Medical University of South Carolina Vascular Surgery Residency

Educational Goals and Objectives for All Vascular Surgery Rotations including ART, VA, and Roper

PGY 1

Patient Care

1. Evaluate patients for vascular disease, including
   a. history and physical examination
   b. vascular laboratory
   c. computer tomographic imaging
   d. magnetic resonance imaging
   e. angiography
2. Demonstrate competence in basic surgical techniques, including:
   a. knot-tying
   b. exposure and retraction
3. Participate in amputations with specific attention to demarcation levels.
4. Demonstrate proficiency in venous access procedures.
5. Perform the preoperative assessment and postoperative care of patients undergoing major vascular procedures.

Medical Knowledge

PGY 1

1. Describe human arterial and venous anatomy and related regional anatomy.
2. Describe basic arterial and venous hemodynamics.
3. Discuss the anatomy, pathology, and pathophysiology of the arterial wall.
4. Assess patients’ vascular systems using appropriate skills in history-taking and clinical exam.
5. Describe life-threatening signs of vascular disease and indicate when immediate intervention is required.
6. Differentiate between the following diagnostic tools available for assessing vascular disease and explain the relative contribution of each:
   a. angiography
   b. computed axial tomographic scanning
   c. ultrasound
   d. magnetic resonance imaging
7. Summarize the pathophysiology, clinical manifestations, and therapeutic options of specific categories of vascular disease:
   a. venous disease
      i. thromboembolic disease
      ii. pulmonary embolism
   b. arterial disease
      i. atherosclerosis and its related disorders
      ii. occlusive disease
      iii. aneurysmal disease
   c. interaction of cardiovascular and pulmonary systems
8. Discuss basic principles of Doppler ultrasound for performing bedside arterial and venous Doppler testing.
9. Outline the principles of noninvasive laboratory diagnosis, including a description of the role and limitations of the vascular laboratory:
   a. ABI / waveforms
   b. carotid duplex
   c. venous duplex
   d. PPG / LRR venous
   e. graft flow studies
10. Outline the principles of care for ischemic limbs
11. Summarize principles for the preoperative assessment and postoperative care of patients undergoing major vascular surgical procedures.
12. Outline the fundamental elements of nonoperative care of the vascular patient, including the role of risk assessment and preventative measures.
13. Describe the hemodynamics and pathophysiology of specific clinical symptoms:
    a. claudication
    b. transient ischemic attack TIA
    c. stroke
    d. mesenteric angina
    e. angina pectoris
    f. renovascular hypertension
    g. arteriovenous fistula
14. Explain the concept of critical arterial stenosis
15. Differentiate between acute arterial and acute deep venous occlusion.
16. Determine a plan for assessment of operative risk in these categories:
    a. cardiac
    b. pulmonary
    c. renal
    d. metabolic
    e. levels of anesthetic risk
Interpersonal Communication Skills

PGY 1

In patients with vascular disease:
1. Be able to create and sustain a therapeutic and ethically sound relationship with patients and their families
2. Use effective listening skills.
3. Provide information to patients using effective nonverbal, explanatory, questioning, and writing techniques.
4. Work effectively with other members of the health care team.
5. The resident will actively participate in the discussions about patient care plans with nursing, social workers, and ancillary personnel. The resident will learn about the importance of communication with referring physicians.
6. Be prepared to describe an acceptable method to handle the following example interactions:
   a. patient’s referring doctor has told patient that his aortic aneurysm is a “time bomb”, but in fact it is too small to offer repair
   b. patient’s family refuses to assume at home care after operation, but refuses to allow patient to be transferred to a long term care facility

Professionalism

PGY 1

While caring for patients with vascular disease:
1. Demonstrate respect, compassion, and integrity.
2. Demonstrate responsiveness to the needs of patients and society and supercedes self-interest.
3. Demonstrate accountability to patients, society, and the profession of surgery.
4. Demonstrate a commitment to excellence and on-going professional development.
5. Demonstrate a commitment to ethical principles pertaining to provision of or withholding of clinical care.
7. Be able to obtain informed consent for planned interventions.
8. Demonstrate sensitivity and responsiveness to patient’s culture, age, gender, and disabilities.
9. Be prepared to discuss the professional and ethical principles with respect to the following example situations:
   a. patient with lower extremity claudication who refuses to stop smoking, but demands intervention
   b. patient’s family insists that the patient be told that he must undergo carotid endarterectomy for asymptomatic stenosis, but patient does not want any operation
10. Be punctual for all service activities, conferences, operating room, and other patient care responsibilities.
11. Respond to pages and requests for assistance in a timely manner.
Practice-based Learning

