ALLHAT trial, the largest trial of antihypertensives to date, doxazosin, a related drug was found to increase mortality. Short acting calcium channel antagonists like nifedipine have been shown to increase mortality. Long acting calcium channel antagonists are safe. Beta blockers have consistently been shown to reduce mortality. Angiotensin receptor blockers can cause uterine ischaemia and impaired fetal renal function, and are contraindicated in pregnancy.

20) TTTF

Hyperparathyroidism is known to cause hypertension, although the exact mechanism of this is not clear. Hypokalaemia occurs in renal artery stenosis. If a hypertensive patient has a low serum potassium, the possibility of either renal artery stenosis or hyperaldosteronism should be considered. In ectopic ACTH syndrome, the classical features of Cushing's disease are not apparent; marked proximal muscle weakness may be the only feature. In pheochromocytoma the rises in blood pressure may be episodic. Classical hypertensive retinopathy changes may not be present, and only flame haemorrhages which occur during the sudden increases in blood pressure may be seen. Carcinoid syndrome can cause transient elevation of blood pressure, but is generally not a cause of sustained hypertension.

21) FTTF

While thiazide diuretics are good antihypertensive drugs, they are not ideal for use in a patient with benign prostatic hypertrophy. Firstly, diuresis will result in increased frequency of urine. Secondly, prazosin will relieve symptoms of prostatism and is probably the preferred drug in this situation. Although ACE inhibitors and angiotensin receptor blockers can worsen renal function by altering intrarenal autoregulation, and can cause hyperkalaemia, both these drugs have long term benefits in retarding the progression of renal failure, even in advanced renal disease. Ramipril reduces proteinuria and is

nephroprotective in diabetic patients. Metoprolol and other beta blockers, in particular carvedilol, reduce mortality in patients with congestive cardiac failure. Methyldopa can result in postural hypertension and depression in elderly patients and is not the best choice in these patients.

22) TTFTT

Tight blood pressure control is probably the most effective mechanism of preventing the progression of renal failure at any stage of renal dysfunction. Diltiazem is effective in reducing proteinuria in patients with diabetic nephropathy, although often ACE inhibitors are used for this purpose because of their mortality benefits. ACE inhibitors and angiotensin receptor blockers are both equally effective in preventing the progression of renal failure. However these drugs should be used with care because they can initially cause deterioration of renal function. They are also known to cause hyperkalaemia. Dietary restriction of sodium is an effective non-pharmacological method of treatment of hypertension.

23) FTTTF

For reasons which are unknown, renovascular hypertension is rare among blacks. Among non-blacks, renovascular hypertension is one of the most important causes of severe hypertension. A low serum potassium in a hypertensive patient should alert the physician to the possibility of renal artery stenosis or Conn's syndrome. Renal arteriography is still the gold standard for diagnosis. Plasma renin activity is increased in renal artery stenosis.

24) FFFFT

The aim in hypertensive emergency is to reduce the blood pressure by not more than 25% within 2 hours. Rapid reduction of blood pressure may cause ischaemic stroke or myocardial infarction. Intravenous nitroprusside is the drug of first choice due to its short duration of action. Its effects can be reversed rapidly by stopping the infusion. Sublingual nifedipine can drastically drop the blood pressure and can increase the risk of stroke. It should not be used. There is no place for the use of mannitol; blood pressure lowering alone is usually enough. Aortic dissection is one of the most serious complications of hypertensive emergency.

25) TFTTT

Hypertension-Answers

Hypertension is one of the most important causes of congestive cardiac failure and stroke. Ischaemic heart disease is more likely in hypertensives. Longstanding hypertension can cause renal failure, and in patients with existing renal disease, uncontrolled hypertension is the most important factor which worsens the rapidity of progression.

CARDIOVASCULAR DRUGS

- 1) Aspirin
 - a) Reduces mortality after a myocardial infarction
 - b) Must be discontinued if the patient complains of dyspepsia
 - c) Is effective in primary prevention of myocardial infarction
 - d) Prevents stroke
 - e) Gives additive benefit when combined with warfarin after pulmonary embolism

- 2) Regarding anticoagulation
 - a) Warfarin is indicated in patients with mitral stenosis and atrial fibrillation
 - b) Low molecular weight heparin is less effective than unfractionated heparin in unstable angina
 - c) After a pulmonary embolism, warfarin treatment is indicated for at least 3 months
 - d) Patients with recurrent transient ischaemic attacks should be treated with warfarin
 - e) In patients on long term warfarin it is sufficient to check the INR every 3 months

- 3) Isosorbide dinitrate
 - a) Improves in angina by causing coronary vasodilatation
 - b) Reduces mortality after myocardial infarction
 - c) Causes headache
 - d) Causes tolerance
 - e) is effective when administered transcutaneously

- 4) Beta blockers
 - a) Reduce angina by reducing myocardial oxygen demand
 - b) Are contraindicated in heart failure
 - c) Are contraindicated in chronic obstructive airways disease
 - d) Reduce left ventricular hypertrophy
 - e) Reduce the incidence of sudden cardiac death after myocardial infarction

Cardiovascular drugs

- 5) Thiazide diuretics
 - a) are first line drugs in heart failure
 - b) are first line drugs in hypertension
 - c) are unsuitable for use in patients with stage 2 hypertension
 - d) maybe safely combined with angiotensin receptor blockers
 - e) Are contraindicated in diabetes mellitus

- 6) Spironolactone
 - a) reduces mortality in heart failure
 - b) high doses should be used in heart failure
 - c) can cause hyperkalaemia when combined with ACE inhibitors
 - d) is safe in moderate renal failure
 - e) can cause gynaecomastia

- 7) Digoxin
 - a) is indicated in patients with mitral stenosis in sinus rhythm
 - b) improves survival in heart failure
 - c) reduces symptoms in heart failure
 - d) can cause tachyarrhythmias
 - e) can cause heart block

- 8) Angiotensin converting enzyme inhibitors are indicated in
 - a) In a 40 year old patient with idiopathic dilated cardiomyopathy
 - b) In a patient after a myocardial infarction
 - c) In a patient with aortic stenosis
 - d) A hypertensive patient with proteinuria
 - e) A normotensive diabetic without proteinuria

- 9) Angiotensin receptor blockers
 - a) Are contraindicated in renal failure
 - b) Have beneficial effects in diabetes mellitus
 - c) Can be safely combined with other antihypertensives
 - d) Have antiarrhythmic properties
 - e) Reduce mortality in heart failure

Cardiovascular drugs

- 10) True or false
- a) Vitamin E is of proven value in the treatment of hypertension
 - b) Prazocin has survival benefit in hypertension
 - c) Folic acid supplementation may be beneficial in preventing ischaemic heart disease
 - d) Beta carotene has beneficial effects in ischaemic heart disease through its antioxidant effects
 - e) Nicotinic acid is an effective cholesterol lowering agent
- 11) The side effects of angiotensin converting enzyme inhibitors include
- a) Cough
 - b) Headache
 - c) Hyperkalaemia
 - d) Worsening of renal function in patients with chronic renal failure
 - e) Hypotension with the first dose
- 12) Amiodarone
- a) Can cause hypothyroidism
 - b) Has a half life of 3 days
 - c) Causes prolongation of the QT interval
 - d) Is useful in the treatment of atrial fibrillation
 - e) Is safe in pregnancy
- 13) Regarding Calcium channel blockers
- a) Reduce mortality in patients with ischaemic heart disease
 - b) Are effective antianginal agents
 - c) Reduce proteinuria
 - d) Short acting nifedipine increases mortality in hypertension
 - e) Can be used to delay surgery in patients with aortic regurgitation
- 14) Side effects of thiazide diuretics include
- a) hypercalcaemia
 - b) acute pancreatitis
 - c) hyperglycaemia
 - d) cholestatic jaundice
 - e) hyperkalaemia

Cardiovascular drugs

- 15) Streptokinase treatment in acute myocardial infarction
- a) has now been shown to be effective if given via the intramuscular route
 - b) may be associated with an anaphylactic reaction
 - c) is associated with a 25 percent reduction in mortality
 - d) is indicated in non ST elevation MI
 - e) is as effective in improving prognosis in patients with inferior as well as anterior infarctions
- 16) Frusemide
- a) Given intravenously takes 6 hours to bring relief in acute left ventricular failure
 - b) Reduces preload
 - c) Is a less efficacious diuretic than amiloride
 - d) Is preferred to hydrochlorothiazide in the management of hypertension
 - e) Is known to precipitate pre-renal uraemia
- 17) In heart failure
- a) Carvedilol is contraindicated as it has negative inotropic effects
 - b) The compensatory pathophysiological mechanisms have harmful effects in the long term
 - c) Salt restriction is used as a form of therapy
 - d) Oedema is initially detected in the face
 - e) Captopril improves survival
- 18) Aspirin
- a) Is indicated in the management of acute thrombotic stroke
 - b) In low dose (150 to 300mg daily) is known to influence the regular tests of bleeding function
 - c) Allergy manifests as bronchospasm
 - d) Does not improve survival in patients after myocardial infarction
 - e) And streptokinase should not be given concurrently

Cardiovascular drugs

- 19) The following drugs and their actions are correctly paired
- a) Dipyridamole – inhibits platelet phosphodiesterase
 - b) Clopidogrel – inhibits activation of the glycoprotein IIb/IIIa receptors in the platelets
 - c) Tirofiban – inhibits lipooxygenase receptors
 - d) Low dose aspirin – alters the balance between thromboxane A2 and prostaglandin I2 in platelets and vessel wall
 - e) Abciximab – blocks glycoprotein IIb/IIIa receptors in the platelets
- 20) Streptokinase
- a) Is extracted from cultures of beta-haemolytic streptococci
 - b) Has high efficacy in dissolving arterial thrombi that are about 3 weeks old
 - c) Does not have antigenic properties
 - d) Is given as a rapid intravenous bolus
 - e) Is classified as an antiplatelet drug
- 21) The following are true
- a) Aspirin is converted to salicylate by first pass metabolism in the liver
 - b) Fibrinolytic drugs are ineffective in reducing mortality after myocardial infarction in those over 70 years
 - c) Atenolol is a lipid soluble beta blocker
 - d) Fibrinolytic drugs are contraindicated in severe uncontrolled hypertension
 - e) Streptokinase when used to treat myocardial infarction is known to produce arrhythmias
- 22) The following drugs and their effects are correctly paired
- a) Simvastatin – lowers hepatic cholesterol synthesis
 - b) Vitamin E– increases HDL cholesterol
 - c) Gemfibrozil – increases hepatic lipid synthesis
 - d) Cholestyramine – inhibits enterohepatic reuptake of bile salts
 - e) Nicotinic acid – decreases serum triglycerides

Cardiovascular drugs

- 23) Statins
- a) Are contraindicated if serum transaminases are persistently elevated
 - b) Cause rhabdomyolysis
 - c) Are safely used during pregnancy
 - d) Are effective in the primary prevention of coronary events
 - e) Are recommended to be taken in the morning
- 24) Cautions about the use of digitalis include
- a) Hypokalaemia
 - b) Old age
 - c) Diabetes mellitus
 - d) Low platelets
 - e) Presence of atrial fibrillation
- 25) Which of the following is true regarding the action of Clopidogrel?
- a) It is useful in stroke
 - b) It is indicated in unstable angina
 - c) It can cause thrombocytopenia
 - d) It should not be combined with aspirin
 - e) It causes hypertension

Answers to Cardiovascular drugs questions

1) TFTTF

Low dose aspirin irreversibly inhibits platelet cyclooxygenase, resulting in reduction of thromboxane A₂ which is a promoter of platelet aggregation, thereby reducing the risk of thrombotic vascular events. This effect of aspirin is seen with low doses, i.e., 75 to 150mg per day. Larger doses do not confer additional benefit, and in fact may have deleterious effects by inhibiting endothelial synthesis of prostacyclin, which is a vasodilator and inhibitor of platelet aggregation. Aspirin is useful in secondary prevention after acute myocardial infarction, occlusive stroke, transient ischemic attack, stable angina, and coronary artery bypass. It is also used in the treatment of acute ischemic syndromes such as acute MI and unstable angina, and in acute occlusive stroke. It is also of benefit in primary prevention of myocardial infarction. It probably has no additive value to treatment with warfarin in pulmonary embolism. Aspirin causes gastric erosions and dyspepsia, but this alone should not be an indication to stop treatment, unless a gastric ulcer develops, or the patient has upper GI bleeding.

2) TFTFF

Warfarin reduces the risk of stroke in patients with atrial fibrillation, by reducing thrombus formation in the dilated atrium in patients with mitral stenosis. In patients with carotid artery stenosis who develop a TIA, there is a place for treatment with warfarin to prevent a stroke. However there are no clear guidelines regarding the use of warfarin routinely in patients with TIAs where the cause has not been identified. After a pulmonary embolism, warfarin treatment should be continued for at least 3 months, preferably longer. Patients on long term warfarin must, in most instances, have their prothrombin time INR monitored every 2 to 3 weeks.

3) FTTTT

When coronary atheroma is present, the coronary arteries are too rigid to dilate in response to nitrates. The beneficial effects of nitrates is not due to coronary vasodilatation, but occurs as a result of pulmonary and systemic venodilatation resulting in reduced preload. Although of symptomatic benefit, there is no evidence that isosorbide dinitrate improves mortality after myocardial infarction. Isosorbide dinitrate is well known to cause headache, especially soon after commencing therapy. It is usually easily treated with simple analgesics, and it is only rarely that the headaches are so severe as to

warrant discontinuation of the drug. With continued use, the headaches usually resolve. Nitrates are also well known to cause tolerance, and it is essential to have nitrate free intervals to prevent this. Nitrates can be effectively administered sublingually, orally, intravenously, or transcutaneously.

4) TFTTT

Beta blockers have negative inotropic and chronotropic effects, thereby reducing myocardial oxygen demand. These effects are beneficial in coronary ischaemia. Although on physiological grounds beta blockers should worsen heart failure this is not the case. Patients with heart failure have high adrenergic drive, which results in worsening of symptoms and survival. Careful use of beta blockers can be used to treat this. Beta blockers, in particular Carvedilol, has been proven to reduce mortality in patients with moderate heart failure. Care must be taken to commence beta blockers in patients with heart failure, as an initial deterioration in functional status can occur. Beta blockers cause bronchoconstriction, and are contraindicated in asthma and COPD. Beta blockers reduce left ventricular hypertrophy, though ACE inhibitors are more effective for this purpose. After a myocardial infarction, beta blockers reduce the incidence of sudden cardiac death, probably by reducing the occurrence of life threatening tachyarrhythmias.

5) FTFTF

Thiazides are mild diuretics, and are often inadequate for heart failure. Loop diuretics such as frusemide are preferred. Thiazides can, however, be used as add on drugs in chronic heart failure. Thiazides have been consistently shown to have survival benefit in patients with hypertension, and are not recommended as the first line drugs in hypertension. They are suitable either alone or in combination in all stages of hypertension. They can be safely combined with almost any other antihypertensive. Thiazides in larger doses have adverse effects on serum lipids, and may have adverse effects on diabetic control, but evidence from the largest trial on antihypertensive treatment, the ALLHAT trial, demonstrated that thiazides significantly reduced cardiovascular mortality in all patients including diabetics. Thiazides are no longer contraindicated in diabetics.

6) TFTTT

Low doses of spironolactone have been shown to reduce mortality in patients with heart failure. Due to its potassium sparing effects, hyperkalaemia can

occur, especially when used in combination with ACE inhibitors. In low doses, hyperkalaemia is often not a problem, except when renal function is impaired. It can be used with care in moderate renal failure, but serum potassium levels must be closely monitored. Spironolactone causes gynaecomastia, by its anti-androgen effects.

7) FTTT

Digoxin has complex pharmacodynamics and pharmacokinetics. It has cardiac inotropic effects, can cause heart block, and in overdose can result in various types of tachyarrhythmias. There has been much controversy about the use of digoxin in heart failure. When digoxin was first discovered it was found to be effective in congestive heart failure. Subsequently there were concerns that although it improves symptoms it may increase mortality. The Digitalis Investigation Group or DIG trial showed that digoxin improved symptoms and reduced hospital admissions, but neither increased nor decreased mortality. It is used in resistant heart failure as an add-on drug to more beneficial drugs like ACE inhibitors and spironolactone, and is no longer a first line drug in heart failure. However, in mitral stenosis with atrial fibrillation, it is useful in reducing the ventricular rate. There is no indication for its use in patients with mitral stenosis who are in sinus rhythm.

8) TTFTF

ACE inhibitors have a variety of beneficial effects. They reduce symptoms and mortality in patients with heart failure due to any cause. ACE inhibitors also have effects on ventricular remodeling after a myocardial infarction, and can reduce the risk of development of myocardial dysfunction. ACE inhibitors reduce proteinuria in normotensive diabetics with proteinuria, and hypertensives with proteinuria. There is no indication for its use in a normotensive diabetic patient without proteinuria. ACE inhibitors cause systemic vasodilatation, and are contraindicated in patients with aortic stenosis, as they can result in hypotension.

9) FTTFT

Angiotensin receptor blockers cause hyperkalaemia, and may affect intrarenal autoregulation. Transient worsening of renal function is sometimes seen. However, in the long term these drugs retard the progression of renal failure. They have beneficial effects in diabetes mellitus, especially in the prevention of proteinuria and progression of nephropathy. They can be safely combined

with other antihypertensives. Like ACE inhibitors, they have been shown to reduce mortality in heart failure.

10) FFTFT

Although antioxidants such as vitamin E and beta carotene have long been thought to be beneficial in the treatment of cardiovascular disease, there is no convincing trial evidence of such benefit. Elevated homocysteine levels increase cardiovascular risk by its procoagulant effects. Folate deficiency may result in elevated homocysteine levels, and it is thought that in patients who are folate deficient, folic acid supplementation may be of use. Again, there is no definite evidence. Nicotinic acid is an effective, but poorly tolerated, cholesterol lowering agent.

11) TFTTT

Headache is not a recognised side effect of ACE inhibitors. Cough is common, and is an indication to switch over to an angiotensin receptor blocker. Hyperkalaemia is a known side effect, especially in patients on spironolactone, and those in renal failure. ACE inhibitors are useful even in late stages of renal failure; however worsening of renal function can occur, due to changes in intrarenal autoregulation. If renal function deteriorates, the ACE inhibitor may need to be discontinued. First dose hypotension is a well known side effect, and patients are therefore advised to take the first dose while lying in bed.

12) TFTTF

Amiodarone can cause both hypo and hyperthyroidism. It has a very long half life of nearly 100 days. It causes prolongation of the QT interval, and can be arrhythmogenic. It is used to convert atrial fibrillation to sinus rhythm, and therefore has a place in medical cardioversion of acute atrial fibrillation. Foetal thyroid abnormalities are known to occur, and the drug is contraindicated in pregnancy.

13) FTTTT

Though calcium channel antagonists are effective anti anginal agents, there is little evidence that they affect survival in patients with ischaemic heart disease. There is some evidence that diltiazem prevents reinfarction in patients with non Q MI. Calcium channel blockers reduce proteinuria in patients with diabetes. Short acting nifedipine, although an effective antihypertensive agent, increases mortality in patient with hypertension and

should not be used. Nifedipine is used in patients with aortic regurgitation to reduce symptoms and delay surgery.

