VA VASCULAR
Revised 6/8/07

Composition of the service:
The VA vascular service is comprised of a chief resident (PGY 5), a junior resident (PGY 2/3), and an intern (PGY 1). In addition, there is a physician assistant assigned to the team, as well as a facilitator to assist in scheduling of OR cases, angios, and admissions, and a Nurse coordinator to assist with admission and discharge planning. Residents are supervised by the attending surgeons assigned to the VA vascular service.

Residents are responsible for the day-to-day care of all VA vascular surgery patients with daily supervision by the attending surgeons. Residents communicate directly with the individual immediately senior to them on all admissions, consultations, and significant changes in the condition of all inpatients and outpatients.

Roles and responsibilities of each team member:

Interns are responsible for the care of the ward patients and are the first responders to urgent patient needs. They are to apprise the junior and chief resident of changes in the condition of the patients.

Junior residents are responsible for supervising the intern in caring for patients on the ward. Additionally, they assume primary responsibility for the care of ICU patients, and any requests for consultations. The junior resident also is responsible for all vascular surgical issues in the dialysis unit (dialysis access, limb salvage, foot wounds, etc.).

The chief resident has overall responsibility for the VA vascular service and serves as a role model for professionalism, leadership, surgical knowledge, and patient care. The chief resident delegates responsibilities including coverage of operations, clinics, and ward care.

Educational Goals for Residents: Intern

Medical Knowledge

1. Atherosclerosis:
    a. acquire a basic understanding of the concepts and theories dealing with etiology and pathophysiology (high shear stress, low shear stress, response to injury, clinical risk factors)
    b. develop an appreciation for the incidence of atherosclerosis in the US Veteran population including clinical risk factors and vascular beds involved (cerebrovascular, coronary, visceral, aortic and lower extremity)

2. Diabetes mellitus
    a. learn proper clinical classification
    b. learn the clinical pattern and presentation of the common complications associated with diabetes (retinopathy, nephropathy, neuropathy)
    c. develop an effective method for perioperative blood glucose control and insulin dosing

3. Venous disease
    a. learn (or review) lower extremity venous anatomy
    b. learn the etiology of venous thrombosis (Virchow's triad)
    c. learn management of DVT (heparin to warfarin and duration)

d. develop an understanding of the complexities of chronic venous insufficiency (etiology, pathophysiology, management)

4. Aneurysm disease
    a. acquire a basic understanding of the concepts and theories dealing with etiology and natural history
    b. learn the definition and the common anatomic locations for aneurysm disease

5. Limb salvage surgery
    a. learn basic patient evaluation skills (pulse exam, bedside ABIs, evaluation for neuropathy and pedal sepsis)
    b. learn to interpret noninvasive vascular lab exam (lower extremity PAE)
    c. learn lower extremity arterial anatomy and accurately interpret aortogram with run-off

6. Carotid surgery
    a. know the natural history of symptomatic carotid artery stenosis
    b. review arterial anatomy and be able to interpret an arch aortogram
    c. know how to interpret a carotid duplex exam

7. Claudication
    a. fully appreciate the natural history of patients with claudication (predictive of MI more than amputation)
    b. have an understanding of the lower extremity treadmill exam and be able to offer a hemodynamic explanation for why the ABI drops in claudicators

8. Lower extremity amputations
    a. become familiar with the frequently performed types of lower extremity amputation (toe, metatarsal head resection, TMA, below-knee, above-knee) allowing for a full appreciation of the functional impact on the patient including rehab requirements
    b. learn surgical technique for the various types of lower extremity amputation including patient positioning and use of "the bump"

9. Dialysis access surgery
    a. learn the deranged hemodynamics associated with A-V fistula
    b. learn the proper upper extremity vascular evaluation (pulse exam, arm BPs, vein mapping)
    c. review upper extremity venous and arterial anatomy

10. Mesenteric ischemia
    a. learn (or review) mesenteric arterial anatomy
    b. interpret AP and lateral aortogram including major visceral branch anatomy and pathology
    c. learn clinical presentation and initial management of patients with acute and chronic mesenteric ischemia

Patient Care

1. identify and successfully modify clinical risk factors for atherosclerosis in the VA patient population (smoking, hyperlipidemia, hypertension, hyperglycemia, diet, exercise, stress)
2. demonstrate an understanding of the clinical strategy for management of diabetic foot infections (cultures, antibiotics, wound debridement including timing and methods of debridement, orthotics)
3. demonstrate an understanding of the clinical strategy for prevention of diabetic foot ulcers (patient education, blood glucose control, proper foot gear through prosthetics)