PGY 1

For patients with vascular disease:
1. Develop a method to record and track over time the results of intervention performed by the resident.
2. Be involved in the teaching of students and more junior residents and colleagues.
3. Present patients for discussion during rounds and seminars, with appropriate literature references to support planned intervention.
4. Understand the role of study design and the use/misuse of statistical analysis in review the results of published research in this surgical field.
5. Demonstrate the ability to use information systems to obtain pertinent information regarding surgical issues and problems.
6. Use information technology to manage and provide patient-related information.
7. Be prepared to describe how to obtain relevant information to support patient management in the following example situations:
   a. high risk patient with large (8 cm) abdominal aortic aneurysm
   b. role of carotid angioplasty in the management of carotid artery disease

Systems-based Practice

PGY 1

For patients with vascular disease:
1. Review critical factors for decision making in vascular surgery
   a. risk:reward ratio
   b. morbidity and mortality probability
   c. preoperative and postoperative assessment
   d. noninvasive laboratories, duplex scanning
   e. role of advanced radiologic techniques: angioplasty, CT scanning, MRI/MRA imaging
2. Apply the decision making process in analyzing complex vascular diseases, including the following:
   a. cerebrovascular problems
   b. mesenteric vascular disease
   c. renovascular disease
   d. aneurysmal disease
   e. lower extremity arterial occlusion
   f. venous disease
3. Understand the role of a tertiary referral center in the surgical management of simple and complex problems.
4. Practice cost-effect health care and resource allocation, specifically reducing the use of unnecessary preoperative and postoperative screening and/or testing.
1. Practice cost-effect health care that does not compromise patient care.
2. Understand the responsibility of the surgeon in managing indigent patients.
3. Direct patients and their families towards individuals within the Institution that can help them with understanding complex issues of societal support and resources.
4. Understand an awareness of the role of health care managers and surgeon-extenders in the surgical management of patients.
5. Advocate for quality patient surgical care.
7. Demonstrate awareness of the costs associated with providing surgical care to patients with vascular disorders.
8. The resident will produce at least one oral power point presentation each year, and a minimum of at least two published manuscripts during the training program, and will be specifically instructed in retrospective case analysis, meta-analysis and the use of commonly encountered statistical tests for analysis of vascular outcomes, including quality of life (QOL) metrics, life table analysis, Kaplan-Meier analysis, Student’s t test, chi square, uni- and multi-variable analysis, etc.
9. Be prepared to discuss the interplay of the competing societal and patient needs in the following example situations:
   a. routine renal artery arteriography in patients undergoing cardiac catheterization
   b. serial screening carotid duplex ultrasound for all patients at risk of having systemic atherosclerosis
PGY 2

**Patient Care**

All of the above for PGY 1, plus:

10. Demonstrate skill in basic surgical techniques, including:
   a. knowledge of instrumentation
   b. incisions
   c. closure of incisions
   d. familiarity with and handling of graft material and suture

11. Participate in surgery for venous disease, including:
   a. ligation and stripping of varicose veins
   b. management of venous stasis ulcers
   c. management of venous thrombosis
   d. placement of vena cava filters

12. Participate in amputations with specific attention to control of toxicity

13. Demonstrate the ability to perform arterial access and venous access, including:
   a. Incisions
   b. Percutaneous, with and without ultrasound guidance
   c. Closure of incisions, and closure of percutaneous puncture with closure devices
   d. Thrombectomy and revision of arterial grafts

5. Participate in basic catheter exchange techniques over a wire (Seldinger) using standard wires and catheters

PGY 2

**Medical Knowledge**

All of the above for PGY 1, plus:

1. Review and describe the basic clinical manifestations of the following vascular disorders:
   a. thromboembolic disease – arterial and venous
   b. chronic venous insufficiency and lymphatic obstruction
   c. portal hypertension

2. Differentiate between the following diagnostic tools available for assessing vascular disease and explain the relative contribution of each:
   a. magnetic resonance imaging and magnetic resonance angiography
   b. duplex scanning and ultrasonography

3. Summarize the etiology, pathophysiology, and therapeutic options of specific categories of vascular disease:
   a. venous disease
      i. varicose vein disease
      ii. post-phlebitic syndrome
      iii. portal hypertension
   b. lymphatic disease
      i. anatomy of lymphatic system and lymphatic return
      ii. congenital lymphatic anomalies
      iii. acquired lymphatic disease
iv. operative procedures for correction of lymphatic disease
c. arterial disease
   i. aortic and other vascular aneurysms
   ii. atherosclerotic vascular disease
   iii. arterial embolic disease
   iv. extracranial cerebrovascular disease
   v. visceral ischemic syndromes
   vi. renovascular hypertension
   vii. degenerative arterial disease
   viii. trauma
   ix. arteriovenous fistulas

