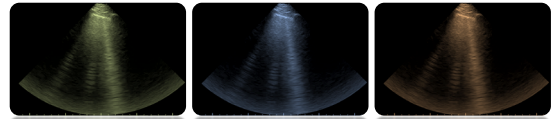LE CENTRE DE SIMULATION MÉDICALE **ARNOLD AND BLEMA STEINBERG** MEDICAL SIMULATION CENTRE

M U S E

McGill UltraSound Evaluation (MUSE) Program

Bedside Ultrasound Course for Primary Care Clinicians

Table of Contents

Section 1: Course description

Introduction

The primary care clinician is faced with a wide variety of clinical scenarios for which bedside ultrasound can assist in diagnoses, therapeutics, management, procedures, and ultimately, improved patient outcomes. Our course aims to improve the bedside ultrasound skills of primary care providers through a modular, problem-based approach.

Course Material

Once registered we will send you the course textbook: "Bedside Ultrasound-Level 1". Please read the entire textbook prior to the course in order to optimize your learning during the practical sessions. The textbook expresses topics simply and clearly, and can be read in a matter of hours.

In order to prepare for Module 6 you will need to understand the parasternal long axis view of the heart. This topic is not discussed in the textbook but is is well covered at:

http://media.med.sc.edu/ultrasound_institute/wip/11A1/player.html

The course material allows advance preparation to optimize the participant's hands-on experience during the practical sessions. The course material also permits post-course review to solidify acquired concepts and skills.

Format

Part 1: Practical Introductory Workshop

- participants engage in a thorough hands-on introduction to bedside ultrasound in seven common clinical scenarios

Part 2: Supervised Scans

- participants are will be supervised while successfully scanning standardized models 20-30 times in each of *three applications of their choosing.* The choice of applications tailors the course to the participants' clinical reality.

Infrastructure

The course is organized by the McGill UltraSound Evaluation (MUSE) Program, at the Arnold and Blema Steinberg Medical Simulation Centre, Montreal, Canada. The MUSE Program has 8-10 new state-of-the-art portable ultrasound machines on site at all times and several ultrasound simulators programmed to demonstrate pathology.

Teaching Faculty

We offer an excellent instructor to learner ratio (1:2). The Teaching Faculty of the Program has extensive expertise in teaching bedside ultrasound. Their experience spans practicing and

teaching ultrasound from rural and urban ER and ICU departments, to overseas volunteer work, medical wards, and office-based clinics.

Target audience

This course is tailored to the needs of the motivated, self-learning primary care clinician. It is suitable for both the rural-remote or urban primary care clinician.

Section 2: Course Format

Part 1: Practical Introductory Workshop (Day 1, 8 hours)

Time	Module #	Common clinical scenario
7:30-8:00	Registration	
8:00-9:00	1. Abdominal pain (Aorta)	Male, 70, abdominal pain, radiating to the back. AAA?
9:00-10:00	2. Abdominal pain or AKI (Kidney, bladder)	Male, 42, with flank pain and hematuria. Or male, 82, with increasing creatinine. Obstructive uropathy?
10:00-10:15	Refreshments	
10:15-11:15	3. Abdominal pain (Gallbladder)	Female, 40, post-prandial RUQ pain and a Murphy's sign. Cholecystitis?
11:15-12:15	4. Pelvic pain, vaginal bleeding (Female pelvis)	Female, 30, pregnant, with pelvic pain and minimal vaginal bleeding at 7 weeks since LNMP. Identifying an IUP and ruling out abdominal/pelvic free fluid at bedside with ultrasound
12:15-13:00	Lunch	
13:00-14:00	5. Chest pain, dyspnea 1 (Lung, pleura)	Female, 62, with COPD, CHF, and dyspnea. How to use ultrasound to evaluate the dyspneic patient
14:00-15:00	6. Chest pain, dyspnea 2 (Lung, pleura, heart, IVC)	Male, 80, has increasing dyspnea and chest pain. Integrating lung, pleura, heart, and IVC ultrasound
15:00-15:15	Refreshments	

15:15-16:15	7. Swollen leg (Femoral and popliteal veins)	Male, 50, with lung cancer and a swollen leg. R/O DVT
16:15-17:15	Review	

