

UCI Critical Care Ultrasound Lecture Series & Image Acquisition Workshop

This document describes the year-long program in ultrasound (US) training for Fellows in Pulmonary Critical Care Medicine (PCCM), Acute Care Surgery –Trauma (ACS-Trauma), Anesthesiology Critical Care Medicine (ACCM), and Neurosciences Critical Care (NSCC). The lectures are organized in a progressive manner; and, are geared to provide a comprehensive curriculum in critical care US, and enough echocardiography for board eligibility – should a fellow be inclined to pursue this accreditation. The main focus is transthoracic echo (TTE), however, specific sessions are provided on vascular access, head/neck, lungs, abdomen/pelvis, extremities, etc.

The lecture series is designed to provide a structured scholarly approach to supplement the clinician training that should occur daily in the ICU. Critical Care fellows are expected to obtain TTE imaging on all unstable patients in the mornings between 7:00 am – 8:30 am so the resultant data will be available to be acted upon at attending rounds. Subsequent imaging is to be obtained as needed during the remainder of the day. Other TTE training skills can be developed by interacting with the hospital-based ultrasonographers, and by joining TTE readings in the late mornings and afternoons with cardiology faculty.

This lecture schedule is organized into weekly noon time sessions, with experienced faculty leading the sessions, paired with variable degrees of hands-on echo imaging workshops using simulators or volunteer human models (fellows, residents, med students) as available and deemed appropriate by the faculty leading the session. The weekly meetings are offered to provide structure and faculty support to both pace the US training and reinforce principles covered in the suggested readings and videos.

Results of US findings obtained during the week by any fellow, and submitted for review, will be discussed during multidisciplinary rounds to help guide future image acquisition, interpretation, and patient management. The textbooks of choice for the rotation are: 1) Point of Care Ultrasound by Nilam J. Soni, et al (abbreviation for assignments: PoCU), 2) Essential Echocardiography edited by Scott Solomon, 2007 (abbreviation: “EE”); Other resources include on-line library of lectures, videos, and educational materials from Dr. Chris Fox, Dr. Davinder Ramsingh, Dr. Liz Turner, and Dr. William Wilson.

If the regularly scheduled Monday US training occurs on a holiday, the lecture will be given the following Wednesday.

Evaluation:

30% Participation in weekly echo didactic (including info. sharing with other fellows)

30% Maintenance of a logbook of patient studies (required for all TTEs performed)

10% image acquisition proficiency

10% image interpretation capabilities

10% participation in Quiz – approximately every 9 weeks

10% practical examination – approximately every 18 weeks

90-100%	outstanding
80-90%	above expectations
70-80%	expectations
60-70	below expectations

Critical Care US Lecture Series will begin Mon, July 13, 2015,
12:00-1:00 PM (unless otherwise stated all meetings in CR 6843).

Week 1 - Topic	Principles of Ultrasound – doppler & ultrasound physics
	EE – Chap 1: echocardiographic instrumentation & principles of doppler
	PoCU – Chap 2: Ultrasound Physics [pre-course exam]
Week 2 - Topic	Basic TTE image acquisition, nomenclature, basic knobology
	EE – Chap 2: introduction to imaging, Chap 3: protocol & nomenclature in TTE, Chap 4: Clinical Utility
	PoCU – Chap 3: Transducers; Chap 4: Orientation; Chap 5: Basic Operation of an Ultrasound Machine; Chap 6: Artifacts
Week 3 - Topic	Evaluation of intravascular volume status & volume responsiveness (e.g. HD response to fluid challenge, leg raising, etc.)
	EE – Chap: None; (Supplemental info from D. Ramsingh – TBD)
	PoCU – Chap 18: Inferior Vena Cava
Week 4 - Topic	U/S-assisted intravascular access (central, PIC, A-lines)
	EE – Chap: None; (Supplemental info from D. Ramsingh – TBD)
	PoCU – Chap 28: Central Venous Access; Chap 29: Peripheral Venous Access; Chap 30: Arterial Access
Week 5 - Topic	Systolic Function – Emphasis on LV (some intro to RV)
	EE – Chap 5: systolic function
	PoCU – Chap 14: LV Function; Chap 15: RV Function
Week 6 - Topic	TTE for unstable ICU pt – image acquisition for rescue diagnosis
	EE – Chap 4: Clinical Utility
	PoCU – Chap 13: Cardiac Ultrasound Technique; Chap 40: Hypotension & Shock
Week 7 - Topic	Advanced Knobology & Image Storage (keeping up on your TTE log)
Week 8 - Topic	Clinical conditions requiring formal Echo Study (e.g. impaired LV function, severe pulm HTN, valve abnormality, vegetation)
Week 9 - Topic	Image review workshop (interesting images from prior weeks) Plus – Quiz covering didactic material from weeks 1-8.
	EE – Chap: Review prior chapters
	PoCU – Review prior chapters - especially Chap 38: Dyspnea & Acute Respiratory Failure; Chap 40: Hypotension & Shock
Week 10 - Topic	Basic Hemodynamic Measurements (Part 1)

