Vascular Pathology I

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Goals and Objectives

• Identify and differentiate the various forms of atherosclerosis
• Understand the inter-relationships of vascular injury, clotting, inflammation and repair
Normal Anatomy

- Serosa
- Muscularis
- Intima
Normal Muscular Artery
Normal Vein
Risk Factors for Atherosclerosis

- Diabetes
- Dyslipidemia
  - High LDL
  - High homocysteine
  - Low HDL
  - High Triglycerides
- Male
- Tobacco Smoking
- Hypertension
- Obesity
**Sequences in Progression of Atherosclerosis**

**Initial lesion**
- Histologically “normal”
- Macrophage infiltration
- Isolated foam cells

**Fatty streak**
- Mainly intracellular lipid accumulation

**Intermediate lesion**
- Intracellular lipid accumulation
- Small extracellular lipid pools

**Atheroma**
- Intracellular lipid accumulation
- Core of extracellular lipid

**Fibroatheroma**
- Single or multiple lipid cores
- Fibrotic/calcific layers

**Complicated lesion**
- Surface defect
- Hematoma—hemorrhage
- Thrombosis

**Endothelial Dysfunction**

**Nameclature and Main Histology**

**Earliest Onset**
- From first decade

**Main Growth Mechanism**
- Growth mainly by lipid addition

**Clinical Collateral**
- Clinically silent
- Increased smooth muscle and collagen increase
- Clinically silent or overt
- Thrombosis and/or hematoma
Aorta Microscopic

- Tunica intima
- Elastic fibers
- Smooth muscle
- Erythrocytes
- Tunica media
- Tunica adventitia

Scale: 0.2 mm
Atherosclerosis

- Lipid deposition in media
- Disruption of elastic fibres
- Weakening of vessels
- Calcification
  - Hardening of the arteries
Fatty Streak
Multi-Factoral

- Fatty streaks seen in Korean War KIAs
- Genetics
- Diet
Coronary Atherosclerosis-Mild
Sequential Sections
Coronary Atherosclerosis

- Focal disease
  - Dissect every 5 mm
- Areas of turbulent flow
- Damage to endothelium
Endothelial Damage
Occlusive Disease
Angina Pectoris

- Stable Angina
- Unstable angina
- Prinzmetal’s Angina
Acute Thrombosis

- Lipid is thrombogenic
- Exposure of lipid causes blood to clot
- Further narrows a narrowed lumen
Thrombosis
Acute Infarction
Infarction
Acute Thrombosis
Aneurysms

- Atherosclerotic
- Syphilitic
- Connective tissue diseases
- Berry
Atherosclerotic Aneurysms

- Infra-renal aorta
- Fusiform dilations of artery
Aorta Microscopic
Atheroma
Cholesterol Clefts
Aorta and Disruption
Fatty Streak
Atherosclerotic aorta
Atherosclerotic aneurysm
Atherosclerotic aneurysms

- Systemic disease
- Associated with smoking
- Dependent on size
- Consequences
  - Rupture
  - 90% mortality emergent
  - 1% mortality elective
Consequences

• Dissection
• Rupture
• Impingement on other vessels
  – Carotid arteries
  – Coronary arteries
  – Vertebral arteries
Dissecting AAA
Aortic Dissection
Dissection
False Lumen
AAA prognosis

- Under 5 cm watch and wait
- Over 5 cm observe
- Serial CT scans
- 5-10% rate of rupture/year
Arteriolosclerosis-Gross
Ateriolosclerosis
Fibrinoid Necrosis