Part 2: Supervised scans (Day 1-2, 9 hours)

Time	Activity	Participants choose three applications
8:00-9:00	Supervised scans	
9:00-10:00	Supervised scans	
10:00-10:15	Refreshments	
10:15-11:15:	Supervised scans	
11:15-12:15:	Supervised scans	
12:15-13:00	Lunch	
13:00-14:00	Supervised scans	
14:00-15:00:	Supervised scans	
15:00-15:15	Refreshments	
15:15-16:15	Supervised scans	
16:15-17:15	Supervised scans	
17:15-17:30	Wrap-up & review	

Participants will perform 20-30 scans in each of three chosen applications. In this way, participants will reach the number of supervised scans per application recommended by expert guidelines for conferring competency (ACEP Ultrasound Guideline, 2008).

Course Registration

Registration fee for 2-day course includes:

- Part 1: Practical Introductory Workshop
- Part 2: Supervised Scans (20-30 scans in three applications)
- A certificate of completion
- CME credits (3 per hour from CFPC, or FRCP; 1 per hour from McGill University)
- Textbook "Bedside Ultrasound – Level 1" (ISBN 978-0-9919566-0-9; A-line Press)
- Appropriate links to online resources
- Tea and coffee during refreshment breaks, and a light lunch

Registration type	Pre-course registration fee	On-site registration fee
Clinician	$2200	$2400
Fellow and/or Resident	$1000	$1200
Student	$600	$800

REGISTRATION FORM
Bedside Ultrasound for
Primary Care Clinicians

Date of course : _____

Name: _____

Address: _____

City: _____   Province: _____   Postal code: _____

Email: _____

Fee: $_____

Payment by cheque to: McGill University

Credit Card Payment: Please complete Credit Card Authorization Form on next page

Send registration form and cheque to:

The MUSE Program c/o Stephanie Tassé-Smith
Arnold and Blema Steinberg Medical Simulation Centre
3575 Parc Avenue, Suite 5640
Montreal, Quebec H2X 3P9

Questions?: medsimcentre@mcgill.ca

Arnold and Blema Steinberg Medical Simulation Centre   **CREDIT CARD**

3575 Parc Avenue Suite 5640   **AUTHORIZATION FORM**

Montreal, QC H2X 3P9

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Appendix: Objectives Overview

The objectives are organized into seven modules that encompass bedside applications for common clinical scenarios:

Module 1: **Abdominal Pain (aorta)**

Module 2: **Abdominal Pain or AKI (kidney and bladder)**

Module 3: **Abdominal Pain (gallbladder)**

Module 4: **Abdominal/Pelvic Pain (first trimester pregnancy)**

Module 5: **Chest pain and dyspnea 1 (lung)**

Module 6: **Chest pain and dyspnea 2 (heart and lung)**

Module 7: **Swollen leg (femoral and popliteal veins)**

Each module is described in the following pages in terms of:

- clinical scenario
- objectives
- pathologies

Module 1: Abdominal Pain (aorta)

Clinical scenario: Male, 70, abdominal pain radiating to back. Rule out AAA.

Objective #1. Probe choice

- Choose an appropriate probe for imaging the abdominal aorta

Objective #2. Patient position and scanning technique

- Assume appropriate patient and sonographer position for imaging the abdominal aorta

Objective #3. Abdominal aorta in the transverse plane

- Obtain an ultrasound image of the abdomen in the transverse plane

- Identify the abdominal aorta, vertebral body, IVC, and liver in the transverse plane

- Image the abdominal aorta in the transverse plane every centimeter from the epigastrium until the bifurcation of the aorta into the iliac arteries

- Measure the diameter of the abdominal aorta in the transverse plane

Objective #4. Abdominal aorta in the sagittal plane

- Identify the abdominal aorta in the sagittal plane

- Measure the diameter of the abdominal aorta in the sagittal plane

Pathology (AAA)

- Discuss definition and sonographic appearance of AAA.

