NOTES
VASCULAR STEAL SYNDROMES

GENERALLY, WHAT ARE THEY?

PATHOLOGY & CAUSES

- AKA steal syndrome
  - Occlusion → blood follows path of least resistance → abnormal blood flow
- Hemodynamics
  - Length, width of vessel
- Obstruction/narrowing of vessel → increased resistance → blood follows path of least resistance → area distal to obstruction/narrowing receives less blood, others receive more blood

TYPES

- Coronary steal syndrome
  - Coronary arteries
- Subclavian steal syndrome
  - Subclavian artery

CAUSES

- Narrowing/obstruction of vessel
- Atherosclerosis/structural abnormalities

SIGNS & SYMPTOMS

- See individual disorders

DIAGNOSIS

DIAGNOSTIC IMAGING

- Incidental finding

CT angiography

- Blood flow/occlusion

Doppler ultrasound

- Retrograde blood flow

LAB RESULTS

- Atherosclerosis, elevated troponin

OTHER DIAGNOSTICS

- Nuclear stress test
- ECG alterations
- Heart catheterization

TREATMENT

MEDICATIONS

- Pharmacological treatment; see individual disorders

SURGERY

- Revascularization of ischemic area
  - Endovascular methods, bypass surgery, percutaneous transluminal angioplasty

CORONARY STEAL SYNDROME

osms.it/coronary-steal-syndrome

PATHOLOGY & CAUSES

- Narrowed/obstructed coronary vessel + vasodilator alters cardiac circulation → blood shunted away from area distal to narrowing/obstruction exacerbating ischemia
- AKA cardiac steal syndrome
- Artery narrowing/obstruction → dilation of distal arteries to compensate for decreased blood flow → addition of vasodilator → dilation of resistance vessels → blood supplying ischemic zone shunted away to areas of least resistance → more ischemia
- Narrowing of coronary arteries + vasodilator (e.g. dipyridamole, adenosine) → blood flows to non-obstructed vessels → exacerbating ischemia
  - *Dipyridamole:* antiplatelet, vasodilator → all coronary vessels dilate when in individual with partial obstruction of coronary artery
  - Vasodilator may steal blood from deprived region distal to obstruction
- Dilation of resistance vessels → blood shunted away from coronary vessels

CAUSES

- Coronary artery bypass grafting surgery (CABG)
  - Rare
  - Due to left internal mammary artery (LIMA) graft
  - Retrograde flow from LIMA to left subclavian artery
- Drugs
  - Dipyridamole, nitroprusside, isoflurane (inhaled anesthetic), vasodilators
- Coronary arteriovenous fistula between coronary artery, cardiac chamber

COMPLICATIONS

- Recurrent myocardial infarction (MI), ischemia

SIGNS & SYMPTOMS

- Cerebrovascular
  - Presyncope/syncope, vertigo, vision loss, memory loss, weak pulse
- Chest pain
- Unequal pulses in upper extremities
- Blood pressure differences between arms

DIAGNOSIS

OTHER DIAGNOSTICS

- Cardiac stress test
  - Vasodilator produces ischemic ECG changes (with/without exercise)
- Coronary angiography

TREATMENT

SURGERY

- Balloon angioplasty, stent insertion, coronary bypass

SUBCLAVIAN STEAL SYNDROME

osms.it/subclavian-steal-syndrome

PATHOLOGY & CAUSES

- Stenosis/occlusion in subclavian artery → reversal of blood flow in vertebral artery
- Occlusion/narrowing in subclavian artery → blood drawn away from head, flows retrogradely to supply oxygen to upper extremities (e.g. blood to brain stolen to supply left upper limb)
  - More often on left than right due to anatomical location of left subclavian artery
- Narrowing of subclavian artery → short low resistance pathway becomes high resistance
- Blood flows up right brachiocephalic → right subclavian → right vertebral artery → basilar artery, left vertebral joins → blockage of left vertebral upstream → blood from right vertebral artery enters left vertebral → left subclavian → flows back to left arm
- Rare condition

CAUSES

- Atherosclerosis (most common)
  - Narrowing, hardening of arteries due to plaque buildup
- Takayasu disease (least common)
  - Chronic inflammation of aorta, large vessels
- Giant cell arteritis
- Blalock Taussig shunt
  - Surgical procedure to increase blood flow to lungs; tube placed between subclavian, pulmonary arteries
- Thoracic aortic dissection
- Thoracic outlet compression
- Interrupted aortic arch
- Congenital aortic coarctation

RISK FACTORS

- Smoking, diabetes, obesity, lack of exercise, unhealthy diet, family history
- More common in individuals who are biologically male

COMPLICATIONS

- Upper limb ischemia, neurological problems

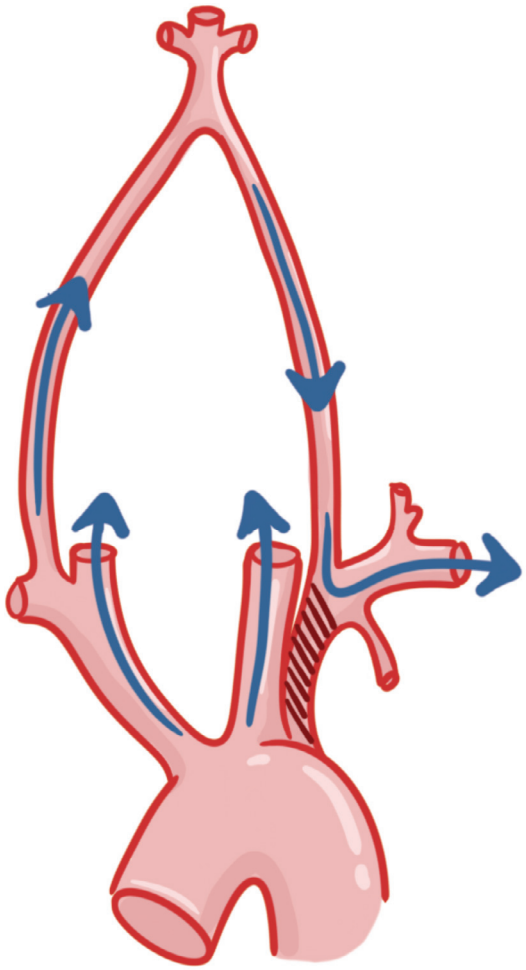

Figure 23.1 An illustration depicting the flow of blood in subclavian steal syndrome. Blood flows around the blockage in the proximal subclavian artery, reversing flow in the internal carotid and "stealing" the blood from the brain.

SIGNS & SYMPTOMS

- Asymptomatic
- Numbness of arm, extends to fingertips (most frequent)
- Vertebrobasilar artery insufficiency
  - Presyncope/syncope, neurologic deficits
- Upper extremity claudication
- Tingling sensation/numbness in face
- Decreased blood pressure on affected side
- Transient hemiparesis (weakness) of affected side
- Blood pressure (BP) in left arm < BP in right arm
- Pulse in left arm < pulse in right arm

DIAGNOSIS

DIAGNOSTIC IMAGING

- CT angiography
- Doppler ultrasound scan

TREATMENT

SURGERY

- Balloon stenting, angioplasty
- Endarterectomy