4. Describe the natural history of medically-treated vascular disease in the following categories:
   a. carotid arterial stenosis
   b. abdominal aortic aneurysm
   c. chronic femoral artery occlusion

5. Describe the role and pharmacology and methods of action of anticoagulant agents, including direct thrombin inhibitors as well as antiplatelet agents, in the management of patients with vascular disease.
**Interpersonal Communication Skills**

**PGY 2**

In patients with vascular disease:
7. Be able to create and sustain a therapeutic and ethically sound relationship with patients and their families
8. Use effective listening skills.
9. Provide information to patients using effective nonverbal, explanatory, questioning, and writing techniques.
10. Work effectively with other members of the health care team.
11. The resident will actively participate in the discussions about patient care plans with nursing, social workers, and ancillary personnel. The resident will learn about the importance of communication with referring physicians.
12. Be prepared to describe an acceptable method to handle the following example interactions:
   a. patient’s referring doctor has told patient that his aortic aneurysm is a “time bomb”, but in fact it is too small to offer repair
   b. patient’s family refuses to assume at home care after operation, but refuses to allow patient to be transferred to a long term care facility

**Professionalism**

**PGY 2**

While caring for patients with vascular disease:
12. Demonstrate respect, compassion, and integrity.
13. Demonstrate responsiveness to the needs of patients and society and supercedes self-interest.
14. Demonstrate accountability to patients, society, and the profession of surgery.
15. Demonstrate a commitment to excellence and on-going professional development.
16. Demonstrate a commitment to ethical principles pertaining to provision of or withholding of clinical care.
17. Maintain confidentiality of patient information.
18. Be able to obtain informed consent for planned interventions.
19. Demonstrate sensitivity and responsiveness to patient’s culture, age, gender, and disabilities.
20. Be prepared to discuss the professional and ethical principles with respect to the following example situations:
   a. patient with lower extremity claudication who refuses to stop smoking, but demands intervention
   b. patient’s family insists that the patient be told that he must undergo carotid endarterectomy for asymptomatic stenosis, but patient does not want any operation
21. Be punctual for all service activities, conferences, operating room, and other patient care responsibilities.
22. Respond to pages and requests for assistance in a timely manner.
Practice-based Learning

For patients with vascular disease:
8. Develop a method to record and track over time the results of intervention performed by the resident.
9. Be involved in the teaching of students and more junior residents and colleagues.
10. Present patients for discussion during rounds and seminars, with appropriate literature references to support planned intervention.
11. Understand the role of study design and the use/misuse of statistical analysis in reviewing the results of published research in this surgical field.
12. Demonstrate the ability to use information systems to obtain pertinent information regarding surgical issues and problems.
13. Use information technology to manage and provide patient-related information.
14. Be prepared to describe how to obtain relevant information to support patient management in the following example situations:
   a. high risk patient with large (8 cm) abdominal aortic aneurysm
   b. role of carotid angioplasty in the management of carotid artery disease

Systems-based Practice

For patients with vascular disease:
2. Review critical factors for decision making in vascular surgery
   a. risk:reward ratio
   b. morbidity and mortality probability
   c. preoperative and postoperative assessment
   d. noninvasive laboratories, duplex scanning
   e. role of advanced radiologic techniques: angioplasty, CT scanning, MRI/MRA imaging
2. Apply the decision making process in analyzing complex vascular diseases, including the following:
   a. cerebrovascular problems
   b. mesenteric vascular disease
   c. renovascular disease
   d. aneurysmal disease
   e. lower extremity arterial occlusion
   f. venous disease
3. Understand the role of a tertiary referral center in the surgical management of simple and complex problems.
4. Practice cost-effect health care and resource allocation, specifically reducing the use of unnecessary preoperative and postoperative screening and/or testing.
14. Practice cost-effect health care that does not compromise patient care.
15. Understand the responsibility of the surgeon in managing indigent patients.
16. Direct patients and their families towards individuals within the Institution that can help them with understanding complex issues of societal support and resources.
17. Understand an awareness of the role of health care managers and surgeon-extenders in the surgical management of patients.
20. Demonstrate awareness of the costs associated with providing surgical care to patients with vascular disorders.
21. The resident will produce at least one oral power point presentation each year, and a minimum of at least two published manuscripts during the training program, and will be specifically instructed in retrospective case analysis, meta analysis and the use of commonly encountered statistical tests for analysis of vascular outcomes, including quality of life (QOL) metrics, life table analysis, Kaplan-Meier analysis, Student’s t test, chi square, uni- and multi-variable analysis, etc.
22. Be prepared to discuss the interplay of the competing societal and patient needs in the following example situations:
   c. routine renal artery arteriography in patients undergoing cardiac catheterization
d. serial screening carotid duplex ultrasound for all patients at risk of having systemic atherosclerosis
PGY 3