14) FTTTF

The most important side effects of thiazides are orthostatic hypotension, photosensitivity, hypokalemia, anorexia and epigastric distress. Hepatic dysfunction, acute pancreatitis, and erythema multiforme are known to occur. There are concerns that thiazides can cause hyperglycaemia and worsen diabetes, but this effect is clinically not of importance.

15) FTTFT

Apart from the fact that streptokinase is effective only if given intravenously, it causes bleeding, and if given by the intramuscular route will result in the formation of a muscle haematoma. It is well known to cause anaphylactic reactions. Treatment with streptokinase is associated with a 25 percent reduction in mortality. The beneficial effects in terms of survival are long term, as demonstrated by the 10 year follow up of the cohort of patients treated with streptokinase in the ISIS-2 trial. There is no benefit seen with streptokinase treatment in non ST elevation MI. Streptokinase is equally effective in all types of ST elevation MI.

16) FTFFT

Furosemide acts in left ventricular failure by causing pulmonary venodilatation and reducing preload rather than through diuresis; this action is rapid, and brings relief within 30 minutes. Being a loop diuretic, it is a much more potent diuretic than amiloride, which is a potassium sparing diuretic. Thiazides are the drugs of first choice in hypertension, and furosemide is not used as a first line drug in hypertension. By causing volume contraction, furosemide can precipitate pre-renal uraemia.

17) FTFTT

Although the negative inotropic and chronotropic effects of beta blockers should result in their worsening heart failure, clinical trials have shown that beta blockers, in particular Carvedilol, improves survival in heart failure. High levels of adrenergic activity are present in patients with heart failure, as a compensatory mechanism to the low cardiac output state. This excessive adrenergic activity is in fact detrimental. Beta blockers are postulated to help by blocking excessive the excessive adrenergic response in heart failure. Salt restriction is of proven value in heart failure. Oedema is usually seen in

dependent areas in heart failure. ACE inhibitors improve survival in heart failure.

18) TFTFF

Low dose aspirin irreversibly inhibits platelet cyclooxygenase, resulting in reduction of thromboxane A₂ which is a promoter of platelet aggregation, thereby reducing the risk of thrombotic vascular events. This effect of aspirin is seen with low doses, i.e., 75 to 150mg per day. Larger doses do not confer additional benefit, and in fact may have deleterious effects by inhibiting endothelial synthesis of prostacyclin, which is a vasodilator and inhibitor of platelet aggregation. Aspirin is useful in secondary prevention after acute myocardial infarction, occlusive stroke, transient ischemic attack, stable angina, and coronary artery bypass. It is also used in the treatment of acute ischemic syndromes such as acute MI and unstable angina, and in acute occlusive stroke. It is also of benefit in primary prevention of myocardial infarction. In low doses it does not influence the results of regular tests of bleeding. Allergy to aspirin can manifest as bronchospasm, and aspirin can worsen asthma. Many trials have shown that aspirin improves survival in myocardial infarction, being as effective as streptokinase when given during the acute attack. Streptokinase and aspirin given in combination have additive effects in reducing mortality after a myocardial infarction.

19) TFFTT

Dipyridamole inhibits phosphodiesterase-mediated breakdown of cyclic AMP which prevents platelet activation by multiple mechanisms. Ticlopidine and clopidogrel achieve their antiplatelet effect by blocking the binding of ADP to a specific platelet receptor P₂Y₁₂ that activates G_i, thereby inhibiting adenylyl cyclase and platelet aggregation. Tirofiban and abciximab are glycoprotein IIb/IIIa inhibitors which inhibit platelet aggregation. Low dose aspirin preferentially blocks thromboxane A₂ in the platelets and vessel wall.

20) TFFFF

Streptokinase is a single chain polypeptide derived from beta-hemolytic streptococcus cultures. It binds to plasminogen, forming a complex which becomes an active enzyme that cleaves peptide bonds on other plasminogen molecules, leading to plasmin activation. It is effective in dissolving newly formed arterial thrombi. It is highly antigenic, and antibodies form after its administration, limiting repeated use. It is given as an infusion over an hour.

21) FFFT

Aspirin is hydrolyzed to salicylate, which is active, by esterases in GI mucosa, red blood cells, synovial fluid, and blood; metabolism of salicylate occurs primarily by hepatic conjugation. Fibrinolytic drugs are effective even in elderly patients, although their benefits are limited in those over the age of 80 years. Atenolol is a water soluble beta blocker and does not cross the blood brain barrier. Fibrinolytic drugs are contraindicated in severe hypertension as they may cause intracranial bleeds. Streptokinase given during myocardial infarction cause arrhythmias, which arise due to reperfusion of the ischaemic myocardium . Their presence is a sign that reperfusion is taking place.

22) TFFT

Statins are HMG CoA reductase inhibitors, and inhibit hepatic cholesterol synthesis. Vitamin E has no definite effects on serum lipids. The exact mechanism of action of gemfibrozil is unknown; it is postulated to inhibit lipolysis and decrease subsequent hepatic fatty acid uptake as well as inhibit hepatic secretion of VLDL; together these actions decrease serum VLDL levels; increases HDL-cholesterol. Cholestyramine forms a nonabsorbable complex with bile acids in the intestine, releasing chloride ions in the process; inhibits enterohepatic reuptake of intestinal bile salts and thereby increases the fecal loss of bile salt-bound low density lipoprotein cholesterol. Nicotinic acid inhibits the synthesis of very low density lipoproteins. It is effective in lowering serum triglyceride levels.

23) TTTF

Statins are contraindicated if the serum transaminases are persistently elevated. They are also known to cause rhabdomyolysis. They are contraindicated in pregnancy. Statins are effective in both primary and secondary prevention of coronary events. They are taken at night, since most of the hepatic cholesterol synthesis takes place at night.

24) TFFF

Hypokalaemia worsens digitalis toxicity. However, in overdose, digoxin causes hyperkalaemia. Elderly patients are at greater risk of digoxin toxicity because of reduced renal function. Digoxin has no effect on platelets. The presence of atrial fibrillation is an indication rather than a caution for the use of digoxin. Digoxin is used to control the ventricular rate in atrial fibrillation.

Cardiovascular drugs-Answers

25) TTTFT

Clopidogrel is useful in the secondary prevention of stroke. It is also indicated in unstable angina. Clopidogrel can cause thrombocytopenia, and there are some reports of thrombotic thrombocytopenic purpura. It can be safely combined with aspirin. Hypertension is a rare but recognized side effect.

CARDIAC ARREST

- 1) The following are true regarding a cardiac arrest occurring out of hospital
 - a) More than 50 percent will survive
 - b) Patients with asystolic arrest are more likely to survive than those with ventricular fibrillation
 - c) Younger patients are more likely to survive
 - d) A patient with a witnessed cardiac arrest is more likely to survive
 - e) Treatment with atropine for a bradyarrhythmia after resuscitation is likely to improve survival

- 2) Regarding sudden cardiac death
 - a) It is defined as death occurring within 10 minutes of the terminal clinical event
 - b) 50 per cent of all cardiac deaths are due to cardiac arrest
 - c) The risk of sudden cardiac death is higher during the first 6 months of life compared to children over the age of 1 year.
 - d) It is commoner in men than in women
 - e) Up to 30 percent of sudden cardiac deaths are due to non-cardiac causes

- 3) The following are causes of sudden cardiac death
 - a) Acute coronary syndrome
 - b) Viral myocarditis
 - c) Wolff Parkinson White syndrome
 - d) Treatment with erythromycin and astemizole in combination
 - e) Hyperkalaemia

- 4) True or false regarding drugs used in cardiopulmonary resuscitation
 - a) The initial dose of adrenaline is 1mg (10 mL of 1:10000 solution) given intravenously
 - b) Sodium bicarbonate should be given during the first cycle of resuscitation
 - c) Intravenous magnesium is routinely used
 - d) The dose of atropine used in non ventricular fibrillation / Ventricular tachycardia arrest is 3mg intravenously
 - e) Tracheal administration of drugs needs 2 to 3 times the doses used

Cardiac arrest

- 5) The following are true
 - a) Atrial fibrillation causes cardiac arrest in adults
 - b) Defibrillation is the treatment for pulseless ventricular tachycardia
 - c) 1mg of adrenaline intravenously is given for ventricular fibrillation
 - d) Calcium gluconate is the drug of choice for treatment of non VF/VT cardiac arrest
 - e) Thrombolysis is a known cause of non VF / VT arrest

- 6) Regarding basic life support
 - a) Responsiveness of the victim is assessed by applying a painful stimulus
 - b) Jaw thrust is the best airway maneuver in suspected cervical spine injury
 - c) If there is no breathing, 2 effective breaths should be given
 - d) Check of circulation in an adult is by palpating for the presence of a brachial pulse
 - e) Location for chest compressions is the upper half of the sternum

- 7) A 56 year old patient develops sudden chest pain and faintness. His blood pressure is 90/50mmHg, and peripheries are cold. ECG shows a ventricular tachycardia.
 - a) He should be positioned in the head down position
 - b) The most likely diagnosis is an acute myocardial infarction
 - c) He should be given cardiac massage
 - d) Intravenous lignocaine is indicated
 - e) Intravenous adrenaline 1mg is indicated

- 8) A 55 year old woman with ischaemic heart disease and left ventricular failure develops ventricular fibrillation while in hospital. The following are true
 - a) Her chances of survival are approximately 25 percent
 - b) She should be given cardiac massage
 - c) Intravenous amiodarone is the first line drug
 - d) intravenous adrenaline is indicated
 - e) defibrillation is the treatment of choice

Cardiac arrest

- 9) Noncardiac causes of sudden death include
 - a) nontraumatic bleeding
 - b) poisoning
 - c) drowning
 - d) stroke
 - e) pulmonary embolism

- 10) An elderly man walking to the hospital clinic suddenly collapses about 50 metres away from the intensive care unit. On examination he is unresponsive, but is breathing.
 - a) You should call for help before attempting to resuscitate the patient
 - b) If many bystanders are present, the patient should be quickly carried to the intensive care unit
 - c) His radial artery should be palpated to feel for the pulse
 - d) He should be positioned in the supine position if his circulation is intact
 - e) Cardiac massage should be commenced if his pulse cannot be felt

- 11) The following clinical features are seen in a patient with cardiac arrest
 - a) absent pulses
 - b) cyanosis
 - c) tachypnoea
 - d) warm extremities
 - e) flushing of the face

- 12) Regarding cardiac arrest
 - a) Ventricular fibrillation has a better prognosis than asystole
 - b) Early defibrillation is the single most important therapeutic determinant of survival
 - c) Atrial fibrillation is a cause
 - d) Complete heart block is a known predisposing cause
 - e) Respiration is always absent

Cardiac arrest

- 13) The following manouvres are used in cardiopulmonary resuscitation
 - a) Calling for help before attempting to resuscitate the patient
 - b) Unplugging the electrical device in the case of electrocution
 - c) Head tilt chin lift manouvre in a patient injured in a road traffic accident
 - d) The presence of spontaneous breathing is assessed by feeling for the flow of air from the nostrils
 - e) Mouth to mouth respiration should be started prior to assessment of breathing and circulation if the patient is unconscious

- 14) The following are effective in the treatment of supraventricular tachycardia
 - a) Digoxin
 - b) Propranolol
 - c) Adenosine
 - d) Isoprenaline
 - e) Verapamil

- 15) In cardiogenic shock
 - a) Dopamine is the drug of first choice
 - b) Dobutamine will help augment cardiac output
 - c) Noradrenaline will increase the workload on the heart
 - d) Vasopressin is used
 - e) Intravenous nitrates are used

- 16) The following are used to assess whether the patient is breathing or not
 - a) Looking for the chest rising and falling
 - b) Listening for air escaping during exhalation
 - c) Holding a mirror in front of the patients nose
 - d) Feeling for the flow of air
 - e) Pinching the patient to see if he takes a deep breath

Cardiac arrest

- 17) When cardiopulmonary resuscitation is undertaken
- a) initial rescue breathing should be provided to the unresponsive, nonbreathing victim before looking for circulation
 - b) chest compressions should be started only if the person is sure that there is no pulse, because chest compressions are dangerous if the heart is beating
 - c) chest compressions and ventilations should be given in a ratio of 5 compressions to 1 ventilation
 - d) in giving chest compressions, the heel of the hand is placed over the xiphisternum
 - e) if the rescuer is unwilling to perform mouth to mouth breathing, it is purposeless to continue with chest compressions
- 18) The following are complications of cardiac massage
- a) rib fractures
 - b) fracture of the sternum
 - c) pneumothorax
 - d) hemothorax
 - e) cardiac rupture
- 19) A 46 year old woman is admitted with a polymorphic ventricular tachycardia. After reversion to sinus rhythm it is noted that she has an abnormally long QT interval
- a) The condition could be congenital
 - b) The use of the combination of erythromycin and astemizole is a likely cause
 - c) Hypocalcaemia is a known cause
 - d) Beta blockers are recommended in treatment
 - e) Intravenous magnesium is the drug of choice in the presence of ventricular tachycardia in this patient

Cardiac arrest

- 20) In the treatment of cardiac arrest, if the electrocardiogram shows ventricular fibrillation
- Three DC shocks using energies of 200, 200 to 300, and 360 joules should be given in sequence
 - if there is no response the sequence of three shocks should be repeated immediately
 - bicarbonate should be given immediately to reduce acidosis
 - intubation is indicated if there is no response to initial therapy
 - Intravenous adrenaline is indicated
- 21) A 50 year old patient with ischaemic heart disease develops ventricular tachycardia. Her blood pressure is 130/80mmHg. The following are true
- Antiarrhythmic therapy is not indicated as she is haemodynamically stable
 - Synchronized DC cardioversion at 100 joules is the recommended management
 - Intravenous lignocaine 50-100mg is effective
 - Amiodarone is the drug of first choice
 - Verapamil is effective
- 22) In the management of a patient with anaphylaxis:
- intravenous fluids must be given
 - H2 receptor antagonists are effective as adjunctive therapy
 - Adrenaline should be given subcutaneously
 - atropine is indicated
 - Hydrocortisone will act within 10 minutes
- 23) In a patient with cardiac arrest, if the electrocardiogram shows asystole
- Three DC shocks using energies of 200, 200 to 300, and 360 joules should be given in sequence
 - CPR should be continued
 - Ventricular fibrillation may develop
 - Adrenaline 1 mg intravenously every three to five minutes should be administered
 - Vasopressin is more effective than adrenaline

Cardiac arrest

- 24) A 50 year old male develops cardiac arrest. He is not breathing, and pulses are not palpable. His electrocardiogram shows a regular rhythm with a rate of 60 beats per minute
- a) Pulseless electrical activity is the likely diagnosis
 - b) Pulmonary embolism is a cause
 - c) Sodium bicarbonate is indicated in the presence of hyperkalaemia
 - d) if the complexes are wide, the prognosis is poor
 - e) has a better prognosis than asystole
- 25) On discovering an unconscious patient outside hospital
- a) Rapid assessment of the airway and breathing must be performed initially
 - b) Cross infection with *Neisseria meningitidis* may occur during CPR
 - c) Two effective rescue breaths should be given once apnoea is confirmed
 - d) On confirming an arrest, one minute of CPR should be performed before leaving the patient and getting help
 - e) On confirming an arrest, a ratio of 15 compressions to 2 ventilations should be adopted at all times

Answers to Cardiac Arrest questions

1. FTTTF

The survival rate of out of hospital cardiac arrest is around 20 percent. Ventricular fibrillation has a much better prognosis than asystolic arrest, in which the outcome is dismal. The factors associated with increased survival after arrest are; witnessed arrest, lower patient age, shorter time to arrival of emergency medical personnel, and no treatment with atropine for a bradyarrhythmia after resuscitation.

2. FTTTT

Sudden cardiac death is death occurring within 1 hour of the terminal clinical event. The risk of sudden death is high up to the age of 6 years, the sudden infant death syndrome. It is commoner in men.

3. TTTTT

Ischaemic heart disease, viral myocarditis, WPW syndrome can all give rise to dangerous arrhythmias including ventricular fibrillation. Both erythromycin and astemizole cause prolongation of the QT interval, and this can give rise to polymorphic VT and sudden death. The combination used to be a common one in the treatment of sore throats, clinicians preferring erythromycin to penicillin because of fears about penicillin allergy, and astemizole to chlorpheniramine because of sedation. Hyperkalaemia is a well recognized cause of asystole and sudden death.

4. TFFTT

Higher doses of drugs are needed for tracheal administration. Magnesium is indicated in polymorphic VT. The indication for sodium bicarbonate are as follows; preexisting hyperkalemia, preexisting bicarbonate-responsive acidosis is present; for treatment of tricyclic antidepressant overdose; and to alkalinize the urine in aspirin or other drug overdose.

5. FTTFT

Atrial fibrillation does not cause cardiac arrest, except in WPW syndrome where it can deteriorate into VT. Defibrillation is the treatment for pulseless VT/VF. Pulmonary thromboembolism is a known cause of non VF/VT arrest.

6. FTTF

Responsiveness of the victim is assessed by calling the victims name, and shaking him. The head tilt chin lift manoeuvre is usually used to ensure airway patency, but in suspected cervical spine injury it can cause cord compression. Jaw thrust alone is used here. Circulation is checked using the carotid pulse, and is not always easy to feel, especially for the layman. Chest compressions are given with the heel of the hand over the lower part of the sternum.

7. TTF

The head down position is suitable for this hypotensive patient to maximize cerebral blood flow. The most likely cause of this presentation in a male of this age is an acute myocardial infarction. Cardiac massage is not indicated as his pulse is recordable, and he is breathing and is alert. Intravenous lignocaine is indicated in haemodynamically stable VT – this patient should receive DC cardioversion to revert the VT. There is no place for adrenaline.

8. TTFT

Her chances of survival are poor. However, the chances are better because it is a witnessed arrest. Cardiac massage is indicated as there is no ventricular output in ventricular fibrillation, but the definitive therapy is defibrillation, without which she will die. Intravenous adrenaline is indicated in asystolic arrest to try and induce VF, which has a better prognosis.

9. TTTT

All of these can cause sudden death, though strictly speaking, in pulmonary embolism death is due to cardiovascular compromise.

10. TFFT

The first thing to do is to call for help. The patient should not be moved, because it has been shown to worsen outcome. Someone should go to the ICU and bring the resuscitation equipment out to the patient. The carotid artery is used to feel for circulation. If circulation is intact he must be positioned in the left lateral position. Cardiac massage must be performed if his pulse cannot be felt.

11. TTF

Absent pulses, cyanosis, absent or gasping respiration are features of cardiac arrest. Warm extremities and flushing are suggestive of an anaphylactic reaction.

12. TTFTF

Ventricular fibrillation has a much better prognosis provided that the patient receives advanced cardiac life support. Without defibrillation, VF will almost never revert to normal. Early defibrillation is, of all the manouvres, the most important determinant of survival. Atrial fibrillation does not cause cardiac arrest. Complete heart block can give rise to escape arrhythmias due to the very slow heart rate, including VT and VF. Respiration may be present for some time after cardiac arrest.