Sept 14, 2015	EE – Chap: TBD (Supplemental info from C. Fox – TBD)
	PoCU – Chap 40: Hypotension & Shock
Week 11 - Topic	Myocardial Ischemia
	EE – Chap 7: Myocardial infarction
	PoCU – Chap 17: Left Ventricular Function
Week 12 - Topic	Pericardial Effusion and Disease
	EE – Chap 9: Pericardial Effusion and Disease
	PoCU – Chap 17: Pericardium
Week 13 - Topic	Emergency Echo – Standardized Approach to Rescue TTE
	EE – Chap: TBD
	PoCU – Chap 42: Cardiac Arrest – also review Chap 38: Dyspnea & Acute Respiratory Failure; Chap 40: Hypotension & Shock
Week 14 - Topic	Pulm U/S Part 1: Evaluation for Pneumothorax & Pleural Effusions
	EE – Chap: none
	PoCU – Chap 8: Lung & Pleural Ultrasound Technique; Chap 9: Lung Ultrasound Interpretation; Chap 10: Pleural Ultrasound Interpretation; Chap 11: Lung and Pleural Procedures
Week 15 - Topic	Pulm U/S Part 2: Evaluation for Pneumonia & Pulmonary Edema
Oct 19, 2015	EE – Chap 5: none
	PoCU – Chap 8: Lung & Pleural Ultrasound Technique; Chap 9: Lung Ultrasound Interpretation; PoCU – Chap 38: Dyspnea & Acute Respiratory Failure.
Week 16 - Topic	Extremities Part 1: Review of Central Venous Access – Evaluation for DVT
Oct 26, 2015	EE – Chap:
	PoCU – Chap:
Week 17 - Topic	Basic Hemodynamic Measurements (Part 2)
	EE – Chap:
	PoCU – Chap:
Week 18 - Topic	Extremities Part 2: Soft tissue wound eval (LNs, nec. Fasciitis) and Review of Lower Extremity w/ DVT
	EE – Chap: None
	PoCU – Chap 33: Lymph Nodes; Chap 36: Skin & Soft Tissues; Chap 37: Joints

CCM US Series continues Mon, Sept 15, 2014, 12:00-1:00 PM
(unless otherwise stated all meetings in CR 6843).

Week 19 - Topic	Right Ventricle, Tricuspid Valve and Pulmonic Valve – Eval & Quantification of TAPSE, PA Pressure calculations, etc.
	EE – Chap: TBD
	PoCU – Chap 15: Right Ventricular Function
Week 20 - Topic	Abdominal U/S Part 1: Genitourinary (includes hydronephrosis eval)
	EE – Chap: None
	PoCU – Chap 20: Kidneys; Chap 21: Bladder; Chap 24: First Trimester Pregnancy; Ch 25: Testicular Ultrasound
Week 21 - Topic	Abdominal U/S Part 2: Stomach & duodenum (NGT/FT), SBO, hepato-biliary system.
	EE – Chap: None
	PoCU – Chap 19: Gallbladder; Chap 23: Peritoneal Free Fluid
Week 22 - Topic	Diastology
	EE – Chap 6: Diastolic Function
	PoCU – Chap: None
Week 23 - Topic	Cardiac Image Review
	EE – Chap: None
	PoCU – Chap: None
Week 24 - Topic	Aorta, major arteries, Vena cava and its tributaries
	EE – Chap 20: Diseases of the Aorta
	PoCU – Chap 22: Abdominal Aorta
Week 25 - Topic	Aortic Valve: Stenosis and Regurgitation - Quantification
	EE – Chap 11: Aortic Stenosis, Chap 12: Aortic Regurgitation
	PoCU – Chap 16: Valves
Week 26 - Topic	Mitral Valve: Stenosis and Regurgitation – Quantification CANCELED
	EE – Chap 13: Mitral Stenosis, Chap 14: Mitral Regurgitation
	PoCU – Chap 16: Valves
Week 27 - Topic	Airway: including ETT positioning and Surgical Airway
	EE – Chap: None (Supplemental info from D. Ramsingh – TBD)
	PoCU – Chap: None