Patient Care

All of the above for PGY1 and PGY 2, plus:
1. Achieve basic exposure of major arterial and venous structures under supervision
2. Participate in more complex arterial and venous interventions involving advanced techniques, stents, balloons, and covered grafts
3. Demonstrate understanding and basic skills in simple vascular suture techniques
4. Manage complications of common major vascular procedures such as:
   a. carotid endarterectomy
   b. aortic reconstruction
   c. lower extremity vascular reconstruction

Medical Knowledge

All of the above for PGY 1 through PGY 2, plus:
1. Analyze the role of the endothelium in atherosclerosis, thrombosis, and thrombolysis.
2. Discuss the principles of and contraindications for anticoagulation and thrombolytic therapy.
3. Describe the surgically correctable causes of hypertension and their diagnostic modalities.
4. Outline the indications for operations for claudication, abdominal aortic aneurysm, carotid stenosis, and amputation.
5. Describe the indications for balloon angioplasty and vascular stent placement vis a vis open surgery, with risks, complications, and outcomes.
6. Describe the pathogenesis and complications of aneurysmal disease.
7. Summarize the etiology, microbiology, and treatment of diabetic foot infection.
8. Discuss the mechanics of action and the therapeutic role of the following pharmacologic types of agents:
   a. vasopressors
   b. vasodilators
   c. adrenergic blocking agents
   d. anticoagulants
   e. antiplatelet agents
   f. thrombolytics
9. Demonstrate knowledge of the general principles of vascular surgical technique including:
   a. vascular control and suturing
   b. endarterectomy
   c. angioplasty
   d. bypass grafting
10. Discuss clotting factors and how they interact including hypercoagulable states and coagulopathies.
11. Discuss the role of the following factors in maintaining homeostasis in the coagulation pathways:
   a. platelet granules
   b. endothelial cell
   c. antithrombin III
   d. platelets
   e. protein S
   f. protein C
Interpersonal Communication Skills

PGY 3

In patients with vascular disease:
1. Be able to create and sustain a therapeutic and ethically sound relationship with patients and their families
2. Use effective listening skills.
3. Provide information to patients using effective nonverbal, explanatory, questioning, and writing techniques.
4. Work effectively with other members of the health care team.
5. The resident will actively participate in the discussions about patient care plans with nursing, social workers, and ancillary personnel. The resident will learn about the importance of communication with referring physicians.
6. Be prepared to describe an acceptable method to handle the following example interactions:
   a. patient’s referring doctor has told patient that his aortic aneurysm is a “time bomb”, but in fact it is too small to offer repair
   b. patient’s family refuses to assume at home care after operation, but refuses to allow patient to be transferred to a long term care facility

Professionalism

PGY 3

While caring for patients with vascular disease:
1. Demonstrate respect, compassion, and integrity.
2. Demonstrate responsiveness to the needs of patients and society and supercedes self-interest.
3. Demonstrate accountability to patients, society, and the profession of surgery.
4. Demonstrate a commitment to excellence and on-going professional development.
5. Demonstrate a commitment to ethical principles pertaining to provision of or withholding of clinical care.
7. Be able to obtain informed consent for planned interventions.
8. Demonstrate sensitivity and responsiveness to patient’s culture, age, gender, and disabilities.
9. Be prepared to discuss the professional and ethical principles with respect to the following example situations:
   a. patient with lower extremity claudication who refuses to stop smoking, but demands intervention
   b. patient’s family insists that the patient be told that he must undergo carotid endarterectomy for asymptomatic stenosis, but patient does not want any operation

10. Be punctual for all service activities, conferences, operating room, and other patient care responsibilities.
11. Respond to pages and requests for assistance in a timely manner.
Practice-based Learning

For patients with vascular disease:
1. Develop a method to record and track over time the results of intervention performed by the resident.
2. Be involved in the teaching of students and more junior residents and colleagues.
3. Present patients for discussion during rounds and seminars, with appropriate literature references to support planned intervention.
4. Understand the role of study design and the use/misuse of statistical analysis in review the results of published research in this surgical field.
5. Demonstrate the ability to use information systems to obtain pertinent information regarding surgical issues and problems.
6. Use information technology to manage and provide patient-related information.
7. Be prepared to describe how to obtain relevant information to support patient management in the following example situations:
   a. high risk patient with large (8 cm) abdominal aortic aneurysm
   b. role of carotid angioplasty in the management of carotid artery disease