13. TFFTF

Always call for help first. Attempting to unplug the electrical device can result in the rescuer getting electrocuted, as the electrical short maybe at the plug point. Either the main switch should be turned off, or the electrical device knocked out of the way with a wooden stick while the rescuer stands on a book or other non conducting surface. The head tilt chin lift manouvre can cause cord compression if the patient has a cervical spine injury. Jaw thrust alone is performed in this situation. Spontaneous breathing is assessed by looking for the chest rising and falling, listening for air escaping during exhalation, and feeling for the flow of air from the nostrils. Assessment of breathing and circulation should always be performed prior to commencing mouth to mouth respiration.

14. TTTFT

Isoprenaline is a beta agonist which increases the heart rate. It is sometimes used in heart block where pacing facilities are not available. Digoxin is used to slow the ventricular response in atrial fibrillation. Propranolol and verapamil are both used for the same purpose in atrial fibrillation, and verapamil is used in the treatment of atrioventricular reentrant tachycardia.

15. FTFFF

Dopamine has cardiac inotropic effects and also causes peripheral vasoconstriction. Noradrenaline and vasopressin increase peripheral resistance. These drugs increase the afterload, which is not desirable in low cardiac output states. They are the preferred drugs in septic shock, where the cardiac output is normal, but peripheral vasodilatation is present. Dobutamine is the drug of choice. Intravenous nitrates cause vasodilatation and will further reduce the arterial pressure.

16. TTFTF

Breathing is assessed by doing all three of the following; looking for the chest rising and falling, listening for air escaping during exhalation, and feeling for the flow of air from the nostrils.

17. TFFFF

Two rescue breaths should be given prior to assessing circulation. Laymen often have difficulty feeling the carotid pulse. Chest compressions must be started if the rescuer feels that there is no circulation, i.e., if the patient is unresponsive and not breathing; it will do no harm even if the heart is beating. The heel of the hand is placed over the lower part of the body of the sternum, NOT the xiphisternum. If mouth to mouth breaths cannot be given, chest compressions should be continued; it has been shown to be beneficial.

18. TTTTF

The complications associated with cardiac massage are; rib fractures, fracture of the sternum, separation of the ribs from the sternum, pneumothorax, hemothorax, lung contusions, laceration of the liver and spleen, and fat embolism. Cardiac rupture is not known to occur.

19. TTTFT

There are many causes of the long QT syndrome, which predisposes to torsades de pointes or polymorphic VT. Congenital causes include the Romano Ward Syndrome and the Jervell Lange Neilsen syndrome, the latter which is associated with deafness. Hypoglycaemia, hypocalcaemia are known to cause it. In hypokalaemia, low amplitude T waves and the presence of U waves just after the T waves give a false impression of QT interval prolongation. Many drugs can cause it, including amiodarone, quinine, tricyclic antidepressants, phenothiazines, erythromycin and newer antihistamines such as astemizole. Beta blockers will slow the heart rate and thus prolong the QT interval. Drugs like salbutamol and isoprenaline will accelerate the heart rate and shorten the QT interval, reducing the risk of developing VT. Intravenous magnesium is the drug of first choice in this condition.

20. TFFTF

Three unsynchronized DC shocks in the sequence 200, 200 and 360 should be given. If the rhythm does not revert CPR must be recommenced before attempting to shock again. There is no indication to give bicarbonate unless

the arrest was due to hyperkalaemia or severe metabolic acidosis. Intubation is indicated if there is no response. Intravenous adrenaline is indicated in non VT/VF arrest.

21. FTTTF

Although the patient is haemodynamically stable, if the VT continues, cardiac output will fall, and she will become haemodynamically unstable. DC cardioversion is indicated in haemodynamically unstable patients; in this patient either amiodarone or lignocaine will be effective. Amiodarone is the recommended drug. Verapamil is used in SVT, and is dangerous in VT.

22. TTTFF

Intravenous fluid, colloids and crystalloids are indicated in anaphylactic shock. H₂ receptor antagonists are also postulated to be effective as adjunctive therapy, especially to reduce gastric hyperacidity. Adrenaline is usually given intramuscularly. There is no indication for atropine. Hydrocortisone will take several hours to act.

23. FTTTF

DC cardioversion is not helpful in asystole, except where fine ventricular fibrillation is present, and mimics asystole. CPR should be continued, and attempts should be made to convert the asystole to ventricular fibrillation, using adrenaline. Vasopressin has been shown to be useful in out of hospital cardiac arrest, but there is still inadequate evidence to show that it is more effective than adrenaline.

24. TTTTF

Pulseless electrical activity (previously called electromechanical dissociation) is defined by the presence of some type of electrical activity other than VT or VF in the absence of a detectable pulse. PEA is often associated with specific clinical states that can be reversed when identified early and effectively treated. It can be associated with potentially reversible causes, such as acidosis, pericardial tamponade, hypothermia, hypoxia, pulmonary embolism or a variety of drug overdoses (eg, tricyclic antidepressants, beta blockers, calcium channel blockers). In these conditions the complexes are narrow, and the prognosis is better. Survival is poor when electrical activity is wide and slow; the rhythm often representing the last electrical activity of a dying myocardium Bicarbonate is indicated in preexisting hyperkalaemia, when preexisting bicarbonate-responsive acidosis is present; for treatment of

Cardiac arrest-Answers

tricyclic antidepressant overdose; and to alkalinize the urine in aspirin or other drug overdoses. It is not routinely used for the acute lactic acidosis associated with CPR, but may be given if the initial interventions (defibrillation, ventilation, cardiac compression, and vasopressor therapy) have been ineffective. The use of bicarbonate is acceptable in intubated and ventilated patients with a long arrest interval.

25. TFFFT

Assessing the environment to see if it is safe to approach is the first priority when considering providing aid to an unconscious patient. CPR related infections are extremely rare, although Tuberculosis, HIV and Neisseria meningitidis have all been recorded. Once it has been confirmed that the patient is not breathing one must get help or alert the emergency services, even if this means leaving the patient. However, if the patient is an infant or child, a victim of trauma, a near drowning or if drug or alcohol intoxication is likely, then one minute of CPR should be performed before going for help. The correct ratio of compressions to ventilations is 15:2 regardless of the number of rescuers present.

RHEUMATIC HEART DISEASE

- 1) The following epidemiological factors increase the risk of acute rheumatic fever
 - a) lower standards of living
 - b) poor dental hygiene
 - c) overcrowding
 - d) Poor socioeconomic class
 - e) Lack of access to health care

- 2) Acute rheumatic fever
 - a) occurs after pharyngeal infections with *Streptococcus pyogenes* Lancefield Group A
 - b) occurs predominantly in children under the age of 10 years
 - c) causes diffuse inflammatory oedema of the endocardium
 - d) causes permanent deformity of affected joints
 - e) is complicated by fibrosis of affected valves

- 3) In a 12 year old child with fever and joint pains, the following clinical features are suggestive of acute rheumatic fever
 - a) Pain and swelling of the small joints of the hands
 - b) Migratory arthritis
 - c) The leg joints typically being involved first
 - d) An early diastolic murmur at the left sternal edge
 - e) The presence of an enlarged spleen

- 4) Vegetations in acute rheumatic fever
 - a) are most commonly situated on tricuspid and pulmonary valves
 - b) are large and friable
 - c) are aseptic
 - d) contain microscopic Aschoff bodies
 - e) cause rupture of valve cusps

Rheumatic heart disease

- 5) Regarding the pathology of mitral valve stenosis
 - a) Large friable vegetations are seen on the mitral valve during episodes of acute rheumatic fever
 - b) Fibrosis of the valve occurs
 - c) Fusion of the valve commissures occurs
 - d) Thickening and shortening of the chordae tendinae cause limitation of valve mobility
 - e) A valve area of less than 2cm^2 is defined as tight mitral stenosis

- 6) In acute rheumatic carditis
 - a) Complete heart block is known to occur
 - b) Cardiomegaly is seen on the chest radiograph
 - c) The presence of a pericardial rub indicates the presence of pericarditis
 - d) Mitral stenosis is the commonest valvular lesion
 - e) Severe congestive heart failure is known to occur

- 7) Regarding Sydenhams chorea
 - a) peripheral sensory loss is seen
 - b) The abnormal movements are often asymmetrical
 - c) Emotional changes may occur in children
 - d) Is known to occur 6 months after streptococcal infection
 - e) It is self limiting

- 8) Regarding the subcutaneous nodules of rheumatic fever
 - a) They are tender
 - b) The overlying skin can be moved easily over the nodules.
 - c) They are characteristically seen in association with chorea
 - d) They are usually symmetric.
 - e) Nodules are present for approximately six weeks

Rheumatic heart disease

- 9) Regarding acute rheumatic fever
- a) In young children, is preceded by sore throat in more than 70 per cent of patients
 - b) Streptococcal skin infection is a recognized cause
 - c) Adequate treatment of streptococcal pharyngitis markedly reduces the incidence
 - d) Antistreptococcal antibodies have a high sensitivity in diagnosis of antecedent streptococcal infection
 - e) The incidence is on the rise in developing countries
- 10) Regarding the treatment of acute rheumatic fever
- a) Cortocosteroids are the first line treatment for arthritis
 - b) Carditis is treated with high dose aspirin
 - c) Oral penicillin in a dose of 500 mg two to three times daily for adults for 10 days is indicated to eradicate streptococcal infection
 - d) Erythromycin is used for treatment in patients who are allergic to penicillin
 - e) Treatment with aspirin is continued until the ESR returns to normal
- 11) Regarding the prevention of acute rheumatic fever
- a) Family contacts should have throat swab culture
 - b) The disease is notifiable
 - c) Treatment of documented streptococcal pharyngitis has been shown to reduce the incidence
 - d) Long term penicillin prophylaxis reduces the recurrence rate
 - e) Early treatment of streptococcal skin sepsis has been shown to reduce the incidence
- 12) Regarding the recurrence of rheumatic fever
- a) Recurrence is most common within the first 2 years after the first episode
 - b) Intramuscular benzathine penicillin is more efficacious at preventing a recurrence than oral penicillin
 - c) Benzathine penicillin prophylaxis should be given every 4 weeks in patients with rheumatic carditis
 - d) In a patient with documented carditis, penicillin prophylaxis is continued until the age of 21 years
 - e) The streptococcal vaccine is used as an alternative to penicillin prophylaxis

Rheumatic heart disease

- 13) Regarding chronic rheumatic heart disease
- a) Less than 25 percent of patients with acute rheumatic fever will develop chronic valvular heart disease
 - b) Rheumatic mitral valve stenosis is known to occur in patients under the age of 20 years
 - c) Nearly all patients with mitral stenosis recall a history of rheumatic fever
 - d) Aortic valve regurgitation is the commonest valvular lesion
 - e) Tricuspid valve regurgitation is always secondary to pulmonary hypertension
- 14) Causes of sudden acute breathlessness in a patient with mitral stenosis include
- a) The development of atrial fibrillation
 - b) The development of a tachyarrhythmia
 - c) Myocardial infarction
 - d) Infective endocarditis
 - e) Chest infection
- 15) In mitral stenosis
- a) left ventricular failure is a characteristic feature
 - b) atrial dilatation leads to atrial fibrillation
 - c) the risk of embolic stroke is increased
 - d) the pulse volume is high
 - e) haemoptysis is known to occur
- 16) In a patient with mitral stenosis, the following features on echocardiography indicate that the valve is unsuitable for balloon mitral valvuloplasty
- a) Tight mitral stenosis
 - b) Calcification of the valve
 - c) An audible opening snap
 - d) Atrial fibrillation
 - e) Fibrosis of the subvalvular apparatus

Rheumatic heart disease

- 17) In a patient with tight mitral stenosis
- a) The development of atrial fibrillation will result in worsening of symptoms
 - b) An pulmonary regurgitant murmur may be heard
 - c) The presystolic accentuation of the mid diastolic murmur is not heard if atrial fibrillation is present
 - d) The presence of a displaced cardiac apex is suggestive of tight mitral stenosis
 - e) A thrusting apex beat is felt
- 18) Regarding the electrocardiographic findings in mitral stenosis
- a) The presence of a tall p wave in Lead II and an upright p wave in V1 indicates the presence of left ventricular dilatation.
 - b) The presence of p-mitrale indicates the development of pulmonary hypertension
 - a) Left ventricular hypertrophy is present
 - b) Left axis deviation is seen
 - c) Right bundle branch block is seen
- 19) Regarding the chest radiograph appearance in mitral stenosis
- a) Cardiomegaly is a characteristic feature
 - b) A straight left heart border is seen
 - c) dilatation of the upper lobe pulmonary veins is a feature
 - d) in a lateral radiograph, the oesophagus may be compressed
 - e) oligoemic lung fields indicate significant pulmonary hypertension
- 20) Regarding the pharmacological treatment of mitral stenosis
- a) Frusemide will reduce symptoms by reducing total blood volume
 - b) Beta blockers are contraindicated
 - c) Digoxin is indicated even in the absence of atrial fibrillation
 - d) Vasodilators are contraindicated
 - e) Warfarin is indicated in atrial fibrillation

Rheumatic heart disease

- 21) In a patient with chronic rheumatic heart disease, the following are indications for mitral valve replacement
- Tight mitral stenosis in pregnancy
 - Severe pulmonary hypertension
 - Associated mitral regurgitation
 - Severely calcified valves
 - Distorted valves with a valve area below 1 cm²
- 22) In a patient with mixed mitral valve disease, the following clinical features suggest significant mitral valve regurgitation
- A thrusting apex beat
 - A displaced apex
 - Poor volume pulse
 - a pan systolic murmur
 - atrial fibrillation
- 23) Regarding mitral regurgitation
- In western populations, rheumatic fever is the commonest cause of mitral regurgitation
 - Mitral valve prolapse is a cause
 - It is a high risk lesion for infective endocarditis
 - It occurs in hypertrophic obstructive cardiomyopathy
 - Functional mitral regurgitation occurs in dilated cardiomyopathy
- 24) The following are indications for valve replacement in a patient with mitral regurgitation
- Acute mitral regurgitation after myocardial infarction
 - Symptomatic patients with severe chronic regurgitation
 - Left ventricular ejection fraction < 60%
 - Left ventricular systolic dimension > 45 mm
 - Severe left ventricular dysfunction
- 25) The following clinical features are seen in aortic regurgitation
- A collapsing pulse
 - Duroziez sign
 - An ejection systolic murmur radiating to the neck
 - A mid diastolic murmur in the mitral area
 - A displaced apex beat

Rheumatic heart disease

- 26) Regarding aortic valve disease
- a) Acute aortic regurgitation may occur in infective endocarditis due to valve cusp rupture
 - b) severe regurgitation with a left ventricular ejection fraction $< 55\%$ in an asymptomatic patient is an indication for valve replacement
 - c) Symptomatic patients with aortic stenosis can be managed medically if their left ventricular function is preserved
 - d) Patients with aortic stenosis can be treated with vasodilators
 - e) Patients with aortic stenosis over the age of 40 years should have a coronary angiogram prior to valve surgery

Answers to Rheumatic Heart Disease questions

1) TFTTT

Lower standards of living, overcrowding, poor socioeconomic class all increase the risk of getting rheumatic fever. In the developed world the incidence has been steadily falling, but it is still a significant problem in the developing world. Lack of prophylactic penicillin treatment increases the risk of recurrences. Poor dental hygiene increases the risk of infective endocarditis in patients with valve disorders, but does not have a significant effect on the causation of rheumatic fever.

2) TFTFT

Acute rheumatic fever occurs after pharyngeal infections with streptococcus pyogenes strains belonging to Lancefield group A. The disease is most common in the second decade, and it is less common in very young children. A pancarditis occurs, with involvement of the pericardium, myocardium and endocardium. A flitting or migratory arthritis of large joints occurs, but the arthritis is self limiting, and permanent deformity does not usually occur. Recurrent episodes of rheumatic carditis can result in progressive valvular damage, with fibrosis of the affected valves.

3) FTFFF

The classical pattern of arthritis in acute rheumatic fever is a flitting, or migratory arthritis affecting the large joints, with a predilection to the lower limb joints. The joints are painful and tender. Inflammation of each joint usually lasts less than one week. The synovial fluid from the inflamed joints is sterile. The classical cardiac lesion in acute rheumatic fever at presentation is a mitral regurgitant murmur, the Carey-Coombs murmur. Aortic regurgitation and mitral or aortic stenosis, though common in chronic rheumatic heart disease, are unusual in acute rheumatic carditis. The presence of an enlarged spleen in a child with arthritis and fever suggests an alternative diagnosis, such as juvenile rheumatoid arthritis, Stills disease, or a systemic infective illness.

4) FFTTF

Vegetations in acute rheumatic fever are small and firmly attached to the margins of the valve. They do not embolize. The commonest site is the mitral valve. The characteristic histological lesion is the Aschoff body, which is pathognomonic of rheumatic fever. The Aschoff body is an aggregate of large

Rheumatic heart disease-Answers

cells, with polymorphous nuclei and basophilic cytoplasm, arranged as a rosette around an avascular core of fibrinoid; the aggregate is usually perivascular. In contrast to the vegetations of rheumatic fever the vegetations of infective endocarditis are large and friable, and frequently embolize. Rupture of valve cusps is uncommon.

5) FTTTF

Vegetations in acute rheumatic fever are small and firmly attached to the margins of the valve. They do not embolize. In contrast to the vegetations of rheumatic fever the vegetations of infective endocarditis are large and friable, and frequently embolize. Fibrosis of the valve and fusion of the valve commissures occurs with recurrent episodes of rheumatic fever, and thickening and shortening of the chordae causes limitation in valve mobility which adversely affects the opening and closure of the valve. A valve area of less than 1cm^2 is defined as tight.

6) TTTFT

A pancarditis occurs in acute rheumatic fever. Myocarditis is associated with varying degrees of atrioventricular conduction defects; first degree heart block is the classical ECG finding in acute rheumatic carditis but complete heart block is known to occur. Cardiomegaly is the commonest finding on the chest radiograph, and is due to acute myocarditis. Mild to moderate chest discomfort, pleuritic chest pain, or a pericardial friction rub are indications of pericarditis. The commonest valvular lesion at presentation is mitral regurgitation. Mitral stenosis is the commonest lesion in chronic rheumatic heart disease, but is rare at first presentation of acute rheumatic fever. Congestive heart failure is known to occur, due to a combination of severe myocarditis and valvular dysfunction. In severe cases, it may mimic viral myocarditis; it is a life threatening situation, and must be treated early and aggressively.

7) FTTTT

Sydenham chorea, chorea minor, or "St. Vitus dance" is a neurologic disorder consisting of abrupt, purposeless, nonrhythmic involuntary movements, muscular weakness, and emotional disturbances. Sensory loss is not a feature. Muscle weakness is demonstrated by asking the patient to squeeze the examiner's hands; the pressure of the patient's grip increases and decreases continuously, a phenomenon known as relapsing grip or "milking sign." The chorea can be more marked on one side, and can occasionally be unilateral.

Rheumatic heart disease-Answers

In children, it can present with emotional disturbance, with outbursts of inappropriate behavior, including crying and restlessness. Rarely a transient psychosis can occur. Chorea is self limiting, and long term neurological sequelae are unusual. It has a longer latent period than the other manifestations of rheumatic fever, and can occur up to 8 months after streptococcal infection.

