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.