Systems-based Practice

For patients with vascular disease:
1. Review critical factors for decision making in vascular surgery
   a. risk: reward ratio
   b. morbidity and mortality probability
   c. preoperative and postoperative assessment
   d. noninvasive laboratories, duplex scanning
   e. role of advanced radiologic techniques: angioplasty, CT scanning, MRI/MRA imaging
2. Apply the decision making process in analyzing complex vascular diseases, including the following:
   a. cerebrovascular problems
   b. mesenteric vascular disease
   c. reno-vascular disease
   d. aneurysmal disease
   e. lower extremity arterial occlusion
   f. venous disease
3. Understand the role of a tertiary referral center in the surgical management of simple and complex problems.
4. Practice cost-effect health care and resource allocation, specifically reducing the use of unnecessary preoperative and postoperative screening and/or testing.
5. Practice cost-effect health care that does not compromise patient care.
6. Understand the responsibility of the surgeon in managing indigent patients.
7. Direct patients and their families towards individuals within the Institution that can help them with understanding complex issues of societal support and resources.
8. Understand an awareness of the role of health care managers and surgeon-extenders in the surgical management of patients.
11. Demonstrate awareness of the costs associated with providing surgical care to patients with vascular disorders.
12. The resident will produce at least one oral power point presentation each year, and a minimum of at least two published manuscripts during the training program, and will be specifically instructed in retrospective case analysis, meta-analysis and the use of commonly encountered statistical tests for analysis of vascular outcomes, including quality of life (QOL) metrics, life table analysis, Kaplan-Meier analysis, Student’s t test, chi square, uni- and multi-variable analysis, etc.
13. Be prepared to discuss the interplay of the competing societal and patient needs in the following example situations:
   a. routine renal artery arteriography in patients undergoing cardiac catheterization
   b. serial screening carotid duplex ultrasound for all patients at risk of having systemic atherosclerosis
PGY 4

**Patient Care**

All of the above for PGY 1 through PGY 3, plus:

1. Interpret and plan for complex procedures, including endovascular aneurysm repair, using preoperative and intraoperative imaging
2. Efficiently and expediently provide percutaneous arterial and venous access in a variety of common procedures
3. Discuss and demonstrate the role of adjunctive measures in operative procedures including angioscopy, thrombolytic therapy, and video- and ultrasound-assisted procedures.
4. Demonstrate ability to manage graft and suture materials.
5. Demonstrate the standard incisions and exposure of:
   a. abdominal aorta and its major branches
   b. peripheral arterial system
   c. carotid arterial system
   d. arteriovenous fistula
6. Obtain vascular control of major vessels:
   a. aorta
   b. vena cava

**Medical Knowledge**

All of the above for PGY 1 through PGY 3, plus:

1. Describe the basic clinical manifestations of congenital vascular disease.
2. Summarize the etiology, diagnosis, and therapeutic options of specific categories of vascular disease:
   a. arterial disease
      i. inflammatory vascular disease and vasculitis
      ii. arteriovenous fistulas or malformations
      iii. neurovascular compression syndromes (thoracic outlet)
   b. miscellaneous
      i. tumors
      ii. sympathetic nervous system (causalgia, reflex sympathetic dystrophy)
3. Discuss the principles of angiography to include the following considerations:
   a. indications and complications
   b. principles and techniques of intraoperative angiography
   c. principles and techniques of emergency room angiography
4. Differentiate between different operative approaches to the vascular system to include:
   a. incisions and exposure
   b. handling of vascular tissues
   c. principles of vascular bypass grafting
   d. emergency vascular surgery
   e. re-operative vascular surgery
   f. principles of endarterectomy
Interpersonal Communication Skills

PGY 4

In patients with vascular disease:
1. Be able to create and sustain a therapeutic and ethically sound relationship with patients and their families
2. Use effective listening skills.
3. Provide information to patients using effective nonverbal, explanatory, questioning, and writing techniques.
4. Work effectively with other members of the health care team.
5. The resident will actively participate in the discussions about patient care plans with nursing, social workers, and ancillary personnel. The resident will learn about the importance of communication with referring physicians.
6. Be prepared to describe an acceptable method to handle the following example interactions:
   a. patient’s referring doctor has told patient that his aortic aneurysm is a “time bomb”, but in fact it is too small to offer repair
   b. patient’s family refuses to assume at home care after operation, but refuses to allow patient to be transferred to a long term care facility