8) FTFFF

Subcutaneous nodules are another of the Duckett-Jones major criteria for the diagnosis of rheumatic fever. They are characteristically non tender, range from a few millimeters to one to two centimeters in diameter, and most commonly are located over a bony surface or prominence or near tendons. Tender nodules should raise the suspicion of erythema nodosum, which are also seen in rheumatic fever, although they are not relevant in diagnosis. The overlying skin is mobile over the nodules, and is not inflamed. The nodules are symmetric. In number they range from a single lesion to a few dozen, and average 3 to 4. They last for one or two weeks. The differential diagnosis is rheumatoid nodules, which are larger and persist for a longer period of time. Although the elbows are involved most frequently in both diseases, rheumatic fever nodules are more common on the olecranon, whereas rheumatoid nodules usually are found 3 to 4 cm distally.

9) FFTTF

The recollection of sore throat is less than 20 percent in younger children, while in older children and young adults it approaches 70 percent. Streptococcal pharyngitis is the only streptococcal infection associated with acute rheumatic fever – it does not follow streptococcal skin sepsis. Treatment of documented streptococcal pharyngitis has been shown to reduce the incidence of rheumatic fever. At least one of the antistreptococcal antibodies (streptolysin "O", hyaluronidase, and streptokinase) are present in the majority of patients with acute rheumatic fever. The incidence has declined in both the developing and the developed world; however, it remains a significant health problem in developing countries, with an estimated 10 to 20 million new cases per year.

10) FFTTF

The first line anti-inflammatory drug for the treatment of arthritis is aspirin, in high doses; 80 to 100 mg/day in children and 4 to 8 g/day in adults. In carditis, there is controversy as to the use of aspirin, as salicylates cause salt and water

retention and may worsen congestive heart failure. Corticosteroids are therefore preferred in carditis with heart failure; however studies have shown conflicting results, and there is no clear evidence in terms of short term (resolution of symptoms and signs) or long term (need for valve surgery later on) benefit. Oral penicillin for 10 days eradicates streptococcal infection, and reduces the severity of the disease. Sulphonamides and erythromycin are alternatives. Treatment with aspirin must be continued until the symptoms have disappeared and the ESR returns to normal.

11) TFTTF

Family and close contacts should have their throat cultured, and those found positive for streptococcus should be treated with penicillin. The disease is not notifiable. Treatment of streptococcal pharyngitis has been shown to prevent the incidence of the disease, but since skin sepsis does not give rise to acute rheumatic fever, treatment of skin sepsis does not, although it reduces the risk of acute glomerulonephritis. Long term penicillin prophylaxis reduces the risk of recurrent infections, and reduces valvular damage.

12) TFFFF

Although a recurrence of rheumatic fever can occur at any time, it most commonly occurs within the first two years. In patients who are not allergic to penicillin, either benzathine penicillin 1.2 million units intramuscularly every 3 weeks, or oral penicillin V 250mg twice daily are used to prevent streptococcal pharyngitis and thus reduce the likelihood of recurrence of rheumatic fever. Sulphadiazine 500mg-1000mg daily or erythromycin 250mg twice daily are alternatives if the patient is allergic to penicillin. There is no convincing evidence that benzathine penicillin is superior to oral prophylaxis in terms of efficacy; however where compliance may be a problem, parenteral prophylaxis is preferred. Benzathine penicillin injections every three weeks are more effective at preventing recurrence than when given every four weeks. In documented cases of rheumatic carditis, benzathine penicillin should be given lifelong, because rheumatic fever can recur even late in life. A streptococcal vaccine is not available commercially as yet, although there is a lot of ongoing research into developing one.

13) FTFFF

Over 50 percent of patients with acute rheumatic fever will ultimately develop chronic valvular heart disease; this rate is higher in developing countries compare to developed countries. The reasons postulated for this difference

include the increased number of recurrences due to inadequate use of prophylaxis, and increase virulence of the infecting streptococci. Mitral stenosis can develop early in patients in developing countries, for the same reason. A history of rheumatic fever is reported in 50 to 70 percent of patients. Mitral stenosis is the commonest rheumatic valvular lesion, and is present in 90% of patients. While tricuspid regurgitation occurs due to dilatation of the tricuspid valve ring secondary to severe pulmonary hypertension, primary involvement of the tricuspid valve is a recognized occurrence.

14) TTFTT

In a patient with mitral stenosis, the development of atrial fibrillation in a patient previously in sinus rhythm often results in acute breathlessness. In the normal heart, atrial contraction contributes little to ventricular filling, most of which takes place during early diastole. When the mitral valve is stenosed, the atrial kick contributes significantly to ventricular filling. The sudden loss of atrial contraction results in a sudden reduction in ventricular filling, and this results in worsening of the pulmonary oedema. In addition, if there is atrial fibrillation with a rapid ventricular response, diastole will be shortened, and ventricular filling time reduced. A similar effect occurs if a tachyarrhythmia occurs. Infective endocarditis and chest infection can cause both cause worsening dyspnoea. While myocardial infarction can cause breathlessness due to left ventricular failure, it is relatively uncommon; firstly, mitral stenosis is present in younger female patients who are at a lower risk for ischaemic heart disease; secondly, the left ventricle is often small due to compromised filling, and therefore is less susceptible to ischaemia.

15) FTTFT

In mitral stenosis, left ventricular failure does not usually occur, unless significant mitral regurgitation is coexistent. Because of compromised left ventricular filling the left ventricular end diastolic diameter is small. The pulse volume is therefore low. Pulmonary oedema occurs because of the stenosis of the mitral valve resulting in increased left atrial, and therefore increase pulmonary venous pressure. Often clinicians refer to this as left ventricular failure, which is technically speaking, a misnomer. The risk of embolic stroke is high in patients with mitral stenosis, and this is greatly increased in the presence of atrial fibrillation. Haemoptysis is known to occur in tight mitral stenosis due to rupture of pulmonary-bronchial venous connections secondary to pulmonary venous hypertension. It occurs most

frequently in patients who have elevated LA pressures without markedly elevated pulmonary vascular resistances. It is almost never fatal

16) FTFFT

Symptomatic patients with tight mitral stenosis are often considered for mitral balloon valvuloplasty. The suitability of the valve for the procedure is often determined echocardiographically. Wilkins et al devised a scoring system which would predict success of balloon valvuloplasty. A score of 0 to 4 for each of four factors:

- The degree of leaflet rigidity
- The severity of leaflet thickening
- The amount of leaflet calcification.
- The extent of subvalvular thickening and calcification

The maximum score is 16; higher scores indicate more severe anatomic disease and a lower likelihood of a successful balloon valvotomy. The presence of an opening snap indicates that the valve is pliable and therefore suitable for balloon valvuloplasty. Atrial fibrillation is not a contraindication.

17) TTFFF

The development of atrial fibrillation usually marks a worsening of the progression of symptoms. In the normal heart, atrial contraction contributes little to ventricular filling, most of which takes place during early diastole. When the mitral valve is stenosed, the atrial kick contributes significantly to ventricular filling. The sudden loss of atrial contraction results in a sudden reduction in ventricular filling, and this results in worsening of the pulmonary oedema. In addition, if there is atrial fibrillation with a rapid ventricular response, diastole will be shortened, and ventricular filling time reduced. A pulmonary regurgitant murmur, the Graham Steel murmur, occurs due to dilatation of the pulmonary valve ring, and indicates the presence of severe pulmonary hypertension. Conventionally, the presystolic accentuation of the mid diastolic murmur of mitral stenosis is due to the increase in flow across the mitral valve during atrial contraction. However presystolic accentuation is heard in the presence of atrial fibrillation as well- the gradual apposition of the valve cusps towards the end of diastole results in increasing turbulence in flow across the already stenosed valve, and can result in an increase in murmur intensity. In tight mitral stenosis the left ventricular end systolic volume is reduced, and cardiac dilatation does not occur; a displaced apex suggests that there is coexistent mitral regurgitation or aortic valve disease. A tapping apex, due to a palpable first heart sound is felt on palpation in mitral

stenosis; a thrusting apex indicates volume overload and suggests the presence of mitral regurgitation.

18) FFFFF

The presence of a tall p wave in lead II and an upright p wave in V1 indicates the presence of severe pulmonary hypertension leading to right heart failure and right ventricular hypertrophy; this is the p-pulmonale pattern. In p-mitrale, broad, often notched P waves in the limb leads and a biphasic P wave in lead V₁ with a prominent negative component representing delayed depolarization of the LA is seen; this is due to left atrial dilatation, and does not by itself indicate the presence of pulmonary hypertension. Left ventricular hypertrophy is not seen as left ventricular overload or dilatation does not occur in pure mitral stenosis. The axis is usually right due to right ventricular hypertrophy caused by pulmonary hypertension. Right bundle branch is not characteristic, although it can occur in severe right heart dilatation; it is a characteristic of atrial septal defect.

19) FTTTT

The left ventricle is usually small, due to reduced filling across the mitral valve. Cardiomegaly, if seen, indicates either associated mitral regurgitation, or gross right ventricular dilatation. A straight left heart border is seen in mitral stenosis due to enlargement of the left atrium. Upper lobe diversion is characteristic of pulmonary oedema; the caliber of the pulmonary veins in the upper and lower lobes will be equal. Similarly, Kerley B lines will be seen; these are dense, opaque, horizontal lines most prominent in the lower and midlung fields and that result from distention of interlobular septa and lymphatics with edema when the resting mean left atrial pressure exceeds approximately 20 mmHg. An enlarged left atrium may compress the oesophagus, and in extreme cases is a cause for dysphagia. In significant pulmonary hypertension, peripheral pruning of the pulmonary vascular tree occurs, resulting in oligoemic lung fields.

20) FFFFT

Although initially frusemide will reduce blood volume through diuresis, with prolonged use the blood volume returns to normal. The beneficial effects are largely through pulmonary venodilatation. Digoxin is used for rate control in atrial fibrillation; it has no proven benefit in improving symptoms or mortality in patients in sinus rhythm. Beta blockers can be used for rate control if

Rheumatic heart disease-Answers

digoxin does not work; if the patient has atrial fibrillation with a very rapid ventricular response, a beta blocker may be the preferred drug. Vasodilators are contraindicated in aortic stenosis, as peripheral vasodilation may result in hypotension as the cardiac output cannot increase. The risk of embolic stroke in patients with mitral stenosis and atrial fibrillation is very high, and warfarinization to maintain the INR between 2 and 3 is indicated.

21) FFTTF

Severe mitral stenosis in pregnancy needs urgent treatment, but mitral balloon valvuloplasty is the preferred treatment; mitral valve replacement is often not indicated, and the operative risks and risks of anticoagulation are high. Severe pulmonary hypertension itself is not an indication for valve replacement, and such a patient is likely to have a poor outcome whatever the treatment. Associated mitral regurgitation, severely calcified valves or valves distorted by previous valvotomy are indications for valve replacement. Although when the valve orifice is less than 1cm the mitral stenosis is considered tight, it is suggested that mitral valve replacement should be undertaken if the area is below 0.6 cm with severe symptoms.

22) TTFTF

A thrusting displaced apex beat due to volume overload resulting in left ventricular dilatation is characteristic of mitral regurgitation. A poor volume pulse suggests significant mitral stenosis or aortic stenosis. A pansystolic murmur radiating to the axilla is characteristic of MR. Atrial fibrillation occurs earlier in mitral stenosis than mitral regurgitation, and in general the presence of atrial fibrillation favours dominant mitral stenosis.

23) FTTTT

Rheumatic fever is still probably the commonest cause of mitral regurgitation in the developing world, but the incidence has been markedly reduced in developed countries, and now the commonest cause of mitral regurgitation in these countries is mitral valve prolapse. Because of the high flow rates across the diseased valve, the risk of infective endocarditis is high. Dilatation of the mitral valve ring in dilated cardiomyopathy results in functional mitral regurgitation. It also occurs in HOCM.

24) TTTTF

Acute mitral regurgitation is often an indication for urgent valve replacement. Surgery is indicated in all symptomatic patients with severe chronic mitral

regurgitation, and in asymptomatic patients with signs of mild LV dysfunction (ejection fraction < 60% or LV systolic dimension > 45 mm. In patients with very severe left ventricular dysfunction, with an ejection fraction below 30, the high operative risk and poor likelihood of success make valve replacement unfeasible.

25) TTFTT

The high pulse pressure results in a collapsing pulse. Duroziez's sign – A systolic and diastolic bruit heard when the femoral artery is partially compressed is also characteristic. An ejection systolic murmur can often be heard in the aortic area due to the increased flow across the aortic valve. This does not necessarily indicate the presence of aortic stenosis. However as aortic stenosis often coexists it is important to differentiate it from a flow murmur. The presence of a systolic ejection thrill, and radiation of the murmur to the carotids, together with a bisferiens pulse indicates the presence of structural aortic stenosis. A mid diastolic murmur is often heard and can mimic the murmur of mitral valve stenosis. This is known as the Austin Flint murmur is a mid to late diastolic rumble, heard at the apex as a result of antegrade turbulent diastolic blood flow from the left atrium competing with the retrograde regurgitant flow from the aorta. The absence of both a loud S1 and an opening snap of the mitral valve helps in differentiating this murmur from that of mitral stenosis. Dilatation of the left ventricle occurs due to volume overload in aortic regurgitation, and results in a displaced apex beat.

26) TFFFT

Infective endocarditis can cause valve cusp rupture leading to severe acute aortic regurgitation. Urgent valve replacement is indicated. Severe aortic regurgitation with compromised left ventricular function is an indication for valve replacement. Patients with aortic stenosis who become symptomatic must undergo surgery, because the onset of symptoms often heralds the development of left ventricular dysfunction. Vasodilators such as nifedipine and ACE inhibitors are used to offload the heart and delay the time to surgery in patients with aortic regurgitation. They are contraindicated in aortic stenosis as they can cause cardiovascular collapse. Patients with aortic stenosis over the age of 40 years may have coexisting coronary artery disease, and will need angiography to determine if they need coronary artery bypass grafting at the time of aortic valve replacement.

ARRHYTHMIAS

- 1) A 24 year old man is referred after an army medical for investigation of multiple unifocal ventricular ectopics.
 - a) He is likely to have serious organic heart disease
 - b) He should be advised to stop smoking
 - c) An echocardiogram is indicated
 - d) A history of excessive coffee drinking should be looked for
 - e) He should be started on antiarrhythmics

- 2) A 45 year old man admitted with an acute myocardial infarction develops multiple ectopics. His blood pressure is stable.
 - a) He should be treated with intravenous amiodarone
 - b) Hypomagnesaemia is a possible cause
 - c) Hypokalaemia should be looked for
 - d) It is a sign of ongoing myocardial ischaemia
 - e) If an R on T phenomenon is present he is at risk of developing ventricular fibrillation

- 3) The following are indications to refer patients to a cardiologist for evaluation of an arrhythmia
 - a) AF with a rate that is difficult to control or recurrences that are refractory to standard therapies
 - b) Nonsustained VT, particularly in a patient with suspected or proven structural heart disease
 - c) Symptomatic sinus bradycardia
 - d) Second AV block
 - e) asymptomatic first degree heart block

- 4) A patient with an acute inferior myocardial infarction develops complete heart block
 - a) Urgent temporary cardiac pacing is immediately indicated
 - b) It is unlikely to recover spontaneously
 - c) It is a sign of extensive infarction
 - d) Isoprenaline infusion is indicated
 - e) Atropine may revert his rhythm to normal

Arrhythmias

- 5) The following changes can occur in hyperkalaemia
 - a) shortening of the PR interval
 - b) tall peaked T waves
 - c) Widening of the QRS complex
 - d) Asystole
 - e) Bradycardia

- 6) The following cardiac rhythm changes may be normally present in athletes
 - a) sinus bradycardia
 - b) sinus arrest of less than three second's duration
 - c) wandering atrial pacemaker
 - d) nodal bradycardia
 - e) atrial flutter

- 7) The following can cause dangerous arrhythmias
 - a) Digoxin overdose
 - b) Snake bite
 - c) Myocarditis
 - d) Yellow oleander poisoning
 - e) Organophosphate poisoning

- 8) The following are true
 - a) A narrow complex tachycardia with a heart rate of 150 beats per minutes suggests the possibility of atrial flutter with 2:1 block
 - b) Ventricular tachycardia is almost always pathological
 - c) A narrow complex tachycardia cannot be ventricular tachycardia
 - d) A broad complex tachycardia can occur in supraventricular tachycardia with bundle branch block
 - e) The rhythm in ventricular tachycardia is regular

- 9) In pregnancy
 - a) The presence of multiple ectopic beats warrants treatment
 - b) Supraventricular tachycardias often indicate underlying structural heart disease
 - c) The presence of atrial fibrillation raises the possibility of underlying mitral valve disease
 - d) Atrial flutter is common
 - e) Second degree heart block is a common finding

Arrhythmias

- 10) The following are indications for permanent cardiac pacing
 - a) Sinus bradycardia with a rate of 45 beats per minute
 - b) Second degree heart block
 - c) Complete heart block
 - d) Symptomatic tachy-brady syndrome
 - e) Hypertrophic obstructive cardiomyopathy

- 11) A long corrected QT interval in the ECG
 - a) is a recognised consequence of hypokalaemia
 - b) is a recognised consequence of hypercalcaemia
 - c) may be due to amiodarone
 - d) can be congenital
 - e) is a recognised consequence of rheumatic carditis

- 12) The following conditions may be suggested by characteristic features on the ECG
 - a) hypercalcaemia
 - b) Hyponatraemia
 - c) mitral valve prolapse
 - d) hypothermia
 - e) hypomagnesaemia

- 13) The following are true of Wolff-Parkinson-White syndrome
 - a) Patients present with episodic SVT
 - b) Ventricular tachycardia does not occur
 - c) Digoxin is the treatment of choice
 - d) The ECG taken at the time of the SVT shows characteristic changes
 - e) Atrial fibrillation with wide QRS complexes can occur

- 14) The following are true of atrial fibrillation
 - a) Digoxin is of use in the prevention of paroxysmal atrial fibrillation.
 - b) Mitral stenosis is a cause
 - c) Hypertrophic obstructive cardiomyopathy is a cause
 - d) Digoxin will convert the atrial fibrillation to sinus rhythm
 - e) It results in increased risk of stroke

Arrhythmias

- 15) Adenosine is used in
- a) atrial flutter with 2:1 atrioventricular block
 - b) atrial fibrillation
 - c) atrioventricular nodal re-entry tachycardia
 - d) multiple ectopics
 - e) ventricular tachycardia
- 16) Supraventricular tachycardia with aberrant conduction is the likely diagnosis in broad complex tachycardia when
- a) the blood pressure is normal
 - b) T waves are inverted
 - c) the QRS complexes are very wide
 - d) the rhythm is irregularly irregular
 - e) P waves are seen following each QRS complex
- 17) Multifocal atrial tachycardia
- a) is usually associated with chronic respiratory disease
 - b) is irregularly irregular
 - c) is abolished by digoxin
 - d) the morphology of the p wave is variable
 - e) may be caused by digoxin
- 18) In the sick sinus syndrome
- a) patients are typically under 65 years
 - b) complete heart block is a common feature
 - c) systemic embolism may occur
 - d) failure to increase heart rate with exercise is a feature
 - e) symptomatic patients should have a permanent pacemaker implanted.
- 19) Typical features of complete heart block include
- a) Regular heart rate
 - b) irregular cannon 'a' waves
 - c) paradoxical splitting of the second heart sound
 - d) a loud first heart sound
 - e) a mid-diastolic murmur over the apex

Arrhythmias

- 20) The first heart sound is likely to be variable in
- atrial fibrillation
 - atrial flutter
 - multiple ectopic beats
 - complete atrioventricular block
 - left bundle branch block
- 21) The following can cause bradycardia
- hypothermia
 - hypothyroidism
 - severe anaemia
 - subdural haematoma
 - shock
- 22) The following are true regarding the treatment of ventricular tachycardia (VT)
- DC cardioversion is indicated in haemodynamically unstable VT
 - Amiodarone is effective
 - Intravenous magnesium is used in polymorphic VT
 - Verapamil is effective
 - Unsynchronized DC cardioversion can result in ventricular fibrillation
- 23) A broad complex tachycardia is more likely to be supraventricular tachycardia with abberation than ventricular tachycardia if
- cannon waves are seen in the neck waves
 - fusion beats are seen on the ECG
 - the tachycardia is abolished by carotid massage
 - the previous ECG is normal
 - there is a concordant pattern across the precordial leads
- 24) Causes of atrial fibrillation include
- constrictive pericarditis
 - ASD
 - anxiety
 - recent MI
 - complete heart block

Arrhythmias

- 25) A 35 year old woman presented with a history of intermittent light-headedness. The following are possible causes
- a) Atrial premature beats.
 - b) Sinus pauses
 - c) Supraventricular tachycardia.
 - d) Transient Mobitz type 1 atrioventricular block.
 - e) Ventricular premature beats.