4. employ an effective method for perioperative blood glucose control and insulin dosing
5. acquire clinical skills for successful management of patient with lower extremity venous ulcer (debridement, wound care, antibiotics, elevation, compression therapy)
6. know and utilize current methods for prevention of contrast dye nephropathy (sodium bicarb, Mucomyst)

Professionalism

1. cultivate a professional appearance and attitude (dress, hygiene, demeanor)
2. take the clinical work seriously and place a high standard on personal conduct and behavior
3. exhibit behavior consistent with being dependable and responsible (finish the task, accept responsibility for shortcomings)
4.

Interpersonal and Communication Skills

1. respect the opinion of others (patients, family, students, nurses, techs, other care-givers)
2. deliver succinct oral presentations on rounds and in clinic
3. demonstrate good listening skills (take an accurate history, carry out tasks when told, focused and engaged on rounds)
4. successfully become a respected member of the team

Practice-based learning

1. attend journal club and review selected articles (occurs twice a month)
2. participate in teaching of medical students, physician assistants, and nurses
3. attend and participate in monthly VA morbidity and mortality conference
4. actively participate in daily rounds (share information and knowledge, ask questions)

Systems-based practice

1. attend and participate in discharge planning conferences which includes social workers, families, wound care specialists, home health, etc.

Junior resident (educational goals)
All intern goals as well as these specific junior resident goals

Medical Knowledge

1. Atherosclerosis
    a. know the incidence and significance of coronary artery disease in vascular patients
    b. know preoperative medical management effective in prevention of perioperative MI (beta-blockers, statins, aspirin)

2. Diabetes mellitus
    a. appreciate the complexities of wound healing in the diabetic foot (vascular disease, infection, neuropathy)
    b. understand the significance of peripheral neuropathy in the patient with diabetic foot ulcer (diagnosis, management)
    c. appreciate the significance of peripheral vascular disease in healing of the diabetic foot ulcer (incidence, distribution)

3. Venous disease
    a. know the numerous strategies utilized for prevention of post-op DVT
    b. know the well recognized conditions potentially causing hypercoagulability (cancer, anti-thrombin III, protein C, protein S, factor V Leiden, lupus anticoagulant, antiphospholipid antibody)
    c. have a basic understanding of lower extremity chronic venous insufficiency (etiology, pathophysiology, management)
    d. know how to manage a patient with varicose veins including indications for intervention
    e. know the surgical technique for greater saphenous vein stripping including excision of varicosities
    f. have a basic understanding of the role of the noninvasive vascular lab in testing for venous disease (venous duplex, venous recovery time)

4. Aneurysm disease
    a. know the data from prospective randomized trials (ADAM, DREAM, etc)
    b. understand the complexities involved with patient selection for intervention (risk versus benefit in specific patients depending on patient age, aneurysm size, and co-morbid medical conditions)
    c. be able to interpret a CT scan of a patient with AAA (measure diameter, proximal neck, visceral arteries, left renal vein, iliac aneurysms)
    d. know aneurysm anatomic requirements for endograft repair
    e. know the incidence and classification of endoleaks following endograft repair

5. Limb salvage surgery
    a. understand the principles of patient selection (revascularization versus primary amputation)
    b. understand principles of management for pedal sepsis, osteomyelitis, local gangrene (wound cultures, antibiotics, operative drainage/debridement, and delayed closures)
    c. know the indications, accuracy, and pitfalls of preoperative imaging (duplex, MR angio, conventional angio)
    d. be familiar with a preoperative methodology for aid in selection of venous conduit (vein mapping)
    e. know lower extremity arterial anatomy and surgical exposures (above knee popliteal, below knee popliteal, posterior tibial, peroneal, anterior tibial)
    f. know the long-term patency rates for autogenous and prosthetic lower extremity bypass

6. Carotid surgery

    a. know the data from important prospective randomized trials (NASCET, ACAS, CREST)
    b. understand the principles for medical management of carotid artery disease (degree of stenosis, antiplatelet therapy, statins, warfarin, follow-up)
    c. know the indications, role, and pitfalls of preoperative imaging (duplex, MR angio, conventional angio)