Professionalism

PGY 4

While caring for patients with vascular disease:
1. Demonstrate respect, compassion, and integrity.
2. Demonstrate responsiveness to the needs of patients and society and supercedes self-interest.
3. Demonstrate accountability to patients, society, and the profession of surgery.
4. Demonstrate a commitment to excellence and on-going professional development.
5. Demonstrate a commitment to ethical principles pertaining to provision of or withholding of clinical care.
7. Be able to obtain informed consent for planned interventions.
8. Demonstrate sensitivity and responsiveness to patient’s culture, age, gender, and disabilities.
9. Be prepared to discuss the professional and ethical principles with respect to the following example situations:
   a. patient with lower extremity claudication who refuses to stop smoking, but demands intervention
   b. patient’s family insists that the patient be told that he must undergo carotid endarterectomy for asymptomatic stenosis, but patient does not want any operation
   c. Be punctual for all service activities, conferences, operating room, and other patient care responsibilities.
   d. Respond to pages and requests for assistance in a timely manner.
Practice-based Learning

For patients with vascular disease:
  a. Develop a method to record and track over time the results of intervention performed by the resident.
  b. Be involved in the teaching of students and more junior residents and colleagues.
  c. Present patients for discussion during rounds and seminars, with appropriate literature references to support planned intervention.
  d. Understand the role of study design and the use/misuse of statistical analysis in review the results of published research in this surgical field.
  e. Demonstrate the ability to use information systems to obtain pertinent information regarding surgical issues and problems.
  f. Use information technology to manage and provide patient-related information.
  g. Be prepared to describe how to obtain relevant information to support patient management in the following example situations:
    h. high risk patient with large (8 cm) abdominal aortic aneurysm
    i. role of carotid angioplasty in the management of carotid artery disease

Systems-based Practice

For patients with vascular disease:
  3. Review critical factors for decision making in vascular surgery
      a. risk: reward ratio
      b. morbidity and mortality probability
      c. preoperative and postoperative assessment
      d. noninvasive laboratories, duplex scanning
      e. role of advanced radiologic techniques: angioplasty, CT scanning, MRI/MRA imaging
  2. Apply the decision making process in analyzing complex vascular diseases, including the following:
      a. cerebrovascular problems
      b. mesenteric vascular disease
      c. reno-vascular disease
      d. aneurysmal disease
      e. lower extremity arterial occlusion
      f. venous disease
  3. Understand the role of a tertiary referral center in the surgical management of simple and complex problems.
  4. Practice cost-effect health care and resource allocation, specifically reducing the use of unnecessary preoperative and postoperative screening and/or testing.
      a. Practice cost-effect health care that does not compromise patient care.
      b. Understand the responsibility of the surgeon in managing indigent patients.
      c. Direct patients and their families towards individuals within the Institution that can help them with understanding complex issues of societal support and resources.
d. Understand an awareness of the role of health care managers and surgeon-
extenders in the surgical management of patients.

e. Advocate for quality patient surgical care.

f. Explain the risk: reward ratios of surgical care for patients with vascular
disease.

g. Demonstrate awareness of the costs associated with providing surgical care to
patients with vascular disorders.

h. The resident will produce at least one oral power point presentation each year,
and a minimum of at least two published manuscripts during the training
program, and will be specifically instructed in retrospective case analysis,
meta-analysis and the use of commonly encountered statistical tests for
analysis of vascular outcomes, including quality of life (QOL) metrics, life
table analysis, Kaplan-Meier analysis, Student’s t test, chi square, uni- and
multi-variable analysis, etc.

i. Be prepared to discuss the interplay of the competing societal and patient
needs in the following example situations:

j. routine renal artery arteriography in patients undergoing cardiac
catheterization

k. serial screening carotid duplex ultrasound for all patients at risk of having
systemic atherosclerosis
**PGY 5**

**Patient Care**

All of the above for PGY1 through PGY4, plus:

1. Obtain vascular control of diseased or traumatically occluded blood vessels using:
   a. vascular clamps
   b. vessel loop / Rummel tourniquet
   c. balloon occlusion
   d. digital compression

2. Participate in thromboendarterectomy and thrombectomy/thromboembolectomy

3. Demonstrate appropriate advanced vascular suture techniques.

4. Participate in advanced incisions and access, including retroperitoneal exposure, of:
   a. abdominal aorta and its major branches
   b. peripheral arterial system
   c. carotid arterial system
   d. open and percutaneous brachial and axillary access