Answers to Arrhythmia questions

1) FTTTF

Ventricular ectopics may be associated with an increased risk of sudden death in some patients, but are of no importance in others. Their significance must be considered in association with many other factors since their presence alone is usually of little importance. In an asymptomatic young man who is otherwise healthy, the likelihood of serious organic heart disease is very small. However, basic investigations are necessary, as is a search for possible contributory factors, such as the use of alcohol, recreational drugs, excessive caffeine ingestions etc. Smoking can also cause ectopics, and in any case stopping smoking is advisable even if unrelated to the problem. An echocardiogram is often indicated to exclude valvular heart disease or cardiomyopathy, and exercise testing may be indicated in selected cases. Evaluation should be made by a cardiologist to determine the need for special tests. There is no place for antiarrhythmic therapy in asymptomatic patients with ventricular ectopics, and in fact, as most antiarrhythmic drugs have pro-arrhythmogenic side effects they are better avoided.

2) FTTTT

Ventricular ectopics are common after a myocardial infarction, and is also more likely if the patient has received thrombolysis – these are known as reperfusion arrhythmias. They generally do not require drug treatment. Electrolyte disturbances are common contributory factors. If the R on T phenomenon is seen there is a higher likelihood of developing ventricular fibrillation. Ectopics can be harmless, but can reflect ongoing coronary ischaemia, and serial ECG changes should be looked for. Antiarrhythmic therapy is not indicated for haemodynamically stable ectopics, non-sustained ventricular tachycardia, or accelerated idioventricular rhythm with a heart rate between 100 and 120.

3) TTTTF

The aims of evaluating and treating an arrhythmia are; to eliminate symptoms, prevent imminent death and hemodynamic collapse due to a life-threatening arrhythmia, and offset the long-term risk that a non-life-threatening arrhythmia may portend in a high-risk patient. In general, patients with structural heart disease who develop an arrhythmia need formal evaluation. The following are specific instances where referral to a cardiologist is indicated;

Arrhythmias-Answers

- Patients resuscitated from VF
- AF with a rate that is difficult to control or recurrences that are refractory to standard therapies
- Sustained VT
- Non sustained VT in a patient with suspected or proven structural heart disease
- Symptomatic SVT
- Symptomatic sinus bradycardia
- Second degree or complete heart block
- Unexplained ventricular ectopy in the athlete or in a symptomatic patient
- Patients with devices (pacemakers, ICDs) and uncontrolled rhythm problems

4) FFFFT

Complete heart block is a common complication of inferior myocardial infarction. It occurs due to transient ischaemia of the atrioventricular node which is supplied by the right coronary artery. It is not a sign of a large infarction, and in any case most inferior myocardial infarctions do not cause extensive damage to the myocardium. Most of the time it is short lasting, and often reverts with atropine. Temporary pacing is not urgently indicated, but has a place if the rhythm does not revert to normal. An isoprenaline infusion is not advisable as it can provoke arrhythmias. In contrast, complete heart block which occurs in anterior myocardial infarction usually indicates a very large myocardial infarction. It does not recover spontaneously, and needs temporary cardiac pacing.

5) FTTTT

PR interval prolongation, tall tented T waves and widening of the QRS complex occurs in hyperkalaemia. Bradycardia is also a feature. The widened QRS complex ultimately takes the form of a sine wave, which is a sign of imminent cardiac arrest. Asystole occurs if hyperkalaemia is not treated. The sensitivity of the myocardium to hyperkalaemia is dependent on the level of serum potassium as well as the rate of rise of the serum potassium.

6) TTTFF

Sinus bradycardia, sinus arrhythmia, sinus arrests lasting less than 3 seconds, and wandering atrial pacemaker are often seen in trained athletes. These are signs of high vagal tone. They have no pathological significance, and in fact

may be a sign of cardiovascular health. Nodal bradycardia and atrial flutter are usually of pathological significance, and must be investigated.

7) TTTT

Digoxin and yellow oleander both contain cardiac glycosides, and overdose can result in a variety of cardiac arrhythmias. Both tachy and brady arrhythmias are seen; various degrees of heart block, sick sinus syndrome, nodal tachycardia, as well as SVT and VT can arise. Hypokalaemia makes the toxic effects worse; however digitalis toxicity causes hyperkalaemia which can also cause arrhythmias. Various tachyarrhythmias occur in myocarditis, including VT. Snake bite with certain snakes can also cause myocardial toxicity and cardiac arrhythmias. Organophosphate poisoning can result in bradyarrhythmias due to increased cholinergic activity, and can also result in escape tachyarrhythmias.

8) TTFTT

The atrial rate in atrial flutter is usually 300 beats per minute. Since the ventricles cannot contract at this rate, there is invariably some degree of atrioventricular nodal block. If 2:1 block is present, the ventricular rate will be 150 bpm, and if the block is 3:1 it will be 100 bpm. Ventricular tachycardia is almost due to serious pathology. Characteristically the complexes are wide in VT; however narrow complexes could be seen if the tachycardia arises high in the bundle of His. In supraventricular tachycardia the complexes are usually narrow, but the QRS complex can be broad if bundle branch block is present, or if there is conduction through an aberrant pathway. The rhythm in VT is regular, and an irregular broad complex rhythm is usually atrial fibrillation with bundle branch block or aberrant conduction.

9) FFTFF

Ventricular ectopics are a frequent finding in pregnancy, are harmless, provided that there is no underlying heart disease. Treatment is not required. Supraventricular tachycardia also occurs in some pregnant women, the cause for which is not clearly understood. By itself it does not indicate underlying structural heart disease. Atrial fibrillation and flutter are both often pathological, and are only rarely found in normal pregnant women. The presence of atrial fibrillation should make one suspect underlying mitral stenosis. First degree heart block can be seen, but second degree and complete heart block are very rare.

10) FTTT

Asymptomatic sinus bradycardia with a rate above 40 bpm does not require pacing. A heart rate of 45 bpm does not give rise to symptoms. Second degree or complete heart block usually requires pacing. In symptomatic tachy brady syndrome, symptoms are often due to tachyarrhythmias. However these cannot be easily treated because of the risk of causing bradycardia. The standard treatment is to pace the patient, and control the tachyarrhythmia with a calcium channel blocker or beta blocker as there is then no risk of bradycardia. There is some evidence that right ventricular cardiac pacing is beneficial, as early activation of the septum by the pacemaker results in reduction of the outflow tract obstruction.

11) FFTT

Low T waves and prominent U waves in hypokalaemia may give a false impression of prolongation of the QT interval. Amiodarone, quinine and quinidine, tricyclic antidepressants, phenothiazines, erythromycin, astemizole and many other drugs cause prolongation of the QT interval. It can be congenital, and can be associated with deafness. Hypocalcaemia causes a long QT, hypercalcaemia causes a short QT. It can be occasionally found in rheumatic carditis.

12) FFTF

Hypercalcaemia causes a short ST segment giving rise to a short QT interval. Hyponatraemia does not cause significant changes on the ECG. T wave inversions are seen in mitral valve prolapse, but these are non specific and non diagnostic. In fact they often cause diagnostic confusion with changes of ischaemic heart disease. J waves are seen in hypothermia. Hypomagnesaemia gives rise to changes similar to hypokalaemia, like U waves and flattening of T waves.

13) TFFFT

WPW syndrome is due to the presence of an abnormal bundle of Kent connecting the atria and ventricles. It often presents with atrioventricular reentrant tachycardia or SVT. Ventricular tachycardia can occur and is life threatening. Digoxin and verapamil block conduction in the normal AV node, and increases the risk of developing SVT by increasing the likelihood of impulses traveling through the abnormal pathway. Atrial fibrillation can occur with conduction to the ventricles occurring through the abnormal pathway, resulting in wide QRS complexes.

14) FTTFT

Digoxin is used for rate control in atrial fibrillation, by slowing conduction across the AV node. It does not convert the atrial fibrillation to sinus rhythm. Mitral stenosis, ischaemic heart disease, and cardiomyopathies are all recognized causes. The risk of stroke is increased in atrial fibrillation due to structural heart disease, but not in lone atrial fibrillation.

15) TFTFF

Adenosine causes transient complete heart block. It is used primarily to interrupt the reentrant circuit in AV nodal reentrant tachycardia. Its duration of action is too short to be of benefit in controlling the rate in atrial fibrillation. In atrial flutter with 2:1 block, where diagnosis is a problem, it can be used to increase the block and reveal the flutter waves, thus helping with diagnosis.

16) FFFTF

The blood pressure can be normal in both SVT and VT. The T waves are often inverted in any tachycardia, due to repolarization abnormalities. Very wide QRS complexes suggest VT. An irregularly irregular rhythm occurs in atrial fibrillation with aberrant conduction, which is in effect a supraventricular tachycardia. P waves can be seen following the QRS complexes in SVT.

17) TTFTT

Multifocal atrial tachycardia is often associated with chronic respiratory disease or congestive heart failure. The rhythm is irregularly irregular, often mimicking atrial fibrillation. Digoxin does not abolish it, and in fact it can be caused by digoxin toxicity. The morphology of the p waves varies, and if the rate is below 100 bpm it is known as a wandering atrial pacemaker.

18) TFTTT

Sick sinus syndrome is common in the elderly due to degenerative changes in the sinus node. It can be associated with ischaemic heart disease and cardiomyopathies. Complete heart block is not a feature, although it can be associated if the degenerative process progresses to involve the rest of the conducting system. Systemic embolism can occur, although it is not common. It is due to atrial arrhythmias which may develop. The heart rate does not increase in response to exercise, and can result in exertional syncope or tiredness. Symptomatic patients must be paced.

19) TFFFF

The heart rate in complete heart block is regular. Irregular cannon waves are seen in the jugular veins, due to contraction of the atria during ventricular systole. The first sound is variable in intensity, and depends on the relationship to the atrial contraction. Paradoxical splitting of the second heart sound is seen in left bundle branch block.

20) TFTTF

In atrial fibrillation, ectopics, and complete heart block, ventricular filling time is variable. The first heart sound is therefore variable. In atrial flutter and left bundle branch block there is atrioventricular synchrony, and the intensity of the first heart sound is normal.

21) TTFTF

Hypothermia, hypothyroidism, jaundice, can all cause bradycardia. It can also be seen in trained athletes. Anaemia and shock causes tachycardia. A subdural haematoma can result in increased intracranial pressure, leading to the Cushing reflex – hypertension and bradycardia. It is a sign of increasing intracranial pressure and possible imminent coning.

22) TTTFT

DC cardioversion is indicated in haemodynamically unstable VT, i.e., when there is a low blood pressure, angina, left ventricular failure. Amiodarone is used in haemodynamically stable VT. In Torsade de pointes the drug of choice is intravenous magnesium. Verapamil is used in supraventricular tachycardia, but can cause cardiac arrest if used in VT. DC cardioversion must be synchronized, to avoid a possible R on T phenomenon.

23) FFTFF

Cannon waves are seen if there is atrioventricular dissociation resulting in simultaneous contraction of the atria and ventricles. Fusion beats and capture beats are seen in VT. Carotid sinus massage can abolish SVT but has no effect on VT. A previously normal ECG suggests that VT is more likely, while the presence of bundle branch block or WPW syndrome on the previous ECG suggests SVT with aberrant conduction. Concordance across the precordial leads is seen in VT.

Arrhythmias-Answers

24) TTTTF

Pericardial disease can cause atrial fibrillation. Atrial enlargement in ASD can result in atrial fibrillation. Ischaemic heart disease is a recognized cause of atrial fibrillation. Rarely it can occur in anxiety.

25) TTTTT

All of the above can cause intermittent lightheadedness

CARDIOMYOPATHIES

- 1) Regarding dilated cardiomyopathy
 - a. Hypertension is a recognized cause
 - b. The majority of cases are idiopathic
 - c. 25 per cent of idiopathic dilated cardiomyopathies are familial
 - d. It has a better prognosis compared to ischaemic cardiomyopathy
 - e. Persistent viral infection has been implicated as a possible cause

- 2) The following are recognized causes of dilated cardiomyopathy
 - a. Haemochromatosis
 - b. Friedrich's ataxia
 - c. Cyclophosphamide therapy
 - d. Wilson's disease
 - e. Systemic sclerosis

- 3) The following are suggestive of idiopathic dilated cardiomyopathy rather than ischaemic heart cardiomyopathy
 - a. Dilatation of all four chambers of the heart on echocardiography
 - b. Occurrence in a young patient
 - c. The absence of pulmonary hypertension
 - d. Asymmetrical hypertrophy of the septum of the heart on echocardiography
 - e. A normal ECG

- 4) Patients with dilated cardiomyopathy may present with
 - a. stroke
 - b. haemoptysis
 - c. Sudden cardiac death
 - d. Syncope
 - e. Supraventricular arrhythmia

Cardiomyopathies

- 5) Regarding investigations in dilated cardiomyopathy
 - a. The ECG shows T wave inversions in multiple leads
 - b. Atrial fibrillation may be seen on ECG
 - c. Chest radiograph shows a dilated heart with clear lung fields
 - d. Coronary angiography is indicated in patients over the age of 40 years
 - e. Echocardiogram shows dilatation of the left ventricle more than the right ventricle

- 6) In a pericardial effusion
 - a. On chest radiograph the heart is globular
 - b. The lung fields are plethoric
 - c. Echocardiography is useful in diagnosis
 - d. Bradycardia is a feature
 - e. A low pulse volume is an indication for urgent aspiration

- 7) In dilated cardiomyopathy
 - a. Drug treatment is similar to that of heart failure
 - b. Warfarin is indicated if a history of transient ischaemic attacks is present
 - c. Antiarrhythmics are indicated if the patient has recurrent arrhythmias
 - d. Weight reduction is helpful in management
 - e. Cardiac transplantation is the main option of treatment for patients who do not respond to medical therapy

- 8) The following commonly cause myocarditis
 - a. Dengue fever
 - b. Leptospirosis
 - c. Malaria
 - d. radiation
 - e. Trypanosoma cruzi

- 9) In a patient with myocarditis due to dengue fever
 - a. The cardiac enzymes are usually normal
 - b. Heart block maybe seen
 - c. The absence of T wave changes makes the diagnosis unlikely
 - d. Ventricular arrhythmias may cause death
 - e. Echocardiography shows regional wall motion abnormalities

Cardiomyopathies

- 10) Regarding atrial myxoma
 - a. The symptoms and signs can mimic infective endocarditis
 - b. A mid diastolic murmur may be present
 - c. The left atrium is a common site
 - d. It is malignant
 - e. Surgical removal is indicated

- 11) The following clinical features suggest a diagnosis of hypertrophic obstructive cardiomyopathy
 - a. Double apical pulsation
 - b. A mitral regurgitation murmur
 - c. Collapsing pulse
 - d. An ejection systolic murmur made louder by squatting
 - e. A fourth heart sound

- 12) The following are seen in hypertrophic obstructive cardiomyopathy
 - a. Asymmetrical septal hypertrophy on echocardiography
 - b. Left ventricular hypertrophy
 - c. ST segment elevations in the lateral leads on ECG
 - d. Anterior movement of the mitral valve during systole on echocardiography
 - e. Cardiomegaly on chest radiograph

- 13) The following are causes of restrictive cardiomyopathy
 - a. Loefflers endocarditis
 - b. Amyloidosis
 - c. Tuberculosis
 - d. Diabetes mellitus
 - e. Sarcoidosis

- 14) In restrictive cardiomyopathy
 - a. There is cardiomegaly on chest radiography
 - b. The lung fields are clear
 - c. Low voltage complexes are seen on the ECG
 - d. Endomyocardial biopsy is useful in diagnosing the cause
 - e. There is no specific treatment

Cardiomyopathies

- 15) A 35 year old man presents with recurrent syncope. On one episode he is documented to have ventricular tachycardia. His ECG shows T wave inversions in V1 to V3. Echocardiography shows right ventricular dilatation. A diagnosis of arrhythmogenic right ventricular dysplasia is made.
- Chronic lung disease is a likely cause
 - Right heart failure may develop
 - It may present with sudden death
 - MRI demonstrates fatty infiltration of the right ventricle
 - It is treated with beta blockers
- 16) Peripartum cardiomyopathy
- May develop after delivery
 - Is commoner in women under 30 years of age
 - It is due to a viral infection
 - It is commoner in multiparous women
 - It has a mortality of up to 50%
- 17) Regarding constrictive pericarditis
- Tuberculosis is the most important cause in the developing world
 - Pericardial calcification may be seen on a lateral chest radiograph
 - Hypothyroidism is a known cause
 - It is a cause of atrial fibrillation
 - The treatment is pericardiectomy
- 18) True or false
- in diabetes mellitus, heart failure is always secondary to coronary artery disease
 - carcinoid syndrome causes a dilated cardiomyopathy
 - myocarditis is caused by coxsackie virus infection
 - viral myocarditis may result in irreversible dilated cardiomyopathy
 - persistent tachycardia can result in cardiomyopathy
- 19) The following are recognised causes of reversible dilated cardiomyopathy:-
- Alcohol
 - Selenium deficiency
 - Acromegaly
 - Lead poisoning
 - Coxsackie virus

Cardiomyopathies

- 20) Specific heart muscle disease may result from
- vitamin B1 deficiency
 - cholera
 - Cushing's syndrome
 - carcinoid syndrome
 - scleroderma
- 21) Hypertrophic cardiomyopathy
- is familial
 - is associated with Friedrich's ataxia
 - may be usefully treated with nitrates
 - treated with beta adrenergic blockers has a lower risk of sudden death
 - is best screened for by a 12-lead electrocardiogram
- 22) The following are causes of specific heart muscle disease
- amyloidosis
 - sarcoidosis
 - emphysema
 - haemosiderosis
 - pregnancy
- 23) Which of the following infections cause myocarditis?
- Coxsackie virus
 - Diphtheria
 - Chagas Disease
 - Syphillis
 - Toxoplasmosis

Cardiomyopathies

- 24) A 21 year old man with Hypertrophic Cardiomyopathy presents in clinic with dizzy spells but has not had any syncopal episodes. Which of the following, if present, would indicate an increased risk of sudden cardiac death?
- a. Asymmetric septal hypertrophy
 - b. Blood Pressure drop of 20mmHg during peak exercise tolerance testing
 - c. A family history of sudden death
 - d. Systolic Anterior Movement of the mitral valve on echocardiography
 - e. worsening exertional angina
- 25) A 28-year-old man who is known to have Hypertrophic Cardiomyopathy has an out of hospital cardiac arrest and is successfully resuscitated. The following are possible treatment options
- a. Alcohol Septal Ablation
 - b. Amiodarone
 - c. Beta Blocker
 - d. Implantable Defibrillator
 - e. Myomectomy

Answers to Cardiomyopathy questions

1) TTTFT

Hypertension causes left ventricular hypertrophy. Eventually, long standing hypertension can cause chamber dilatation and result in dilated cardiomyopathy. This accounts for approximately 4 percent of patients. In 50 percent of patients the aetiology is not know; this is referred to as idiopathic dilated cardiomyopathy. Viral myocarditis is the second commonest cause, and Ischaemic heart disease is the next most common cause. The prognosis of ischaemic cardiomyopathy is better than that of cardiomyopathy due to other causes. The condition is familial in about 25 percent of patients with the idiopathic type.