7. Claudication

    a. know the medical management of vasculogenic claudication (exercise program, medication, stop smoking)
    b. acquire knowledge to properly select patients for intervention
    c. know the patency rates for iliac artery stenting (common versus external iliac, short segment stenosis versus long segment occlusion)

d. know the complications of angio and iliac artery stenting (dye nephropathy, arterial injury, A-V fistula, distal embolization, acute thrombosis, early restenosis)

8. Lower extremity amputations

a. acquire overall clinical knowledge to properly select amputation level in specific patients (extent of necrosis, presence of acute infection/purulence, vascular status, pre-op ambulatory status, rehab potential, knee contracture, patient motivation)
b. know the frequently encountered complications associated with amputation surgery including strategies for prevention (infection, hematoma, contracture, nonhealing, phantom pain)

9. Dialysis access surgery
   a. appreciate the prevalence and impact of ESRD in the US Veteran population
   b. know the various types of A-V fistulas used for dialysis access (autogenous, prosthetic)
   c. know the patency rates for frequently performed A-V fistulas for access (Cimino, brachial-cephalic, basilic vein transposition, prosthetic)
   d. know the surgical technique for upper extremity A-V fistula surgery (standard exposures and arterial-venous anastomosis)
   e. know how to evaluate and manage common post-operative complications (nonfunction, hand ischemia)
   f. know indications for performing a fistulogram (poor function, arm swelling)
   g. know how to interpret a fistulogram
   h. know the indications for fistula revision

10. Mesenteric ischemia

Patient Care

1. understand how to prioritize and plan the surgical management of pedal sepsis including timing of operative debridement (urgent/elective), delayed closure techniques, and selected use of guillotine foot amputation

2. manage pre, intra, and post-operative care issues in the patient population on chronic hemodialysis

Professionalism

1. function as a responsive, effective, and well respected representative for vascular surgery in the dialysis unit and the ICU

Interpersonal and Communication Skills

1. function as the primary vascular surgery contact person for the dialysis unit
2. respond promptly to vascular issues arising in the dialysis unit, the ICU, the ER, the canteen, and elsewhere
3. develop an effective, professional working relationship with the dialysis unit charge nurse as well as other nurses and techs within the unit.

Systems-based practice

1. function as the primary interphase between the dialysis unit and the vascular service

a. responsible for assessment and management of dialysis access planning and complications (nonfunction, thrombosis, hand ischemia, arm swelling) as well as lower limb salvage issues within the dialysis unit

b. assure coordination of vascular testing and interventional procedures (vascular lab testing, fistulogram, angiogram, operative procedure) with the regularly scheduled dialysis sessions and travel
c. assure coordination of interventional radiology, vascular lab, operating room, and the dialysis unit

Chief resident (educational goals)

1. responsible for all the intern and junior goals as well as the "chief"-specific goals

Medical Knowledge

1. Atherosclerosis
2. Diabetes mellitus
3. Venous disease
   a. know the types of direct venous valve surgery performed to correct deep venous insufficiency
   b. know the management of axillosubclavian venous thrombosis including indications for thrombolysis and 1st rib resection
   c. know the indications for caval filter placement
4. Aneurysm disease
   a. know the regional anatomy, exposure, and surgical technique (including patient positioning) for open aortic aneurysm repair (transperitoneal and retroperitoneal)
   b. know management of post-operative complications following open and endograft AAA repair (fluid replacement, colonic ischemia, trash foot, endoleaks)
   c. know etiology and management of special types of aneurysm disease (popliteal aneurysm, visceral artery aneurysms, suprarenal AAA, infected aneurysm, inflammatory aneurysm, symptomatic AAA
5. Limb salvage surgery
   a. comprehensive knowledge of surgical technique for lower extremity arterial bypass procedures (vein harvest, arterial exposures, tunneling, wound closures)
   b. know the indications, outcomes, and complications of balloon angioplasty of infrainguinal arterial occlusive disease for limb salvage
   c. know the rational and have a strategy for post-operative vein graft surveillance
   d. know the classification and outcomes for acute limb ischemia (thrombosis versus embolism)
6. Carotid surgery
   a. know the data and have a rational for patient selection for intervention (CEA and stenting; symptomatic and asymptomatic)
   b. know the surgical technique for carotid endarterectomy (patient positioning, surgical exposure, regional anatomy, intraluminal shunt, patch closure)
   c. have a rational and strategy for long-term follow-up after CEA and carotid stenting (restenosis, opposite side)
7. Claudication
   a. know the nonatherosclerotic causes for claudication (neurogenic, popliteal entrapment, adventitial cyst disease)

