**Question 1**

Which of the following antithrombotic properties of the endothelium is false?

A Endothelial cell production of t-PA cleaves fibrinogen to fibrin

B Endothelial cell production of nitric oxide inhibits platelet adhesion

C Endothelial cell production of ADPase inhibits platelet aggegation

D Endothelial cell production of thrombomodulim coverts thrombin into an anticoagulant

Explanation A

Normally, the endothelial cells actively prevent thrombosis by producing factors that block platelet adhesion and aggregation, inhibit coagulation and lyse clots.

**Antiplatelet effects:** Intact endothelium prevents platelets and clotting factors from adhering to the thrombogenic extracellular matrix (ECM). PGI2 (prostacyclin) and nitric oxide produced by the endothelial cells inhibit adhesion. Both of these mediators are vasodilators and inhibit platelet aggregation. Endothelial cells release ADPase that degrades ADP further inhibiting platelet aggregation.

**Anticoagulant effects**: mediated by heparin like molecules, thrombomodulin and tissue factor pathway inhibitor. Thrombomodulin binds to thrombin and converts it form a procoagulant to an anticoagulant via its ability to activate protein C. Protein C inhibits factors Va and VIIIa. Endothelium also produces co-factors for protein C and tissue factor pathway inhibitor (TFPI), which inhibits factors VIIa and Xa

**Fibrinolytic effects:** endothelial cells synthesise tissue plasmin activator (t-PA) that cleaves plasminogen to plasmin which inturns cleaves fibrin to degrade thrombi

**Question 2**

In relation to atherosclerosis, which of the following statements is correct?

A Plaques have 2 principle components, cells and lipids

B Risk is reduced by homocystinuria

C Predominantly affects large and medium elastic arteries

D Is characterised by thickening of the tunica media of arteries

Explanation C

Atherosclerosis literally means hardening of the arteries. The dominant pattern is characterised by the formation of intimal fibrous plaques that often have a central granulomatous core, rich in lipid. It is characterized by thickening of Tunica Intima. Atherosclerotic plaques have three components:

1-cells including smooth muscle cells, macrophages and other leucocytes.

2-connective tissue extracellular matrix- including collagen, elastic fibres and proteoglycans.

3-intracellular and extracellular deposits.

Update: hyperhomocystinaemia. Serum homocysteine levels correlate with coronary atherosclerosis. Homocystinuria due to inborn errors of metabolism results in elevated homocysteine levels and is associated with premature vascular disease. Although low folate and vit B12 levels can increase homocysteine, supplemental ingestion of these vitamins does not effect the incidence of cardiovascular disease

**Question 3**

Which of the following combinations represents the major risk factors for atherosclerosis?

A Increased lipids, cigarette smoking, hypertension, diabetes mellitus

B Hypertension, obesity, male, family history

C Hypertension, male, age, family history

D Hypertension, sedentary lifestyle, obesity, family history

Explanation A

The major risk factors are lipids, smoking, hypertension and diabetes, no matter what age group. Male gender is a risk factor, but only if all other risks are equal. As women age and stop having their menses, their “age risk” equals that of men. Family history is important- but the family risk factor becomes less relevant with age.

**Question 4**

Which of the following statements is correct in relation to atherosclerosis?

A Lesions in the thoracic aorta are more common than in the abdominal aorta

B There are 2 components: cells and connective tissue matrix

C The severity of a lone lesion does not predict severity elsewhere

D Coronary arteries have the worst lesions

Explanation C

The abdominal aorta is the most heavily involved vessel followed by the coronary arteries, popliteal artery, descending thoracic aorta, the internal carotid artery and the branches of the circle of Willis

Atherosclerotic plaques have three components:

1-cells including smooth muscle cells, macrophages and other leucocytes

2-connective tissue extracellular matrix including collagen, elastic fibres and proteoglycans

3-intracellular and extracellular deposits

**Question 5**

The major risk factors for atherosclerosis are contained in which of the following options?