2) TTTFT

The list of causes for dilated cardiomyopathy is very long. In general, ischaemia, toxins, nutritional deficiencies, drugs, endocrine diseases, deposition diseases, neuromuscular disorders, infections, connective tissue diseases, and many others can result in dilated cardiomyopathy. Wilson's disease, where there is excessive deposition of copper in the tissues, does not usually cause a cardiomyopathy.

3) TFTFT

In both ischaemic cardiomyopathy and idiopathic dilated cardiomyopathy chamber dilatation occurs. In idiopathic dilated cardiomyopathy, since the myocardium is intrinsically affected, all four chambers will be affected simultaneously. If, at the onset, dilatation of all four chambers is seen, it is more likely to be idiopathic dilated cardiomyopathy. Pulmonary hypertension may not develop because all chambers have been affected simultaneously. In ischaemic cardiomyopathy the left heart is much more likely to be affected, because of its greater thickness and therefore greater susceptibility to ischaemia. Dilatation of the right heart occurs secondary to the development of pulmonary hypertension. A young patients is more likely to have idiopathic dilated cardiomyopathy. The presence of asymmetrical septal hypertrophy suggests a diagnosis of hypertrophic obstructive cardiomyopathy. The ECG is often abnormal in ischaemic heart disease. A normal ECG may be seen in idiopathic dilated cardiomyopathy – however the ECG is often abnormal in this condition too.

4) TFTTT

Dilatation of the ventricles and atria can result in stasis of blood in the chambers of the heart, resulting in thrombosis and thromboembolic stroke. The risk of embolic stroke is higher in patients with dilated cardiomyopathy. However, anticoagulation with warfarin is not routinely given unless there are demonstrable thrombi in the ventricles or atria, or if the patient has had TIAs or a stroke. Haemoptysis occurs due to rupture of dilated pulmonary venules in patients with elevated pulmonary venous pressure; it is commonly seen in mitral stenosis. In dilated cardiomyopathy, since all four chambers are dilated, the pulmonary venous pressures are usually not very high, and haemoptysis is not a prominent feature. Sudden cardiac death can occur in dilated cardiomyopathy and other types of cardiomyopathy as well, in particular HOCM. Sudden death is often due to arrhythmias. Any type of arrhythmia can occur, including atrial fibrillation, SVT, VT and ventricular fibrillation. Syncope is a frequent complaint among patients with dilated cardiomyopathy, and is due to low cardiac output or arrhythmias which result in a drop in cardiac output.

5) TTFTF

ECG changes such as ST – T changes can be seen in dilated cardiomyopathy. Various forms of bundle branch block may be present. The presence of Q waves may suggest myocardial ischaemia as a probable aetiological factor. Dilatation of all chambers of the heart occurs; atrial fibrillation can occur as a consequence of atrial dilatation. The chest radiograph often shows a dilated heart with congested lung fields. In younger patients, ischaemia is not a common cause of dilated cardiomyopathy; however in any patient over the age of 40 years there is a possibility of ischaemic heart disease as an underlying aetiology. Such patients may have a ‘hibernating myocardium’, where the myocardium is dormant as a response to chronic ischaemia. In such patients, revascularization may improve cardiac function. Dilatation of the left ventricle more than the right ventricle is not characteristic of dilated cardiomyopathy; often this indicates ischaemic heart disease where the left ventricle is more prone to ischaemic damage.

6) TFTFT

A globular heart with clear lung fields is characteristically seen on the chest radiograph in pericardial effusion. Since the effusion compresses both chambers of the heart, right heart filling is also reduced, hence the lung fields are clear. Echocardiography is the most useful investigation in the diagnosis

of pericardial effusion. Tachycardia is often seen in pericardial effusion, as a compensatory response to low cardiac output. If bradycardia is present, the possibility of hypothyroidism as an underlying cause should be considered. A low pulse volume indicates significant myocardial compromise, and is an indication for urgent aspiration.

7) TTTT

Dilated cardiomyopathy results in congestive cardiac failure, and the drug treatment is largely that of heart failure. Since all chambers of the heart are dilated, there is an increased risk of intracardiac thrombi, and hence embolisation resulting in stroke. However there is controversy as to whether patients should routinely be treated with anticoagulants. If a history of TIAs is present, warfarinization is usually indicated. Weight reduction in patients who are overweight to achieve ideal body weight improves symptoms. The definitive treatment in patients who do not respond to medical therapy is cardiac transplantation.

8) TTTT

A variety of bacterial, viral, protozoal and helminthic infections, and many toxins and drugs can cause myocarditis. In tropical countries, leptospirosis is an important cause. Dengue fever and other viral infections can cause myocarditis, usually presenting with chest pain and T wave inversions on the ECG. Cardiac enzymes are often elevated, and troponin T may be positive. American trypanosomiasis is an important cause in Central America. Radiation for cancer of the lung is an important cause.

9) FTTT

Myocarditis is seen in a significant proportion of patients with Dengue fever. In most instances it is asymptomatic, and does not give rise to serious complications. The commonest finding on the ECG is T wave inversions in the anterior leads. Sinus bradycardia is common; varying degrees of heart block are seen occasionally. Life threatening ventricular arrhythmias such as ventricular tachycardia and ventricular fibrillation may occur, particular if electrolyte imbalance is present. A completely normal ECG makes the diagnosis unlikely. Ventricular arrhythmias can cause death. Regional wall motion abnormalities are seen in ischaemic heart disease due to regional ischaemia. The changes in dengue myocarditis are often global, i.e., involve all parts of the ventricle.

10) TTTFT

The most common primary cardiac neoplasm is myxoma. These tumors histologically consist throughout of copious mucopolysaccharide stroma, which are scattered solitary or clustered polygonal cells; the stromal cells originate from multipotent mesenchyme capable of neural and endothelial differentiation. They are frequently pedunculated, and 75 percent arise in the left atrium close to the fossa ovalis. A mid diastolic murmur is present due to obstruction of diastolic flow. The symptoms and signs can mimic endocarditis, and it can present with peripheral embolization. It is non malignant. Cardiac tumours which are malignant include angiosarcomas and rhabdomyosarcomas. Mesotheliomas can arise in the pericardium. Surgical removal is the treatment.

11) TTTFT

A double apical pulsation and a jerky pulse should alert the clinician to the possibility of HOCM. The condition is familial, with an autosomal dominant pattern of inheritance. Mitral regurgitation occurs in almost all patients with obstructive HOCM as a consequence of systolic anterior movement of the mitral valve leaflets and impaired mitral leaflet coaptation. Conditions which increase peripheral vascular resistance such as squatting and handgrip will reduce the intensity of the murmur. This is because increasing the peripheral resistance will reduce the degree of obstruction caused by the hypertrophied septum. A fourth sound is often heard, especially in younger patients.

12) TTTTF

Asymmetrical septal hypertrophy is a characteristic finding in HOCM. Left ventricular hypertrophy occurs with features of left ventricular strain, i.e., ST segment depressions in the lateral leads. As a result of the septal hypertrophy tall R waves in the septal leads (V1-V3) and prominent Q waves in the lateral and inferior leads may be seen. Anterior movement of the mitral valve during systole is characteristically seen in the M Mode echocardiogram. Hypertrophy is often confined to the septum, and cardiomegaly does not usually occur. Long standing mitral regurgitation can result in cardiomegaly later on.

13) TTTFT

Restrictive cardiomyopathy is a distinct entity which has morphologic and hemodynamic characteristics that separate it from dilated and hypertrophic cardiomyopathies. It is comparatively rare. In restrictive cardiomyopathy the ventricles are not dilated, wall thickness is normal. The ventricular walls are

Cardiomyopathies-Answers

rigid, resulting in restriction to diastolic filling and therefore diastolic dysfunction. left ventricular systolic function is normal. It may be idiopathic, or may be due to one of the following conditions; amyloidosis, sarcoidosis, hemochromatosis, chemotherapy or radiation, hypereosinophilic syndrome such as Loefflers, endomyocardial fibrosis, and long-term chloroquine therapy. Tuberculosis often involves the pericardium, resulting in constrictive pericarditis. The clinical features of constrictive pericarditis can resemble those of restrictive cardiomyopathy.

14) TFFTF

Although the ventricles are often not dilated in restrictive cardiomyopathy, cardiomegaly is often present due to atrial dilatation. The lung fields are plethoric, and pleural effusions may be seen. A variety of ECG changes may be seen in restrictive cardiomyopathy, including atrial fibrillation, ST-T changes; however the QRS complexes are usually normal. Low voltage complexes suggest constrictive pericarditis. Endomyocardial biopsy is helpful in diagnosing secondary causes. If an underlying secondary cause can be found, treatment of that cause might improve the cardiomyopathy. There is no definitive treatment for idiopathic restrictive cardiomyopathy.

15) FTTTF

Arrhythmogenic right ventricular dysplasia, which is also called right ventricular cardiomyopathy, is a rare entity characterized by ventricular arrhythmias and an unusual fatty appearance of the RV free wall. Sudden arrhythmic death, often exercise induced, are known to occur. The MRI is useful in diagnosis. The Class III antiarrhythmic drug Sotalol is the most effective drug in treatment.

16) TFFTT

Peripartum cardiomyopathy is characterized by the development of cardiac failure in the last month of pregnancy or within five months of delivery. It is very rare before 36 weeks of gestation. These patients have no identifiable cause for cardiac failure, and have had no evidence of heart disease prior to the last month of pregnancy. It is commoner among the following; women over 30 years of age, multiparous women, women of African descent, women with multiple pregnancy, women with a history of preeclampsia, women with a history of cocaine abuse, and those on long term tocolytic therapy with salbutamol. Various aetiologies have been suggested, including viral

infection, but the cause is unknown. The condition has a mortality of up to 50 percent.

17) TTFTT

There are many causes of constrictive pericarditis. In the developing world, tuberculosis is probably the most common. Pericardial calcification may be seen in the lateral chest radiograph. Hypothyroidism causes pericardial effusion, but not constrictive pericarditis. Atrial fibrillation can occur. Pericardiectomy is the definitive treatment.

18) FFTTT

Coronary artery disease often co-exists with diabetes mellitus. However there is some evidence that an independent 'diabetic cardiomyopathy' may exist. Carcinoid syndrome results in endomyocardial fibrosis and results in a restrictive type of cardiomyopathy. Coxsackie virus infection is a well known cause of viral myocarditis. Most cases of viral myocarditis completely recover; a small number go on to develop irreversible dilated cardiomyopathy. Persistent tachycardia due to any cause can result in myocardial dysfunction, known as tachycardia induced cardiomyopathy.

19) TTTFT

A variety of toxins, infections and metabolic derangements can cause reversible dilated cardiomyopathy. Lead poisoning does not characteristically cause cardiomyopathy.

20) TFFTT

Vitamin B deficiency can result in Beri Beri. Many viruses can cause myocarditis, but cholera is not one of them. Left ventricular hypertrophy secondary to hypertension, and cardiac failure, can occur in Cushings, but a specific heart muscle disease does not occur. Carcinoid syndrome can cause endomyocardial fibrosis. Myocardial fibrosis can occur in scleroderma, and has a poor prognosis.

21) TTFTF

Hypertrophic cardiomyopathy (HCM) is a genetic disease of the cardiac sarcomere, with an autosomal dominant pattern of inheritance. It is associated with Friedrich's ataxia. Vasodilators worsen the outflow tract obstruction by reducing peripheral resistance. Beta blockers or verapamil can prevent sudden cardiac death. The ECG often shows left ventricular

Cardiomyopathies-Answers

hypertrophy, however an echocardiogram is the most useful screening test. Echocardiography shows the characteristic asymmetrical septal hypertrophy and systolic anterior movement of the mitral valve.

22) TTFTT

Emphysema causes right heart failure secondary to pulmonary hypertension. Amyloidosis, sarcoidosis, and haemochromatosis can cause cardiomyopathy. Peripartum cardiomyopathy is a recognized entity.

23) TTTTT

All of these conditions can cause myocarditis.

24) FTFFF

A blood pressure drop during exercise testing, a family history of sudden death, and worsening exertional angina are predictors of sudden cardiac death.

25) TTTTT

All of the above are possible treatment options. However an implantable defibrillator is probably the most useful therapeutic modality to prevent sudden cardiac death in this patient.

CEREBROVASCULAR DISEASE

- 1) Stroke
 - a. Is defined as a focal neurological deficit of vascular origin
 - b. It is the third most important cause of death in the developed world
 - c. It is more common in the elderly
 - d. Rheumatic heart disease is an important causative factor
 - e. It is commoner in women

- 2) Regarding the causes of stroke
 - a. In hypertensive patients, cerebral haemorrhage is more common than infarction
 - b. Subarachnoid haemorrhage is commoner in patients with hypertension
 - c. A tumour of the brain can mimic a stroke
 - d. Isolated, or lone atrial fibrillation increases the risk of stroke
 - a. Dissection of the carotid artery is a recognized cause

- 3) The following are important risk factors for stroke
 - a. Hypertension
 - b. Smoking
 - c. Moderate alcohol consumption
 - d. Polycythaemia vera
 - e. Elevated homocysteine levels in the blood

- 4) Regarding transient ischaemic attacks
 - a. They are usually due to cerebral embolism
 - b. They usually last about 7-8 hours
 - c. Postural hypotension is a recognized cause
 - d. Transient loss of vision in one eye can occur
 - e. Focal epilepsy can mimic a transient ischaemic attack

- 5) Regarding transient ischaemic attacks
 - a. There is an increased risk in valvular heart disease
 - b. Antiphospholipid syndrome is a cause
 - c. 50% of people with a TIA will develop a stroke within a year
 - d. it is never caused by haemorrhage
 - e. long term aspirin reduces the risk of stroke after a TIA

Cerebrovascular disease

- 6) The following should be looked for in a patient with a TIA
 - a. A carotid artery bruit
 - b. Heart murmur
 - c. Bradycardia
 - d. Vasculitic rash
 - e. Diabetes mellitus

- 7) The following are recognized manifestations of a TIA
 - a. Migraine
 - b. Aphasia
 - c. Vertigo
 - d. Transient global amnesia
 - e. Loss of consciousness

- 8) Regarding ischaemic stroke
 - a. The most common site is the parietal cortex
 - b. A very dense stroke in a patient who is fully conscious and alert is likely to be in the internal capsule
 - c. Headache is common
 - d. The reflexes are brisk soon after the occurrence of the stroke
 - e. Epilepsy is a common presentation

- 9) Regarding infarction of the brain stem
 - a. The lateral medullary syndrome occurs due to thrombosis of the posterior inferior cerebellar artery
 - b. A painful third nerve palsy with a pupil which does not react to light suggests a midbrain infarct
 - c. Coma can occur in a brain stem stroke
 - d. Weakness of the upper and lower limb on the right side, with facial weakness on the left side occurs in a medullary stroke
 - e. Weakness of the right facial nerve and right lateral rectus palsy indicates a pontine infarct

- 10) The following can occur due to stroke
 - a. Dementia
 - b. Hemianopic visual loss
 - c. Parkinsonism
 - d. Tremor
 - e. Ataxia

Cerebrovascular disease

- 11) the following clinical features are reliable in distinguishing an infarct from a haemorrhage
- headache
 - loss of consciousness
 - a history of hypertension
 - A CT scan brain
 - EEG
- 12) A 60 year old man is admitted with a dense right face arm leg weakness. He is fully alert. His blood pressure is 180/100mmhg.
- He should be given aspirin 300mg stat
 - He should be started on intravenous heparin
 - His blood pressure should be urgently reduced to 140/90
 - Nifedipine sublingually is the drug of choice for blood pressure reduction
 - If he has been on antihypertensives, these should be continued
- 13) Regarding the management of acute stroke
- Oxygen by mask should be given
 - Hyperglycaemia with a blood glucose under 250mg/dl need not be treated
 - Hypertension must be treated if the blood pressure is above 220/130mHg
 - Fever should be treated with antipyretics and tepid sponging
 - Thrombolysis with tissue plasminogen activator is indicated in most large strokes
- 14) Regarding acute stroke
- Swallowing is assessed by checking the gag reflex
 - A CT scan brain is indicated only in patients with severe headache or drowsiness
 - Cerebellar haemorrhage is an indication for urgent referral to the neurosurgeon
 - In the presence of swallowing difficulty, the patient is kept on NG feeds for 3 months
 - Referral to a multidisciplinary stroke unit improves outcome

Cerebrovascular disease

- 15) Regarding the CT scan in stroke
- A contrast CT scan brain is indicated immediately after the stroke
 - A haemorrhage can be detected in a CT scan within 2 hours
 - An infarct is detectable in a non-contrast CT scan within 6 hours
 - The main place of a CT scan brain is to exclude a haemorrhage
 - The CT scan is a sensitive investigation to detect infarcts in the posterior cranial fossa
- 16) Regarding the management of acute stroke
- Aspirin is indicated in all ischaemic strokes
 - In the presence of atrial fibrillation, warfarin is indicated in a large middle cerebral artery territory stroke
 - Low molecular weight heparin is indicated in ischaemic stroke
 - The goals of blood pressure control are lower in haemorrhagic stroke compared to ischaemic stroke
 - Clopidogrel is useful in the secondary prevention of ischaemic stroke
- 17) The following investigations are routinely indicated in a 45 year old patient with a stroke
- MRI brain
 - ECG
 - Haemoglobin level
 - Blood homocysteine level
 - Lumbar puncture
- 18) In a patient with chronic atrial fibrillation who develops a stroke
- There is a high risk of a second stroke
 - Warfarin is indicated
 - Aspirin, when combined with warfarin, has additive protective effects
 - Conversion of atrial fibrillation to sinus rhythm should be attempted
 - Warfarin increases the risk of cerebral haemorrhage

Cerebrovascular disease

- 19) Regarding the prognosis after a stroke
- 25% of patients die within 2 years of a stroke
 - The majority of deaths after stroke occur within the first month
 - The majority of deaths occur due to recurrent stroke
 - The majority of survivors of stroke return to independent mobility
 - Patients with a haemorrhagic stroke are twice as likely to die early compared to those with ischaemic stroke
- 20) The following are poor prognostic features after stroke
- Drowsiness
 - Conjugate gaze palsy
 - Swallowing difficulty
 - Aphasia
 - Hypertension soon after the stroke
- 21) Regarding haemorrhagic stroke
- It is responsible for around 10% of strokes
 - It is caused by rupture of large arterial aneurysms most commonly
 - The basal ganglia are a characteristic site
 - Cerebral amyloid angiopathy is a cause
 - Hypertension is the most important risk factor
- 22) The following symptoms / signs are correctly paired with the site of the stroke
- Dysarthria → brain stem
 - Right homonymous hemianopia → right occipital cortex
 - Expressive dysphasia → temporal lobe
 - Hemisensory loss → parietal cortex
 - Transient global amnesia → frontal cortex
- 23) Regarding haemorrhagic stroke
- Clot evacuation is considered in large bleeds causing a midline shift
 - Aspirin is contraindicated
 - Cerebellar haemorrhage is an indication for urgent surgical evacuation of the clot
 - The prognosis is poor
 - Intracranial arteriovenous malformations should be looked for as a cause

Cerebrovascular disease

- 24) Regarding subarachnoid haemorrhage
- a. Is often associated with a history of trauma to the head
 - b. It is usually due to a rupture of a berry aneurysm in the circle of Willis
 - c. It accounts for 5% of strokes
 - d. It is commoner in patients with polycystic kidney disease
 - e. Sudden severe occipital headache is a feature
- 25) Regarding the management of subarachnoid haemorrhage
- a. The blood pressure must be controlled to less than 140mmHg systolic
 - b. Nimodipine reduces secondary cerebral vasospasm and improves outcome
 - c. Constipation must be avoided
 - d. A four vessel angiogram must be done within 48-72 hours
 - e. Surgical clipping of the aneurysm is indicated

Answers to Cardiovascular Disease questions

1) TTTTF

Stroke is defined as a focal neurological deficit of vascular origin. It is the third commonest cause of death in the developed world. The incidence of stroke increases with increasing age. Rheumatic heart disease resulting in chronic valvular disease, in particular mitral stenosis with atrial fibrillation is a major causative factor in the development of embolic stroke. Stroke is commoner in men.

