

## Rotation Specific Goals and Learning Objectives

### Ultrasound

#### **Patient Care and Procedural Skills**

- 1) Identify indications and uses for bedside ultrasound for evaluation of cardiopulmonary abnormalities and abdominal pathologies in the ICU.
- 2) Identify contraindications for ultrasound and for transesophageal echocardiography.
- 3) Set up the ultrasound machine and choose the correct probe and machine settings for specific ultrasound exam.
- 4) Know the proper procedure to clean and protect the ultrasound machine and probes.
- 5) Store and review images in HIPAA compliant system.
- 6) Demonstrate safe patient positioning needed for each ultrasound window.
- 7) Place and operate a transesophageal echo probe in a safe manner.
- 8) Obtain adequate imaging windows for examination of the heart, pleura, thorax, abdomen and major vasculature with additional focus on avoidance of lines, drains, and surgical sites.
- 9) Perform Doppler measurements, distance and volume measurements for chamber & vasculature size quantification.
- 10) Integrate results of ultrasound exam with history, physical exam, laboratory and radiographic data to refine differential diagnosis and improve medical decision making.
- 11) Discuss the role of ultrasound in clinical care with patients, family members and hospital staff.
- 12) Discuss findings of ultrasound exam and communicate clearly with faculty, house staff and consultants in the ICU.
- 13) Perform a passive leg raise during cardiac ultrasound to assess fluid responsiveness.
- 14) Perform venous cannulation, thoracentesis and any other procedure using real-time or static ultrasound guidance.

#### **Medical Knowledge**

- 1) Understand physics of medical ultrasound including 2D, Doppler, color-flow Doppler ultrasound.
- 2) Know the diagnostic capabilities and performance characteristics of ultrasound based diagnoses.
- 3) Become proficient at image interpretation to make diagnoses within the realm of critical care ultrasound as described by several society guidelines.
- 4) Understand the findings during cardiac ultrasound examination to identify hypovolemia, global left and right ventricular dysfunction, pericardial effusion with possible cardiac tamponade, acute severe valvular dysfunction.
- 5) Know the findings during pleural and thoracic ultrasound to identify pleural effusion, pneumothorax, consolidation, and pulmonary edema.
- 6) Be familiar with the findings during abdominal ultrasound to identify free peritoneal fluid, loculated peritoneal collection, aortic aneurysm, IVC size and variation with respiration.
- 7) Know the findings during vascular exam to identify intravascular thrombosis and adequacy of venous cannulation.
- 8) Understand methods of quantitatively calculating stroke volume, ejection fraction, and cardiac output.
- 9) Understand the scope of practice of critical care ultrasound and know the appropriate criteria to request complete ultrasound evaluation.

10) Know the limits of diagnostic capabilities of critical care ultrasound.

### **Practice-based learning and improvement**

- 1) Understand the limitations as ultrasound learners and ask for help and advice from faculty and sonographers when difficulties arise in obtaining adequate imaging.
- 2) Use information technology to store images, develop reports, and refer to reports written previously.
- 3) Attend regularly follow-up with faculty and accept feedback and develop plan to improve image acquisition and interpretation skills.
- 4) Integrate evidence-based medicine and knowledge of statistical methods to critically appraise scientific evidence on the role of ultrasound in diagnosis and therapeutics in the ICU.

### **Interpersonal and communication skills**

- 1) Demonstrate caring and respectful behaviors with patients, families, and all members of the health care team.
- 2) Discuss with patients, family, and other healthcare providers the purpose of ultrasound examination and review results.
- 3) Promote learning of residents, medical students, and other learners rotating in the ICU.
- 4) Communicate effectively with ICU faculty, other staff member, and other medical teams on the findings of ultrasound examination.

### **Professionalism**

- 1) Demonstrate respect, compassion, and integrity.
- 2) Demonstrate a commitment to excellence and on-going professional development
- 3) Attempt to minimize disruptions to other components of ICU care during rotation.

### **Systems-based practice**

- 1) Appreciate the utility of ultrasound in preventing unnecessary tests and treatments to promote cost-effectiveness
- 2) Supervise and teach ultrasound skills to residents, medical students, and other providers in the ICU.
- 3) Advocate for patient's needs and understand their concerns.
- 4) Provide rapid and efficient results to the rest of the ICU team.