5. Participate in endarterectomy and bypass grafting.

6. Perform selected operative procedures or selected parts of the following operative procedures under supervision:
   a. aortic aneurysm repair
   b. carotid endarterectomy
   c. aorto-iliac occlusive disease
   d. femoral-popliteal occlusive disease
   e. correction of portal hypertension
   f. peripheral vascular trauma

7. Select and use proper advanced open and endovascular techniques in managing patients with a variety of vascular disorders such as:
   a. ruptured aortic aneurysm
   b. central vascular trauma
   c. suprarenal aortic aneurysm
   d. renovascular hypertension
   e. femoral tibial and pedal bypasses

8. Perform alternative methods of bypass grafting such as:
   a. extra-anatomic bypass, principles and techniques
   b. indirect revascularization
   c. *in situ* techniques
   d. sequential and composite techniques

9. Manage prosthetic graft infections to include:
   a. diagnosis
   b. selection of alternate routes for revascularization
   c. selection of appropriate graft materials
   d. timing of intervention
Medical Knowledge

All of the above for PGY 1 through PGY 4, plus:
1. Illustrate the operative exposure of the major vessels, including:
   a. aortic arch
   b. proximal subclavian
   c. carotid artery
   d. descending thoracic aorta
   e. suprarenal aorta
   f. infra-renal aorta
   g. femoral artery
   h. popliteal artery
2. Categorize the prevention and management of operative and postoperative complications, including graft infections, ischemic bowel, graft thrombosis, and extremity ischemia.
3. Outline the manifestation of failing peripheral vascular grafts.
4. Discuss the principles of re-operative vascular surgery.
5. Outline procedure for managing vascular surgical emergencies such as acute tissue ischemia or major hemorrhage (traumatic or ruptured aneurysm).
6. Demonstrate a basic knowledge of the various types of graft and suture material available.
7. Analyze alternative measures for the diagnosis and management of reno-vascular hypertension.
8. Discuss alternative operative procedures for the management of portal hypertension.
9. Summarize the surgical techniques available for managing the following vascular disorders:
   a. abdominal aortic bypass or aneurysmectomy/aneurysmorraphy
   b. carotid stenosis
   c. femoral-popliteal occlusion
   d. tibial arterial occlusion
10. Analyze the management of complex vascular problems considering the following factors:
    a. morbidity and mortality
    b. advanced surgical techniques
       i. endoscopy
       ii. microvascular techniques
       iii. endoluminal grafting
11. Outline the management of prosthetic graft infections, including:
    a. diagnosis
    b. use of alternate routes for revascularization
    c. use of alternative graft materials
12. Summarize complications of common major vascular procedures such as:
    a. carotid endarterectomy
    b. aortic reconstruction
    c. lower extremity vascular reconstruction
Interpersonal Communication Skills

PGY 5

In patients with vascular disease:
   a. Be able to create and sustain a therapeutic and ethically sound relationship with patients and their families
   b. Use effective listening skills.
   c. Provide information to patients using effective nonverbal, explanatory, questioning, and writing techniques.
   d. Work effectively with other members of the health care team.
   e. The resident will actively participate in the discussions about patient care plans with nursing, social workers, and ancillary personnel. The resident will learn about the importance of communication with referring physicians.
   f. Be prepared to describe an acceptable method to handle the following example interactions:
   g. patient’s referring doctor has told patient that his aortic aneurysm is a “time bomb”, but in fact it is too small to offer repair
   h. patient’s family refuses to assume at home care after operation, but refuses to allow patient to be transferred to a long term care facility

Professionalism

PGY 5

While caring for patients with vascular disease:
   a. Demonstrate respect, compassion, and integrity.
   b. Demonstrate responsiveness to the needs of patients and society and supercedes self-interest.
   c. Demonstrate accountability to patients, society, and the profession of surgery.
   d. Demonstrate a commitment to excellence and on-going professional development.
   e. Demonstrate a commitment to ethical principles pertaining to provision of or withholding of clinical care.
   f. Maintain confidentiality of patient information.
   g. Be able to obtain informed consent for planned interventions.
   h. Demonstrate sensitivity and responsiveness to patient’s culture, age, gender, and disabilities.
   i. Be prepared to discuss the professional and ethical principles with respect to the following example situations:
      a. patient with lower extremity claudication who refuses to stop smoking, but demands intervention
      b. patient’s family insists that the patient be told that he must undergo carotid endarterectomy for asymptomatic stenosis, but patient does not want any operation
   j. Be punctual for all service activities, conferences, operating room, and other patient care responsibilities.
   k. Respond to pages and requests for assistance in a timely manner.
Practice-based Learning