8. Lower extremity amputations

9. Dialysis access surgery
   a. know how to manage steal syndrome (DRIL, fistula ligation)

10. Mesenteric ischemia
    a. know the surgical exposure and technique for embolectomy of the SMA
    b. know the surgical exposure and technique for SMA bypass

Patient Care

1. know how to manage a patient with acute lower limb ischemia including utility of heparin, timing of angio, role of thrombolysis, and methods for surgical revascularization
2. know how to prioritize and manage a patient with ruptured abdominal aortic aneurysm (role of CT scan, proximal aortic clamp versus continued resuscitation, role of endograft repair)
3. have an early post-carotid endarterectomy management schema which includes management strategy for post-op TIA/stroke, cranial nerve deficits, neck wound hematoma

Professionalism

1. sets the standard for professional behavior on the service and serves as a role model for the junior resident and intern
2. exhibits behavior that emphasizes quality patient care above self-interest and successfully inspires others to emulate this philosophy

Interpersonal and Communication Skills

1. communicates honestly and compassionately with patients and families
2. respected as the resident leader of the team
3. mediates and resolves interpersonal conflicts or issues on the team

Practice-based learning

1. presents complications at M&M and provides inciteful comments about the case allowing others to learn from the complication
2. in selected cases functions as the teaching assistant for the junior resident and/or intern

Systems-based practice

1. lead the team in managing wound healing, rehab, and recovery of amputation patients (involves prosthetics, rehab medicine, social worker, Vancouver rehab unit)
2. lead the team in the management of patients undergoing endograft repair of AAA including pre-op evaluation, patient counseling, endograft repair, and follow-up This involves collaboration with imaging and interventional radiology.

Educational Objectives for Residents

Intern (educational objectives)
Medical knowledge

- explain why low shear stress might promote atherosclerotic plaque formation as opposed to high shear stress (increased residence time)
- list at least seven risk factors for development of atherosclerosis (gender, age, smoking, hypertension, hyperlipidemia, diabetes, homocystine, sedentary)
- describe the effects of diabetic neuropathy (motor and sensory) on the foot
- describe Virchow's triad (stasis, hypercoagulability, venous injury)
- describe the pathophysiology of chronic venous insufficiency (ambulatory venous hypertension)
- estimate the yearly risk of rupture of a 5cm AAA (6cm, 7cm)
- describe the risk of popliteal artery aneurysm (embolism, thrombosis)
- describe the typical ABI range for normal (1.0-.9), claudication (.8-.3), ischemic rest pain/ulceration (< .3)
- explain hemodynamically why the ABI falls following exercise in patients with vasculogenic claudication
- describe the natural history of a typical patient with vasculogenic claudication
- estimate the yearly risk of stroke of a TIA patient with >70% carotid artery stenosis treated medically
- describe the hemodynamics of a chronic A-V fistula (proximal arterial dilation, venous hypertension, retrograde flow in the distal artery, increase in cardiac output)
- describe the typical presentation of a patient with acute mesenteric ischemia from cardiac embolus
- describe the typical presentation of a patient with chronic mesenteric ischemia and SMA stenosis

Patient Care

- describe treatment of a patient with lower extremity venous stasis ulcer (antibiotics, local care, bedrest, compression, compression, compression)
- interpret aortogram and run-off of patient with gangrene and a low ABI and devise a revascularization plan for that patient
- name and identify the four fascial compartments in the lower extremity
- describe rationale and protocol for anticoagulation of patient with acute DVT

Professionalism

- attend and participate in conferences (Thursday resident conference, Wednesday journal club, VA M&M, OHSU conferences)
- attend daily rounds (punctual, prepared, engaged)

Interpersonal and Communication Skills

- successfully discharge patients providing clear oral instructions to the patient and family and dictating a concise well organized discharge summary
- patient presentations are focused and concise

Practice-Based Learning

- demonstrate improvement in quality of discharge summaries and operative dictations
- review a patient care article for journal club

Systems-Based Practice

- effectively participate in discharge planning conference with social worker, wound care specialist, families, and consultants

Junior Resident (educational objectives)

Medical Knowledge

- describe the prevalence of perioperative MI in the VA vascular population and list at least three medications which are believed effective in prevention of perioperative MI