A Hypertension, male sex, smoking and hypercholesterolaemia

B Hypertension, obesity, male and family history

C Hypertension, hypercholersterolaemia, smoking and sedentary lifestyle

D Hypertension, diabetes, smoking and hyperchoesterolaemia

Explanation D

The major risk factors are lipids, smoking, hypertension and diabetes, no matter what age group. Male gender is a risk factor, but only if all other risks are equal. As women age and stop having their menses, their “age risk” equals that of men. Family history is important- but the family risk factor becomes less relevant with age.

Extra:

I have left this question as is, but understand that it is confusing. The current text book divides the risk factors (RF) into non-modifiable and modifiable.

Non modifiable= genetic abnormalities, family history, increasing age and male gender

Modifiable= hyperlipidaemia, hypertension, cigarette smoking, DM and inflammation

Genetic is the most independent RF for atherosclerosis- but this applies to only a small percentage of cases. A family history of atherosclerosis outside of true genetic issues (FH hypercholesterolaemia, both homo and heterozygous), are often related to a familial clustering of other established risk factors e.g. hypertension or DM or to other inherited variants that influence other pathophysiologic processes, such as inflammation.

I suspect that if you modify your lifestyle, and keep healthy, your family history (outside of true genetic abnormalities) will be less of a risk factor. Also, if you are elderly and haven’t developed IHD or the like, then you FH of atherosclerosis will again be less of a factor.

**Question 6**

In atherosclerosis, the cells at the centre of the plaque are?

A Leukocytes

B Smooth muscle cells

C Macrophages

D Foam cells

Explanation D

The atherosclerotic plaque consists of a superficial fibrous cap which is comprised of smooth muscle cells with a few leukocytes and relatively dense connective tissue. There is a cellular area beneath and to the side of the cap consisting of macrophages, smooth muscle cells and T lymphocytes, along with a deeper necrotic core in which there is a disorganised mass of lipid material, cholesterol clefts, cellular debris and lipid laden foam cells. Fibrin and thrombin are also contained in this area.

**Question 7**

All of the following are major risk factors for atherosclerosis, with the exception of?

A Hypertension

B Diabetes

C Obesity

D Smoking

Explanation C

The major risk factors are lipids, smoking, hypertension and diabetes, no matter what age group. Male gender is a risk factor, but only if all other risks are equal. As women age and stop having their menses, their “age risk” equals that of men. Family history is important- but the family risk factor becomes less relevant with age.

Obesity per se is not a major risk factor.

**Question 8**

Which of the following statements regarding malignant hypertension is correct?

A Affects 1 to 5% of chronic hypertension sufferers

B Occurs mainly in the older population

C 75% recover with no loss of renal function

D Is associated with low levels of renin

Explanation A

Malignant hypertension affects 1-5% of chronic hypertension sufferers. Risk factors include: younger individuals, men, black and those with a diastole of >130mmHg. It is associated with abnormally high levels of renin. 75% will survive 5 years and 50% will survive with a pre-crisis renal function

**Question 9**

Regarding a hypertensive crisis which of the following options is correct?

A There are 2 morphological features: fibrinoid necrosis of arterioles and hypoplastic arteriolitis

B Occurs more commomly in the older age group

C 75% will recover if treated promptly

D More common in the african population

Explanation D

Malignant hypertension affects 1-5% of chronic hypertension sufferers. Risk factors include younger individuals, men, African descent and those with a diastole of >130mmHg. It is associated with abnormally high levels of renin. 75% will survive 5 years and 50% will survive with pre-crisis renal function. Hypertension is associated with 2 forms of small blood vessel diasease: hyaline arteriolosclerosis and hyperplastic arteriolosclerosis

**Question 10**

Which of the following statements is correct regarding atherosclerotic plaques?

A Coronary arteries are the most often affected

B Thoracic aorta is more frequently affected than the abdominal aorta

C They contain a mixture of cells and connective tissue matrix

D Rarely causes micro emboli

Explanation C

The abdominal aorta is the most heavily involved vessel, followed by the coronary arteries, popliteal, descending thoracic, the internal carotid and the branches of the circle of Willis.

Atherosclerotic plaques have three components:

1-cells including smooth muscle cells, macrophages and other leucocytes.

2-connective tissue extracellular matrix including collagen, elastic fibres and proteoglycans.

3-intracellular and extracellular deposits