For patients with vascular disease:
  a. Develop a method to record and track over time the results of intervention performed by the resident.
  b. Be involved in the teaching of students and more junior residents and colleagues.
  c. Present patients for discussion during rounds and seminars, with appropriate literature references to support planned intervention.
  d. Understand the role of study design and the use/misuse of statistical analysis in review the results of published research in this surgical field.
  e. Demonstrate the ability to use information systems to obtain pertinent information regarding surgical issues and problems.
  f. Use information technology to manage and provide patient-related information.
  g. Be prepared to describe how to obtain relevant information to support patient management in the following example situations:
    h. high risk patient with large (8 cm) abdominal aortic aneurysm
    i. role of carotid angioplasty in the management of carotid artery disease

Systems-based Practice

For patients with vascular disease:
  4. Review critical factors for decision making in vascular surgery
      a. risk:reward ratio
      b. morbidity and mortality probability
      c. preoperative and postoperative assessment
      d. noninvasive laboratories, duplex scanning
      e. role of advanced radiologic techniques: angioplasty, CT scanning, MRI/MRA imaging
  2. Apply the decision making process in analyzing complex vascular diseases, including the following:
      a. cerebrovascular problems
      b. mesenteric vascular disease
      c. reno-vascular disease
      d. aneurysmal disease
      e. lower extremity arterial occlusion
      f. venous disease
  3. Understand the role of a tertiary referral center in the surgical management of simple and complex problems.
  4. Practice cost-effect health care and resource allocation, specifically reducing the use of unnecessary preoperative and postoperative screening and/or testing.
      a. Practice cost-effect health care that does not compromise patient care.
      b. Understand the responsibility of the surgeon in managing indigent patients.
      c. Direct patients and their families towards individuals within the Institution that can help them with understanding complex issues of societal support and resources.
5. Understand an awareness of the role of health care managers and surgeon-extenders in the surgical management of patients.
8. Demonstrate awareness of the costs associated with providing surgical care to patients with vascular disorders.
9. The resident will produce at least one oral power point presentation each year, and a minimum of at least two published manuscripts during the training program, and will be specifically instructed in retrospective case analysis, meta analysis and the use of commonly encountered statistical tests for analysis of vascular outcomes, including quality of life (QOL) metrics, life table analysis, Kaplan-Meier analysis, Student’s t test, chi square, uni- and multi-variable analysis, etc.
10. Be prepared to discuss the interplay of the competing societal and patient needs in the following example situations:
    a. routine renal artery arteriography in patients undergoing cardiac catheterization
    b. serial screening carotid duplex ultrasound for all patients at risk of having systemic atherosclerosis
DUTIES AND RESPONSIBILITIES ON VASCULAR SURGERY SERVICES

ALL
1. Attending daily AM and PM work rounds.
2. Interact with and instruct medical students.
3. Participate in in-house call schedule as assigned.
4. Attend outpatient clinic as assigned.
5. Attend following conferences and others as assigned, including:
   a. Vascular Conferences: MUSC Wednesday AM or Roper Friday AM
   b. Surgical Grand Rounds, Tuesday 7 AM
   c. Surgical M and M Conference, Tuesday 4 PM
   d. Basic Science Lecture, Tuesday 5 pm

PGY 1
1. Write orders and complete daily assigned tasks. Sign all verbal orders given.
2. Provide ward coverage for inpatients and write daily progress notes. Co-sign student notes.
3. Work up patients on the Vascular Service (inpatients and same day admissions).
4. Provide direct patient evaluation, assessment, and communicate with more senior person for problems.
5.

PGY 2
1. Assist PGY 1 in completing ward work, orders, and work-ups.
2. Assume primary responsibility for managing ICU patients in conjunction with ICU service including orders and daily progress notes.
3. Complete initial evaluation of inpatient consults prior to presentation to chief resident or attending.
4. Organize and run vascular conference.
5. Assure ICU/ACU beds are available postop as appropriate.

PGY 3, 4, and 5
1. Oversee evaluation and daily management of all vascular patients.
2. Participate in major vascular reconstructions as primary surgeon or assistant.
3. Communicate directly with attending regarding patient findings and care plans.
4. Insure appropriate informed consent is obtained and communicate with patient families as appropriate.
5. Communicate with nursing service representatives regarding daily management and discharge planning.
6. Coordinate availability of ICU/ACU beds with assistance of PGY 2.
7. Provide daily instruction on patient care and evaluation to medical students.
8. Accomplish operative reports as primary surgeon within 24 hours.
9. Assign other administrative tasks to more junior residents as appropriate.