2) FTTFT

Overall infarction is commoner than haemorrhage as a cause of stroke. In hypertensive patients, and even in patients who have had a cerebral haemorrhage, infarction is more common. Subarachnoid haemorrhage is often due to rupture of a berry aneurysm in the circle of willis, and the incidence is higher in patients with hypertension. Tumours often present with more insidious signs and symptoms, in particular features of increased intracranial pressure such as early morning headaches with vomiting, and gradually worsening neurological signs. However, haemorrhage into a tumour can result in sudden expansion of the tumour, and can present acutely with a focal neurological deficit mimicking a stroke. Atrial fibrillation is an important risk factor for embolic stroke; however in the absence of a cause, i.e., isolated or lone atrial fibrillation, the incidence of stroke is not increased. Anticoagulation is indicated in most cases of atrial fibrillation, but is often not indicated in lone atrial fibrillation. A dissection of a carotid artery can result in a stroke in the territory supplied by that vessel.

3) TTFTT

Hypertension, smoking, diabetes mellitus, hyperlipidaemia are all major risk factors for the development of ischaemic stroke. Hypertension increases the risk of haemorrhagic stroke. Heavy alcohol consumption can increase the risk of strokes, but drinking in moderation has been shown to be useful in the primary prevention of stroke. In polycythaemia vera, the increased viscosity of blood due to the high haematocrit, as well as the associated increase in platelets which often co-exists can result in thrombotic stroke. Patients with homocysteinuria have elevated blood homocysteine levels due to an inherited enzyme defect. These patients have a high incidence of arterial thrombosis and stroke. Elevated blood homocysteine levels increase the thrombogenicity of blood and is a risk factor for thrombotic stroke. Folate deficiency is known

to result in elevated blood homocysteine levels; there is some evidence that folic acid therapy in such patients is useful in lowering homocysteine levels and may protect against strokes.

4) TFTTT

By definition, a TIA is a focal neurological deficit which lasts less than 24 hours; in practice however the majority resolve within half an hour. TIAs are usually due the passage of small emboli through the cerebral circulation. TIAs due to small haemorrhages have been reported, but this is a very rare cause. Often, a source of embolism is present such as carotid artery stenosis, atrial fibrillation, valvular heart disease or endocarditis, or dilated cardiomyopathy with ventricular thrombi. Postural hypotension, bradycardia, hypertension, diabetes mellitus are recognized causes. A prothrombotic state may be the underlying cause, such as polycythaemia or antiphospholipid syndrome.

5) TTTFT

The risk of TIA is increased many fold in patients with valvular heart disease. Mitral stenosis with atrial fibrillation increases the risk 15 times. Antiphospholipid syndrome is a known risk factor for arterial or venous thrombosis. One fifth of patients with a TIA will develop a stroke within a year. Although the majority of strokes are caused by embolism, there are a few case reports of TIAs due to small haemorrhages. Aspirin given long term after a TIA will reduce the risk of stroke. Clopidogrel, another antiplatelet drug has been shown to be more effective in reducing the risk of stroke.

6) TTTTT

Conditions which increases the risk of atherosclerosis, vasculitic conditions, valvular cardiac lesions, prothrombotic states, and low cardiac output states and arrhythmias, can cause TIAs. In the routine evaluation of a patient with a TIA clinical features pointing to any of these conditions should be looked for.

7) FTTTT

Migraine can mimic a TIA and is an important differential diagnosis. The presence of headache makes a TIA less likely. Any type of focal neurological defect can occur in a TIA. Transient global amnesia is a condition of possibly vascular etiology, that typically occurs after the age of 50. Affected patients have a deficit of short-term memory that begins abruptly and persists for minutes to hours, without other cognitive or motor impairment. It is sometimes classified as a separate entity, but is often regarded as a type of

TIA. Loss of consciousness is rare, but can occur due to a TIA involving the posterior circulation.

8) FTFFF

The commonest site of ischaemic stroke is the internal capsule. For a very dense stroke to occur, the lesion may be either a small infarct in the internal capsule where many of the pyramidal fibres are close to each other, or a large infarct of the cortex. If the patient's level of consciousness is preserved the lesion is more likely to be in the internal capsule, as involvement of a large area of the cortex will invariably result in significant cerebral oedema causing drowsiness. Headache is of poor discriminatory value in distinguishing a haemorrhage from an infarct, but is commoner after a haemorrhage. Soon after a stroke, the reflexes are diminished due to spinal shock. Subsequently the reflexes return, and eventually become brisk. Epilepsy is known to occur after an infarct, but is more commonly seen due to haemorrhage. The presence of epilepsy signifies an irritative lesion, and a space occupying lesion should be excluded.

9) TTTFT

Localising strokes which occur in the brain stem is easy if one has a good knowledge of the anatomy and location of the various nuclei and fibres in the brain stem. The lateral medullary syndrome occurs due to thrombosis of the posterior inferior cerebellar artery. Known as Wallenberg syndrome, it results from a lesion of the lateral medulla and was originally described as involving pain and temperature loss on the ipsilateral face and contralateral limbs and trunk. Accompanying signs and symptoms include loss of vibration and proprioception as well as ataxia in the ipsilateral limbs. An ipsilateral Horner's syndrome, vertigo, nystagmus, hoarseness, and dysphagia are often present.

10) TTTTT

Vascular dementia is due to multiple small strokes over a period of time. Hemianopic visual loss can occur due to a stroke of the occipital cortex. Cerebrovascular disease is a known aetiological factor in parkinsonism. Tremor and ataxia can occur due to strokes involving the basal ganglia.

11) FFFTF

Often, the presence of headache after a stroke is thought to be due to haemorrhage. However it is an unreliable symptom, as up to 50 percent of haemorrhages present without headache. Loss of consciousness occurs more commonly due to haemorrhage, but can occur with a large infarct with cerebral oedema, or with a brain stem infarct. Although hypertension is one of the aetiological factors predisposing to haemorrhage, even in hypertensives, ischaemic stroke is commoner. The EEG is unhelpful in differentiation an infarct from a haemorrhage, and a non-contrast-enhanced CT scan brain is the most useful investigation. A haemorrhage is detectable almost immediately, while an infarct can be detected after about 24 hours. Therefore it is the most useful investigation to exclude a haemorrhage.

12) FFFFT

Aspirin or anticoagulation is indicated in sub-massive infarcts. A haemorrhage or a very large infarct is a contraindication to aspirin and anticoagulation. In this man a large cortical infarct or haemorrhage is unlikely as he is fully alert. The most likely lesion is the internal capsule. However, a CT scan must be performed to make sure of this before aspirin or anticoagulation is given. Blood pressure reduction is only necessary if the blood pressure is over 220/120mmHg, and even in this case, should be reduced gradually. Sudden reduction in blood pressure, especially with the use of sublingual nifedipine increases the risk of stroke, and should not be given. If the patient has been on antihypertensives they should be continued.

13) TFFTF

After a stroke, the area of brain which is infarcted is no longer viable. Surrounding the area of ischaemia is a area of brain which is ischaemic but still viable, the ischaemic penumbra. Protection of this ischaemic penumbra is of vital importance to prevent further neurological damage. The factors which can harm this area include hyperthermia, hypo or hyperglycaemia, hypoxia, and electrolyte imbalance. Oxygen is often given to improve hypoxia. Normoglycaemia should be maintained. After a stroke, there is a compensatory increase in blood pressure. Hypertension must be treated only the blood pressure is above 220/130mmHg. Antipyretics and tepid sponging are used to prevent hyperpyrexia. The criteria for thrombolysis are very stringent, and in most large strokes thrombolysis is probably contraindicated.

14) FFTFT

Assessing the gag reflex is unreliable in determining whether the swallowing mechanism is intact. The preferred method is to get the patient to swallow a few teaspoonfuls of water, followed by half a glass of water. If he does not gag or cough he can be allowed to take orally. If he has any difficulty in swallowing, an NG tube should be kept in place for 2 weeks, by which time the swallowing mechanism generally recovers. Clinical signs and symptoms are unreliable in distinguishing between ischaemic and haemorrhagic stroke. In most instances surgery is not urgently required for supratentorial haemorrhage. However cerebellar haemorrhage is an urgent indication for evacuation as it can result in compression of the brain stem and also obstructive hydrocephalus. There is clear evidence that the outcome of stroke patients is better if they are treated in a multidisciplinary stroke unit.

15) FTFTF

The role of CT scanning of the brain after a stroke must be clearly understood if one is to obtain useful information from it. In a non contrast CT scan, a haemorrhage will be visible as a hyperdense or white area, and an infarct as a hypodense or dark area. A haemorrhage is visible soon after its occurrence, but an infarct is visible only after about 24 hours. The main place of CT scan brain is to detect a haemorrhage; this is because the presence of a haemorrhage will be a contraindication for aspirin, and also because it might need neurosurgical intervention. It is difficult to differentiate a haemorrhage from an infarct in a contrast CT scan, as the infarct may enhance with contrast and appear like a haemorrhage. CT scans use X rays, which poorly penetrate bone. It is not sensitive for posterior cranial fossa infarcts because of the high bone density.

16) TFFFT

Aspirin has been shown to be beneficial in the secondary prevention of stroke, and is indicated in all patients with ischaemic stroke. There is new evidence the Clopidogrel may be more effective in secondary prevention of stroke. It is not clear whether the combination of clopidogrel and aspirin gives additive benefit. There is no place for low molecular weight heparin in the routine management of ischaemic stroke, except in the presence of atrial fibrillation. Warfarin is indicated in patients with atrial fibrillation who have developed a stroke (and in fact in the primary prevention of stroke in patients with atrial fibrillation. However, if the infarct is large, there is an increased

risk of secondary bleeding into the infarct; warfarin is contraindicated in this instance.

17) FTTTF

A CT scan is routinely done to determine whether the stroke is ischaemic or haemorrhagic. An MRI is indicated only in selected instances, for example where the lesion does not correspond to the neurological deficit, or where an alternative diagnosis is suspected. An ECG is essential, to determine any rhythm disturbances, in particular atrial fibrillation, and also to look for coexistent ischaemic heart disease. Polycythaemia is a known cause of thrombotic stroke. Elevated serum homocysteine levels is an independent risk factor for stroke. There is no indication for lumbar puncture unless an SAH is suspected.

18) TFFFT

The risk of stroke is greatly increased in a patient with atrial fibrillation, especially in a patient who has already had a stroke. Anticoagulation to maintain the INR between 2 and 3 is necessary in the absence of contraindications. It is not clearly known whether combining aspirin and warfarin is of any additive benefit. Attempts to convert chronic atrial fibrillation to sinus rhythm are very likely to be unsuccessful; conversion to sinus rhythm is also risky, as it may result in an atrial thrombus getting dislodged causing embolisation. Warfarin increases the risk of cerebral haemorrhage, and regular estimating of the prothrombin time INR is essential. Where there is a chance that patient compliance is poor, clinicians often prefer not to use it, as the risks may outweigh the potential benefit.

19) TFFFT

About 25 percent of patients with stroke die within 2 years. Up to 30 percent die within the first month, often due to immediate complications such as aspiration. In the rest, myocardial infarction is probably the commonest cause of death. Of the survivors, one third will return to independent mobility, and about another one third will have severe residual debility. The mortality is much higher among patients with haemorrhagic stroke.

20) TTTTF

Drowsiness or coma, conjugate gaze palsy, severe hemiplegia are all poor prognostic factors. Swallowing difficulty increases the risk of aspiration and

increases mortality. Patients with aphasia find rehabilitation more difficult. Hypertension occurs as a compensatory mechanism to maintain cerebral perfusion after a stroke, and is not by itself associated with poor outcome.

21) TFTTT

Around 10 percent of strokes are due to intracerebral haemorrhage. Most commonly, it is caused by rupture of microaneurysms in small deep penetrating arteries. The basal ganglia, pons, cerebellum and subcortical white matter are the usual sites. Cerebral amyloid angiopathy is characterized by the deposition of amyloid in small to medium-sized blood vessels of the brain., the amyloid deposits cause breakdown of the blood vessel wall with resultant hemorrhage. It is commoner in the elderly, and has no particular association with hypertension. Overall, hypertension is the most important risk factor in cerebral haemorrhage.

22) TFFTF

Dysarthria is often associated with lesions of the brain stem. A right occipital cortex lesion will produce a left homonymous hemianopia. Broca's area, or the motor speech area, is in the frontal cortex. Hemisensory loss can be caused by a lesion in the parietal cortex. The exact aetiology of transient global amnesia is not known, but it is thought to be due to posterior circulation ischaemia.

23) TTTT

Often surgery is not performed in small haemorrhages, but a large bleed causing midline shift is an indication for surgical evacuation. Cerebellar haemorrhage is a definite indication for surgery; the mass effect of a bleed in the posterior cranial fossa can cause brain stem compression and coning, and is a neurosurgical emergency. The prognosis is poor with haemorrhagic stroke, with the risk of dying being about twice that of ischaemic stroke. Intracranial arteriovenous malformations are a possible cause, and should always be looked for as they are potentially treatable with surgery.

24) FTTTT

SAH accounts for 5-10% of strokes. Most SAHs are due to rupture of a saccular aneurysm in the circle of Willis. Trauma to the head results in subdural or extradural haemorrhage. Polycystic kidney disease is associated with berry aneurysms, and therefore SAH is commoner in such patients,

especially as they are usually hypertensive as well. Rupture of an aneurysm releases blood directly into the cerebrospinal fluid under arterial pressure. The blood spreads quickly within the CSF, rapidly increasing intracranial pressure. The bleeding usually lasts only a few seconds, but rebleeding is common and occurs more often within the first day. Sudden severe headache is characteristic, occurring at night in 30 percent of cases. Neck stiffness is a feature. 30 to 50 percent of patients have a minor hemorrhage or "leak," manifested only by a sudden and severe headache (the sentinel headache) that precedes a major SAH by 6 to 20 days. The complaint of the sudden onset of severe headache is sufficiently characteristic that a minor SAH should always be considered.

25) TTTT

Control of the blood pressure to below 140mmHg systolic is helpful in reducing bleeding. Nimodipine, a calcium channel antagonist, reduces secondary cerebral vasospasm and improves outcome if started early. Laxatives are prescribed to prevent the patient from straining. Rebleeding is likely within 14 days, and a four vessel angiogram must be performed to identify the aneurysm. Surgical clipping is indicated.