- describe the typical distribution of atherosclerotic lower extremity vascular occlusive disease in the diabetic population and explain the utility of the noninvasive vascular lab in evaluating the diabetic with vascular disease (noncompressible arteries, toe pressure indexes)
- list at least seven well recognized hypercoagulable conditions
- describe the mechanism of action of heparin and list possible complications (antithrombin III, HIT)
- describe the mechanism of action of warfarin
- describe how to diagnose lower extremity venous insufficiency both clinically and with vascular lab testing
- describe AAA anatomic requirements for endograft repair
- describe the incidence and classification of endoleaks following endograft repair
- describe patency rates for lower extremity bypass (autogenous and prosthetic)
- describe the incidence, clinical manifestations, and prognosis of cranial nerve injury following CEA
- describe the expected patency rates for iliac artery stenting (common versus external iliac)
- describe the patency rates for upper extremity dialysis access fistulas (Cimino, brachial-cephalic, basilic vein transposition, prosthetic)

Patient Care

- describe duplex assessment of deep and superficial veins for the diagnosis of venous insufficiency
- interpret upper extremity duplex vein mapping in ESRD patient and recommend type of upper extremity A-V fistula based on pulse exam and vein mapping
- describe rationale and protocol for anticoagulation of patient with acute leg ischemia
- describe the surgical management of a patient with SMA embolus
- interpret a lower extremity treadmill exam and recommend management of patient with claudication

Professionalism

- serves as a good role model for the intern

Interpersonal and Communication Skills

- assure pre-op and post-op communication with family members
- keep dialysis unit charge nurse apprised of surgical plans for ESRD patients

Practice-Based Learning

- critically review current articles for journal club

Systems-Based Practice

- effectively manage patients with vascular surgical problems in the dialysis unit

Chief Resident (educational objectives)

Medical Knowledge

- list the indications for IVC filter placement
- list the anatomic contraindications for AAA endograft repair
- describe the pathophysiology, incidence, and options for management of vein graft stenosis
- define and describe management of an inflammatory AAA
- describe management of an infected aortofemoral prosthetic graft

Patient Care

- describe the surgical exposure for infrarenal AAA surgery, contrasting transperitoneal and retroperitoneal approaches
- measure and interpret lower extremity intracompartmental pressures and manage compartment syndrome
- describe intraoperative maneuvers useful to assist in distal internal carotid artery exposure (mobilize hypoglossal nerve, divide digastric muscle)
- describe/demonstrate surgical exposure of femoral, popliteal, and tibial arteries
- describe rationale and protocol for anticoagulation and surgical management of patient with crescendo TIAs
- describe management of patient with bloody diarrhea following ruptured aneurysm repair

Professionalism
- responsible for the team being punctual and prepared for rounds and conferences
- is a good role model for the entire team

Interpersonal and Communication Skills
- demonstrates leadership of the resident team
- presents clear concise case presentations at Saturday morning vascular conference
- maintains good open communication and fosters teamwork with the interventional radiology team

Practice-Based Learning
- assigns articles for critical review by the team at journal club
- demonstrates ability to learn from mistakes and makes inciteful and educational presentations at M&M
- functions as the teaching assistant for selected OR cases (AK amputation, foot surgery)

Systems-Based Practice
- assures that all in-patient and out-patient consults are well managed with appropriate staffing, documentation, follow-up, and resolution (this includes phone consults from other VA facilities and hospitals outside of the VA system)

Assigned Reading:

Rutherford text as well as selected, milestone articles (NASCET, ACAS, ADAM, DREAM, anything written by Dr. Moneta)

Evaluation Methods:
Performance ratings

Weekly Schedule:
Monday
0700-0815: OHSU Grand Rounds
0830-0930: OHSU Resident Conference
0930-1600: full day in OR (OHSU attending)
1600-1700: rounds with OHSU attending
1700-1800: OHSU M&M

Tuesday
0800-1100: AM clinic (wounds and follow-up)
1100-1200: rounds with VA attendings
1200-1600: add-on surgery if necessary (hopefully not)

Wednesday
0700-0800: journal club/lecture (alternate) OHSU vascular library
0800-1600: full day in OR
1600-1700 rounds with VA attendings

Thursday
0730-0830: weekly VA resident conference (VA M&M once a month)
0830-1600: full day in OR (two rooms)
1600-1700: rounds with VA attendings

Friday
0900-1600: vascular clinic (full day, free lunch!)
1600-1700: rounds with VA attendings

Saturday
0830-0930: Saturday morning school (OHSU vascular lecture)
0930-1100: case presentations (OHSU)