



Learning Objectives for Rotations in Vascular Surgery Year 3 Basic Clerkship

CLINICAL PROBLEMS IN VASCULAR SURGERY

1. ABDOMINAL AORTIC ANEURYSM

A 70-year old man presents in the emergency department with complaints of significant back pain radiating to his left flank. A blood pressure of 130/80. On examination he is quite anxious. Cardiovascular examination is quite normal. His abdomen is obese, not particularly tender anteriorly but has deep tenderness in the left flank and a pulsatile mass may be palpable.

After completing a clerkship, the student should be able to:

- Do an adequate surgical history and physical and understand what urgent procedures and diagnostic tests are required.
- Understand the urgency of accurate diagnosis and the principles of obtaining a vascular opinion.
- Have an idea of how to prepare a patient for the operating room.
- Know what process is required to expedite the transfer to a vascular center.
- Understand what tests are a minimum such as ECG, chest x-ray, cross match, kidney function, urinalysis and which of these can be deleted in a patient who has profound shock.
- Understand the difference between the investigations of CT scan and ultrasound and what the various benefits of each are in this diagnosis.
- Have an accurate list of the differential diagnosis of the possibilities going from the most urgent which would be ruptured aneurysm through possibilities such as kidney stone, pancreatitis, perforated ulcer or chronic back ache due to musculoskeletal or spinal problems.

Knowledge Base

- The student must understand pathophysiology of abdominal aortic aneurysm and the natural history which they follow.
- The student should have an accurate picture of which aneurysms will rupture and which will not, specifically related to size.
- The student should be able to differentiate between the importance of suprarenal and infrarenal aneurysms and must be able to understand the difference between a asymptomatic aneurysm, a symptomatic aneurysm and a ruptured aneurysm.

- The student must understand the principle of risk to benefit when looking at elective aneurysm surgery with respect to cardiac, pulmonary, renal and cerebral vascular risk, compared to the risk of rupture of the aneurysm.

2. ACUTE ARTERIAL OCCLUSION

A 19-year old man is brought to the emergency department following a motor vehicle accident. He is conscious but inebriated, stable from a cardiopulmonary standpoint. He was complaining of a severely painful left leg and numbness in the left foot.

After completing the clerkship the student should be able to:

- Describe the appropriate "ABC's" of the initial management of this trauma patient.
- Describe the physical examination of the extremities.
- Be aware of the "6-P's" and the importance with respect to this limb.
- Determine the difference between anaesthesia and paresis due to a vascular injury as compared to those due to head injury, spinal injury and peripheral nerve injury.
- Describe the pathophysiology of an arterial injury, what is happening to the structures such as bone, muscle, nerve and skin in that extremity that has no blood supply.
- Understand the urgency of the treatment of this problem and have some idea of how long is acceptable before arterial supply is restored.
- Describe other causes of acute arterial obstruction such as embolism and thrombosis. They should also be able to describe the causes of the thrombosis and the source of emboli.
- Understand the indications for angiography or emergent surgery.
- Understand the place of the use of heparin and urokinase in this therapy.

Knowledge base

- What is happening at the cellular level in ischemic level limb and what happens when the circulation is restored, particularly with respect to compartment syndrome.
- Be able to describe the arterial tree and understand which part of the arterial tree is responsible for nutrition to that part of the limb.
- They should understand the effects on the coagulation system of heparin, coumadin in the lytic agent such as urokinase or tissue plasminogen activator (TPA).

3. CHRONIC ARTERIAL OCCLUSIVE DISEASE

A 65-year old man presents at his doctor's office with complaints of 6 months history of developing pain in the right calf with walking one block. Over the past several days his walking has diminished down to only a few paces and he has developed numbness and pain in the toes of the right foot which is preventing him from sleeping at night.

After completing the clerkship, the student should be able to:

- Be aware of the differential diagnosis of this condition and be able to extract pertinent facts in the history to rule out the other diagnosis.
- Understand the risk factors for atherosclerosis and be able to able to elicit them from the history. They should also understand the pathophysiology atherosclerosis.
- Carry out a proper physical exam and document the status of the peripheral circulation with respect to pulses, temperature, colour.
- Know what tests are appropriate in these patients with respect to blood tests, lipid levels and renal function, non invasive vascular lab testing to look at ankle brachial index and post exercise pressure testing.
- Understand the principles of treatment of peripheral vascular disease from the conservative to the more invasive treatment.
- Understand the importance of lifestyle modification and improvement of risk factors.
- Understand when angiography is indicated and the complications to angiography.
- Have a basic knowledge of what types of treatments such as transluminal angioplasty and bypass surgery are available. The student should understand some of the most significant risks and benefits of these treatments with respect to both short and long term outcomes.

Knowledge base

The student must be able to describe:

- The basic pathology of the atherosclerotic process.
- The arterial tree and where in the arterial tree these factors have the main effect such as diabetes, smoking, age.
- Understand the condition of intermittent claudication and the pathophysiology, how it occurs as well as the metabolic changes that allow an exercise program to overcome claudication.
- The pathophysiology of the patient with severe ischemia and threatened limb loss compared to intermittent claudication.

4. EXTRACRANIAL CAROTID OCCLUSIVE DISEASE

A 70-year old woman presents at the emergency department with a history of having been perfectly well and suffering inability to speak associated with weakness of the right arm and the right leg. By the time she arrives in the emergency department, she is speaking a little but the right arm and right leg are still quite weak.

After completing the clerkship, the student should be able to:

- Have an immediate understanding of the differential diagnosis and causes for stroke, particularly with respect to intracranial haemorrhage and thromboembolic stroke.
- Carry out an accurate history, obtaining collateral history from the family with respect to preexisting risk factors for stroke.
- Carry out the appropriate physical examination from a neurological standpoint as well as from a cardiopulmonary standpoint and an arterial standpoint.
- Have a knowledge of when CT scan is necessary.
- Have an understanding of when it is appropriate to anti coagulate the stroke patient and when it is absolutely contraindicated.
- Have a basic understanding of how duplex ultrasonography work and how accurate it is when planning therapy.
- Have an understanding of the risks and benefits of carotid angiography and when it is appropriate.
- Have a working knowledge of both medical and surgical therapy for extracranial carotid occlusive disease.
- Understand the risks and benefits associated with carotid endarterectomy.

Knowledge base

The student must be able to describe:

- The extracranial and intracranial vascular anatomy as it pertains to both anterior and posterior circulation, TIA's and strokes.
- Understand the difference between a TIA and stroke and the etiology of both.
- Understand the literature pertaining to the management of extracranial carotid occlusive disease with respect to the NASCET study and ACAS study.

5. ACUTE AND CHRONIC VENOUS DISEASE

- The student should be able to examine a patient and be able to determine the changes of venous disease as well as describing varicose veins and whether they are primary or secondary.
- The student should be able to determine from the physical examination whether there is swelling or tenderness over the course of the deep veins which may indicate deep vein thrombosis.
- The student should know the treatment of both deep vein thrombosis, pulmonary embolism, the appropriate use of heparin and lytic therapy such as urokinase.
- The student should understand the conservative therapy of venous management with support and elevation.
- The student should understand the modern treatment of varicose veins from both a conservative and invasive standpoint.

Knowledge base

The student must be able to describe:

- Understand the venous anatomy, including the deep and superficial venous systems, valves and should be able to describe the "venous cap cup mechanism".
- Have knowledge of the cause of deep vein thrombosis with respect to Virchow's triad hypercoagulability and should be able to describe a list of these risk factors.
- Have a good working knowledge of the biology of the coagulation system and the effect of heparin, low molecular weight heparin and as well as lytic therapy.