DIABETES MELLITUS

- 1) Diabetes mellitus
 - a. Affects more than 120 million people worldwide
 - b. The incidence is rising worldwide
 - c. Is curable if detected in the early stages
 - d. Reduces life expectancy even with optimal treatment
 - e. The incidence in Asia is lower than that in Europe

- 2) Regarding the pathogenesis of diabetes
 - a. Low birth weight is a risk factor for developing diabetes later in life
 - b. Obesity increases the risk of developing diabetes
 - c. Low intake of fruits and vegetables increases the chance of getting diabetes
 - d. Physical activity protects against the development of diabetes
 - e. Taking a lot of sugar containing foods in predisposes to diabetes

- 3) Regarding the types of diabetes mellitus
 - a. Type I diabetes is due to insulin deficiency
 - b. Type II diabetes is due to insulin resistance
 - c. Chronic pancreatitis results in type I diabetes
 - d. Gestational diabetes is a form of type II diabetes
 - e. Type I diabetes does not occur in those over the age of 30 years

- 4) Regarding type I diabetes mellitus
 - a. It is often immune mediated
 - b. It is commonest in Asia
 - c. The risk of developing type I diabetes is greater with a diabetic father than a diabetic mother
 - d. It is associated with other autoimmune disorders
 - e. Patients are usually obese

- 5) Regarding type II diabetes mellitus
 - a. It runs in families
 - b. It is commoner among more affluent people
 - c. Patients are usually obese
 - d. It can occur in children
 - e. C-peptide disappears from the blood

Diabetes mellitus

- 6) The following skin lesions are common in diabetics
 - a. Cellulitis of the leg
 - b. Non healing ulcers of the foot
 - c. Balanitis
 - d. Vulvovaginitis
 - e. Eczema

- 7) The following presentations should make one suspect the possibility of the patient having diabetes
 - a. Balanitis
 - b. Unexplained weight loss
 - c. Cellulitis of the leg
 - d. Getting up frequently at night to pass urine
 - e. Tinea infection in the skin

- 8) Regarding the diagnosis of diabetes
 - a. The normal fasting plasma glucose is <110 mg/dL (6.1 mmol/L)
 - b. Diabetes is diagnosed when the FPG is above 126 mg/dL (7.0 mmol/L)
 - c. random blood glucose above 200 mg/dL (11.1 mmol/L) is diagnostic of diabetes
 - d. The oral glucose tolerance test is performed in borderline patients
 - e. Impaired glucose tolerance is a risk factor for cardiovascular complications

- 9) A 40 year old man is found to be diabetic. He is obese, smokes 10 cigarettes a day, and takes a lot of fatty foods in his diet. He is otherwise healthy
 - a. He should be started on drug treatment right away
 - b. Weight reduction will reduce his risk of getting a heart attack
 - c. He should reduce the fats in his diet
 - d. He should not eat fruits
 - e. He should be referred to a dietician

Diabetes mellitus

- 10) The following measures are effective in reducing the risk of complications in a diabetic patient
 - a. A high protein diet
 - b. Low salt diet
 - c. Regular meals
 - d. Control of blood pressure
 - e. Low dose aspirin

- 11) Patients with type I diabetes
 - a. Can be tried on oral hypoglycaemics first
 - b. Should be started on Insulin to prevent ketosis
 - c. must be advised to stop insulin if he skips a meal
 - d. Should be taught to monitor for ketoacidosis
 - e. Should be advised to drink plenty of water

- 12) Regarding the use of insulin in type I diabetics
 - a. The dose should be skipped if the patient is skipping a meal
 - b. Insulin should be stored in the freezer
 - c. Patients who do not have a refrigerator could store it suspended inside a narrow mouth clay pot with a little water at the bottom
 - d. Insulin can be combined with metformin
 - e. Should be given to the same skin site every day

- 13) Regarding insulin injections
 - a. Soluble insulin should be administered together with the meals
 - b. Insulin should be stored in the door of the refrigerator
 - c. Long acting insulin should never be given intravenously
 - d. The needle should be inserted at an angle of 45 degrees to the skin
 - e. The needle can be used only once

- 14) In the treatment of type II diabetes
 - a. Weight reduction alone will be adequate in a proportion of patients
 - b. Insulin is the ideal treatment
 - c. Metformin is recommended in thin patients
 - d. Glibenclamide can cause weight gain
 - e. Pioglitazone improves the action of insulin on the tissues

Diabetes mellitus

- 15) Biguanides have the following advantages over sulphonylureas
 - a. They cause loss of weight and are useful in obese patients
 - b. They can be used safely in renal impairment
 - c. Are less likely to cause hypoglycaemia
 - d. They have lipid lowering activity
 - e. They are less likely to cause lactic acidosis

- 16) Sulphonylureas have the following advantages over biguanides
 - a. They can be used safely in patients with liver cirrhosis
 - b. Are less likely to cause hypoglycaemia
 - c. They are effective in patients with type I diabetes
 - d. They cause weight loss
 - e. They can be used in pregnancy

- 17) Regarding newer oral hypoglycaemic drugs
 - a. The glitazones should be avoided in heart failure
 - b. Acarbose enhances insulin action in the tissues
 - c. Repaglinide increases insulin secretion
 - d. Glitazones can be combined with sulphonylureas
 - e. Glitazones reduce blood triglyceride levels

- 18) Regarding diabetic nephropathy
 - a. It manifests within 5 years of diagnosis
 - b. Is commoner in young diabetics
 - c. Microalbuminuria is the earliest manifestation
 - d. It is unlikely in a patient with no diabetic retinopathy
 - e. It results in renal failure

- 19) Regarding diabetic nephropathy
 - a. The kidneys are usually small in diabetic nephropathy
 - a. ACE inhibitors prevent the progression of nephropathy
 - b. Dietary measures are useful in prevention
 - c. The blood pressure must be controlled to 140/90mmHg
 - d. A rising plasma creatinine is the first sign of diabetic nephropathy

Diabetes mellitus

- 20) Regarding screening for complications in a diabetic patient
- A patient with type I diabetes must be sent for retinopathy screening at the time of first diagnosis
 - Urine for microalbuminuria is useful for detecting early nephropathy
 - The serum lipids should be measured
 - An exercise ECG is recommended in all patients above the age of 40 years
 - Retinopathy screening should be performed annually in type II diabetes
- 21) the following are indications for urgent (within one week) referral to an ophthalmologist in a patient with diabetic retinopathy
- pre-proliferative
 - reduced visual acuity suggestive of macular oedema
 - hard exudates within one disc diameter of the fovea
 - New vessel formation
 - rubeosis iridis
- 22) The following are useful in preventing diabetic retinopathy
- tight control of blood glucose
 - control of blood pressure to less than 130/80
 - low salt diet
 - vitamins
 - lipid lowering therapy
- 23) Tight glycaemic control
- Reduces the risk of developing diabetic nephropathy
 - Reduces the risk of myocardial infarction
 - Reduces the risk of peripheral vascular disease
 - Is beneficial in patients soon after acute myocardial infarction
 - Reduces the risk of impotence
- 24) Regarding diabetic ketoacidosis
- is commoner in type II diabetics
 - urine ketones are always positive
 - the patient is usually very dehydrated
 - Urgent referral to a hospital is indicated
 - The patient will require lifetime insulin in future

Diabetes mellitus

- 25) Diabetic neuropathies which have a good prognosis and may resolve completely include
- a. autonomic neuropathy
 - b. Diabetic amyotrophy
 - c. mononeuritis involving cranial nerves
 - d. entrapment neuropathies
 - e. mixed sensory motor neuropathy

Answer to Diabetes Mellitus questions

1) TTFTT

Diabetes mellitus is a global disease, affecting more than 120 million people worldwide. In Europe and North America the incidence is relatively high. The incidence in Africa is generally intermediate, and that in Asia is low. Worldwide the incidence of diabetes is rising, and the rate of rise is greatest in Asia, probably due to changing lifestyles. Although diabetes can be controlled, a cure is not possible. Good control and optimal treatment of other risk factors prevents many complications, but even in such patients life expectancy is reduced.

2) TTTTF

Low birthweight increases the risk of developing diabetes in later life. This has led to controversy with regard to the thrifty genotype hypothesis. In this 'thrifty phenotype' hypothesis, the risk of diabetes and other adult disorders is programmed by fetal nutrition and the pattern of early growth. Type II diabetes, the predominant form of diabetes, is due to a combination of insulin resistance and relative insulin insufficiency. The main risk factors for type 2 diabetes are age, obesity, family history, physical inactivity and dietary factors such as a high proportion of energy consumed as saturated fat and low intake of fruit and vegetables. Taking sugar containing foods predisposes to obesity; however a direct link between eating sweets and the development of diabetes is not clear.

3) TTFFT

Type I diabetes is due to an absolute deficiency of insulin secretion. Patients are more often thin, and are predisposed to ketosis. Type II diabetics have a combination of peripheral insulin resistance and relative insulin lack. Such patients are often obese, and are not predisposed to ketosis. Type I diabetes usually occurs in young patients, but is known to occur in older patients as well. Chronic pancreatitis and other causes of diabetes which are secondary to pancreatic damage are not classified as type I or type II. Gestational diabetes, i.e., diabetes occurring during pregnancy alone is also classified as a separate group, sometimes called type IV. However both type I and type II diabetes can manifest for the first time in pregnancy.

4) TFTTF

Type I diabetes is due to autoimmune destruction of pancreatic beta cells. It is occasionally associated with other autoimmune disorders and endocrinopathies. GAD antibodies are the most frequently identified antibodies in type I diabetes. The incidence is highest in Europe, intermediate in Africa, and generally low in Asia. The risk of developing type I diabetes is greater if the father is diabetic. Genetic susceptibility is important but is not the sole determinant towards the development of the disease. The exact aetiological factors are not clearly known. Patients are usually thin, and are prone to ketosis if they fast or miss insulin. They are treated with insulin.

5) TTTTF

Type II diabetes is an example of a disease with polygenic inheritance. It runs in families, but is influenced by a variety of environmental and other factors. It is commoner among more affluent people, probably due to higher carbohydrate content in the diet. Patients are usually obese, although they may markedly lose weight when they develop diabetes. Although most common over the age of 30 years, it can occur in children; this is known as maturity onset diabetes in the young, or MODY. It is primarily due to insulin resistance in the peripheral tissues with relative insulin deficiency. C peptide usually remains detectable in blood, in contrast with type I diabetes in which C peptide disappears from the blood. The presence of C peptide indicates active insulin production.

6) TTTTF

Diabetes increases the risk of skin infections. The leg is particularly affected, due to a combination of neuropathy (which predisposes to injury), macrovascular changes leading to peripheral vascular disease and microvascular disease, both of these resulting in poor circulation, and the presence of a high glucose content in the interstitial space. Ulcers of the foot can be very hard to treat, and can lead to amputation. Gangrene is also a common complication. Cellulitis of a limb is also a common presentation. Balanitis and vulvovaginitis are common presentations in diabetics, and are due to candidal infection. There is no increase in the incidence of eczema in diabetics.

7) TTTTT

Diabetics are more prone to fungal infections. Balanitis and vulvovaginitis are common presentations in the uncontrolled diabetic. A blood sugar should be

checked in all such patients, while keeping in mind that sexually transmitted diseases can be a cause. Cellulitis of a limb is more likely to develop in a diabetic. Frequency of urination is a common presentation; it is important to find out whether the quantity of urine is high; frequent passage of small amounts of urine can be due to urinary tract infection (which is also more likely in a diabetic). In an elderly patient the possibility of prostatism should be considered.

8) TTTTT

The classification of diabetes according to the American Diabetic Association and the WHO are as follows;

- Normal – Fasting plasma glucose (FPG) <110 mg/dL (6.1 mmol/L).
- Impaired fasting glucose (IFG) – Fasting plasma glucose between 110 and 125 mg/dL (6.1 to 6.9 mmol/L). This is broadly equivalent to the category of IGT, which was based upon both fasting and two-hour values in the OGTT.
- Diabetes mellitus – FPG at or above 126 mg/dL (7.0 mmol/L) or a random (or two-hour value in an OGTT) at or above 200 mg/dL (11.1 mmol/L).

The place of the oral glucose tolerance test is controversial, but it is still performed in patients with borderline values. Impaired fasting glucose is associated with increased cardiovascular risk; such patients should be on lifestyle modification, and monitored closely for the development of diabetes.

9) FTTFT

Diet control and lifestyle modification should be tried out first in this obese man who smokes and takes an unhealthy diet. Weight reduction is an important factor which will reduce his cardiovascular risk. Reduction of carbohydrates and fats in his diet will be beneficial in controlling the diabetes and reducing weight. He does not need to avoid fruits. Referral to a dietician is often useful in helping patients control their diet. Most importantly he must stop smoking.

10) FTTTT

A high protein diet may increase the risk of proteinuria and renal damage; a normal protein diet is usually recommended in patients without renal disease. Reduction of dietary salt is useful in reducing blood pressure and cardiovascular risk. Regular meals may prevent fluctuations in blood glucose levels, making timing of medication and compliance difficult. Blood pressure control is one of the most important measures to reduce complications and

Diabetes mellitus-Answers

cardiovascular risk; the target blood pressure is 130/80mmHg or lower. Low dose aspirin reduces cardiovascular risk in most patients with risk factors.

11) FTFTT

Patients with type I diabetics always need insulin; the absolute lack of insulin predisposes them to ketosis and life threatening ketoacidosis. Treatment with insulin prevents ketosis. They should never stop insulin, even if they feel nauseated or skip a meal. Patients should be educated about the risks of developing ketoacidosis and the importance of recognizing warning signs of ketosis. They should drink plenty of water to prevent dehydration.

12) FFTTF

The dose of insulin should not be skipped even if the patient skips a meal. If the patient is nauseated or has vomiting or abdominal pain, he should see a doctor as these may be signs of ketoacidosis. Insulin is stored in the door of the refrigerator, i.e., about 4 degrees Celsius. If stored in the freezer it loses potency and must be discarded. An alternative method of storage for patients who do not have a refrigerator is to suspend the insulin vial in a narrow mouthed claw pot with some water at the bottom. The porous wall of the pot causes slow evaporation of water and cools the inside. The site of insulin injection should be rotated with each injection.

13) FTTF

Soluble insulin should be administered approximately half an hour before the meal. Insulin is stored in the door of the refrigerator, at about 4 degrees Celsius. Freezing inactivated it, and if stored in the freezer it must be discarded. Long acting insulins are a suspension and must never be injected intravenously. The usually technique of injection is to pinch up a fold of skin and insert the short insulin needle vertically. The needle should ideally be used only once, but in most instances this is impractical due to cost issues. Reuse of the needle (for the same patient) a few times is not associated with any increase in skin infection.

14) TFFTT

Type II diabetes is due to insulin resistance and relative insulin lack. Insulin levels are initially normal or high. Weight reduction alone is adequate to control the blood sugar in a sizable proportion of people. Insulin is not required in the early stages, although as the disease advances it may be required to achieve control. With time some degree of beta cell exhaustions

Diabetes mellitus-Answers

causes the body's insulin secretion to fall, and at this stage insulin is required. Metformin causes weight loss, and is useful in obese patients. It is not ideal in thin patients as they may lose more weight. Sulphonylureas cause weight gain and should be avoided in obese patients. Pioglitazone enhances the action of insulin on the tissues. It can be used in combination with insulin, although there are concerns that concurrent use with insulin may result in or worsen heart failure. This is probably due to the fluid retention effects of the glitazones. Glitazones may be combined with sulphonylureas or metformin safely.

15) TFTFF

Biguanides cause weight loss, and are ideal in obese patients. Sulphonylureas on the other hand cause weight gain, which in turn can worsen insulin resistance. Lactic acidosis is an important side effect of biguanides, and while in a normal patient the risk with metformin is low, the risk of lactic acidosis is much higher with renal or hepatic impairment. Glitazones and metformin have lipid lowering activity. Biguanides are much less likely to cause hypoglycaemia than sulphonylureas.

16) FFFFF

Sulphonylureas are excreted by the liver, and are best avoided in liver disease. They are well known to cause hypoglycaemia, which can persist even for several days after stopping treatment. Oral hypoglycaemics are not indicated in type I diabetics, who should be treated with insulin. Sulphonylureas cause weight gain. While there are some reports that sulphonylureas may be safe in pregnancy, pregnant diabetics should be managed on insulin.

17) TFTTF

Glitazones cause fluid retention and should be avoided in heart failure. The effect of causing heart failure is said to be worse if glitazones are given in combination with insulin or sulphonylureas; however pioglitazone is licensed for use in combination with sulphonylureas and insulin, and of course with metformin. Glitazones reduce LDL levels and increase HDL levels. Metformin reduces blood triglyceride levels. Acarbose acts largely by limiting carbohydrate absorption from the gut. Repaglinide enhances insulin secretion.

18) FTTTT

Diabetic nephropathy is the most important cause of renal failure and death in a young diabetic patient. It usually occurs 10 – 15 years after the development of diabetes. Passage of small amounts of albumin not detected on the routine urine full report or dipsticks is known as microalbuminuria, and is the earliest indication of the development diabetic nephropathy. Diabetic nephropathy is almost always associated with retinopathy. A diabetic patient with evidence of nephropathy an apparently normal optic fundal examination should have a fluorescein fundal angiogram to detect retinopathy. If this is normal, an alternate cause for the nephropathy must be sought.

19) FTTFT

The osmotic load on the kidney in a diabetic results in glomerular hypertrophy and enlarged kidneys. When renal failure develops the kidneys shrink; therefore normal size kidneys in a diabetic patient are compatible with chronic renal failure. ACE inhibitors reduce proteinuria and retard the progression of nephropathy by mechanisms independent of simple blood pressure lowering. Reduction of proteins and salt in the diet is useful in preventing nephropathy. The target blood pressure is 130/80mmHg in a diabetic with nephropathy.

20) FTTFT

Patients with type I diabetes do not have retinopathy at the time of diagnosis – it usually develops after 10-15 years. Patients with type II diabetes can have retinopathy at first presentation, and screening is recommended. They also need to have repeat screening every year. Urine for microalbuminuria is the most useful test for early detection of nephropathy and should be performed in all type II diabetics. Lipid abnormalities are common in diabetics, especially elevated triglycerides. An exercise ECG is not indicated unless the patient is symptomatic.

21) FFFTT

The indications for referral to an ophthalmologist for possible laser treatment are as follows;

- Urgent (within 1 week) : Neovascularization (new vessel formation) at the disk or elsewhere rubeosis iridis, vitreous haemorrhage, retinal detachment

Diabetes mellitus-Answers

- Early (2–4 weeks): pre-proliferative retinopathy, reduced visual acuity suggestive of macular oedema, haemorrhages and/or hard exudates within one disc diameter of the fovea.

22) TTTFF

The risk factors for diabetic retinopathy are many. The duration of diabetes is the most important – it usually occurs 10-15 years after the onset of diabetes. Tight glycaemic control reduces the risk of retinopathy, although it can cause transient worsening. A small group of diabetic patients develop neovascularization during pregnancy. However women who develop gestational diabetes are not at risk of retinopathy. Hypertension is associated with worsening of retinopathy and, particularly, development of new vessels. Control of high blood pressure protects against progression of retinopathy. Hyperlipidaemia is a risk factor for severe exudative maculopathy. Patients with end stage renal disease often develop worsening of both maculopathy and proliferative retinopathy. Cataract surgery can predispose to maculopathy. On the other hand after cataract surgery the fundus is easier to visualize, and screening becomes easier.

23) TTFTT

Tight glycaemic control reduces the risk of microvascular complication such as nephropathy, retinopathy and neuropathy. Impotence is caused by neuropathy and occasionally macrovascular disease. The effects on macrovascular disease are less prominent. Overall the risk of myocardial infarction is probably reduced, but probably not peripheral vascular disease. After an MI, tight glycaemic control has been shown to reduce mortality.

24) FFTTT

Diabetic ketoacidosis is common in type I diabetics, and is due to absolute insulin lack. Urine ketones are not always positive, but blood ketones usually are positive. The massive diuresis results in severe dehydration. The patient must be managed in hospital, and has to be kept on insulin lifelong to prevent ketosis.

25) FTTTF

Autonomic neuropathy and peripheral neuropathy rarely resolve completely. Diabetic amyotrophy has a relatively good control and may resolve with good diabetic control. Most patients with mononeuritis recover. Entrapment neuropathies are potentially treatable if the entrapment is released.

the 1990s, the number of people in the world who are undernourished has increased from 600 million to 800 million.

There are a number of reasons for this. One is that the population of the world has increased from 5 billion to 6 billion. Another is that the number of people who are undernourished has increased in every country in the world. This is particularly true in the developing countries, where the number of undernourished people has increased from 500 million to 800 million. This is a very serious problem, and it is one that we must address if we are to have a better world for all.

There are a number of ways in which we can address this problem. One is to increase the production of food. This can be done by increasing the amount of land that is used for agriculture, by increasing the amount of water that is used for irrigation, and by increasing the amount of fertilizer that is used. Another way is to improve the distribution of food. This can be done by increasing the amount of food that is stored in grain reserves, by increasing the amount of food that is transported to the most needy areas, and by increasing the amount of food that is distributed to the most needy people.

There are also a number of ways in which we can improve the nutrition of the world's population. One is to increase the amount of food that is consumed. This can be done by increasing the amount of food that is eaten at each meal, by increasing the number of meals that are eaten each day, and by increasing the amount of food that is eaten at each meal. Another way is to improve the quality of the food that is consumed. This can be done by increasing the amount of food that is rich in vitamins and minerals, by increasing the amount of food that is rich in protein, and by increasing the amount of food that is rich in fiber.

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