Week 28 - Topic	Evaluation of PAH, PE, Cardiac masses, review of DVT evaluation
Feb 1, 2016	EE – Chap 18: PE and PAH, Chap 17: Cardiac Masses including thrombi
	PoCU – Chap 26: Lower Extremity DVT; Chap 27: Upper Extremity DVT
Week 29 - Topic	US of Head and Neck: Optic nerve sheath diameter (ONSD) & ICP; review ETT position / mal-position, review surg airway
	EE – Chap: None (Supplemental info from D. Ramsingh – TBD)
	PoCU – Chap 31: Ocular Ultrasound; Chap 32: Thyroid Gland
Week 30 - Topic	Quiz covering didactic material. (1 st half will be written quiz, 2 nd half will be review of quiz)
Week 31 - Topic	Basic Cardiac TTE Review & Basic Hemodynamic Review
	EE – Chap 9: None (Supplemental info from D. Ramsingh TBD)
	PoCU – Chap: None
Week 32 - Topic	Evaluation for PFO / ASD (aggitated saline, vs Perflutren lipid microspheres [Definity TM] vs doppler), + review questions
	EE – Chap: None (Supplemental info from P. Knoll – TBD)
	PoCU – Chap: None
Week 33 - Topic	Diastology Review & Review of PA Pressure calcs and TAPSE
	EE – Chap 6: Diastolic Function + review supplemental materials
	PoCU – Chap15: Right Ventricular Function
Week 34 - Topic	RUSH Exam: Std. approach to Rescue Echo Evaluation – reviewed/refined
	EE – Chap: TBD
	PoCU – Chap 41: Trauma; also review Chap 38: Dyspnea & Acute Respiratory Failure; Chap 40: Hypotension & Shock; Chap 42: Cardiac Arrest
Week 35 - Topic	Abdomen Review: G/U, hepatobiliary, Stomach, DU, NGT, SBO
	EE – Chap: None - (Supplemental info from Shadi Lahham, MD– TBD)
	PoCU – Review Prior Chapters
Week 36 - Topic	Diastology Review & Advanced Hemodynamics
	EE – Chap: None
	PoCU – Chap: None
Week 37 - Topic	Nerve blocks
	EE – Chap: None
	PoCU – Chap 34: Peripheral Nerve Blocks; Chap 35: Lumbar Puncture

Week 38 - Topic	Review pulmonary imaging (Ptx, effusion, pneumonia, pulm edema)
Apr 11, 2016	EE – Chap: None: Review Supplemental info
	PoCU – Chap: Review Online Cases for Chap 9 (Lung) and Chap 10 (Pleura)
Week 39 - Topic	Review extremity imaging (DVTs, soft tissue infections, LNs, PIC)
	EE – Chap: None
	PoCU – Review Prior Chapters
Week 40 - Topic	Review Diastology and LV Function
	EE – Chap 6: Diastolic Function + Chap 5: systolic function
	PoCU – Chap 14: Left Ventricular Function
Week 41 - Topic	Review PAH, PE, and RV Function
	EE – Chap: TBD
	PoCU – Chap 15: Right Ventricular Function
Week 42 - Topic	Hemodynamics Part 2
	EE – Chap: None
	PoCU – Chap: TBD
Week 43 - Topic	Review image optimization – advanced knobology
	EE – Chap: TBD (Supplemental info from Chris Fox– TBD)
	PoCU – Review Chap 3: Transducers; Chap 4: Orientation; Chap 5: Basic Operation of an Ultrasound Machine; Chap 6: Artifacts
Week 44 - Topic	Review volume responsiveness (new technologies)
	EE – Chap: TBD
	PoCU – Review Online Cases
Week 45 - Topic	Review all topics – question smorgesboard (Final Exam)
	EE – Chap: Review all
	PoCU – Chap 38 - 42: Clinical Scenarios and Protocols/Review all

Note: This schedule is subject to change. If changes occur all Critical Faculty and Fellows will be notified, and revised schedules will be released.