Module 2: Abdominal Pain or AKI (kidney and bladder)

Clinical scenario: Male, 42, with flank pain, likely renal colic. (Or with increased creatinine)

Objective #1. Probe choice

- Choose an appropriate probe for imaging the kidney

Objective #2. Patient position and scanning technique

- Assure appropriate patient and sonographer position for imaging the kidney

Objective #3. Kidney and Bladder

- Identify the surface and sonographic landmarks of the kidney
- Sweep both kidneys in coronal and transverse planes
- Identify the renal cortex, medullary pyramids, and renal sinus in both planes
- Identify the bladder in sagittal and transverse planes

Pathology

- **Understand the appearance of hydronephrosis and discuss the degrees of hydronephrosis (mild, moderate, severe)**
- Calculate post-void residual urine volume

Module 3: Abdominal Pain (gallbladder)

Clinical scenario: Female, 40, postpartum, obese with postprandial RUQ pain.

Objective #1. Probe choice

- Choose an appropriate probe for imaging the gallbladder

Objective #2. Patient position and scanning technique

- Assume appropriate patient and sonographer position for imaging the gallbladder

Objective #3. Patient position and scanning technique

- Identify the gallbladder using 3 approaches: (Subcostal sweep; X-minus 7; lateral)
- Practice troubleshooting techniques to find GB (deep breath, LLD position, landmarks)
- Sweep GB in short and long axis

Pathology: Cholecystitis

- Learn the ultrasonographic features of cholecystitis

Module 4: Abdominal and Pelvic Pain (first trimester pregnancy)

Clinical scenario: Female, 32, BHCG +, 7 weeks post LNMP, pelvic pain & vaginal bleeding.

Objective #1. Probe choice

- Choose an appropriate probe for imaging the pelvis

Objective #2. Patient position and scanning technique

- Assume appropriate patient and sonographer position for imaging the pelvis

Objective #3. Uterus

- Identify surface (symphysis pubis) & sonographic (bladder) landmarks to find the uterus
- Sweep the entire uterus in sagittal and transverse plane
- Identify the endometrial stripe

Pathology

- Discuss pseudo-gestational sac

- Discuss the criteria for IUP: gestational sac + yolk sac

- Demonstrate where FF may lie if the ectopic pregnancy is ruptured (Pouch of Douglas, Morrison's, spleno-renal interface)

Module 5: Dyspnea (lung and pleura)

Clinical scenario: Female, 62, with COPD and previous episodes of CHF presents with dyspnea.

Objective #1. Probe choice

- Choose an appropriate probe for imaging the lungs

Objective #2. Patient position and scanning technique

- Assume appropriate patient and sonographer position for imaging the lungs

Objective #3. Anterior chest view

- Identify the soft tissues of the chest wall, the ribs, and rib shadows on an anterior chest view using a linear probe. Understand how shadow artifacts below ribs are generated
- Lung sliding
    - Identify the pleura on an anterior chest view using a linear probe
    - Recognize and define lung sliding on an anterior chest view
- A-lines
    - Be able to identify an A-line on an anterior chest view
- B-lines
    - B-lines can sometimes be seen in normal models, particularly over the posterolateral chest. Find a B-line, and define its characteristics

Objective #4. Posterolateral chest view

- Identify the diaphragm over the posterolateral chest using either a phased array or curvilinear probe
- Note that the diaphragm is curvilinear, concave-caudally, hyperechoic (white on the ultrasound screen), and descends (moves caudally) during inspiration, and ascends (moves cephalad) during expiration
- Identify and understand what forms the "curtain sign" as the model breathes in

Pathology

- Discuss the usefulness of lung sliding in the context of pneumothorax (PTX)
- Describe the appearance of pleural effusions and know where they accumulate
- Discuss the use of "lung profiles" in diagnosing patients with dyspnea
- Discuss the appearance of paradoxical breathing with lung ultrasound

Module 6: Chest pain and dyspnea

Clinical scenario: Male, 80, has increasing dyspnea and chest pain

Building on Module E, "dyspnea" we will introduce the integration of the lung, heart, and IVC assessment

Objective #1. Probe choice

- Choose an appropriate probe for imaging the heart

Objective #2. Patient position and scanning technique

- Assume appropriate patient and sonographer position for imaging the heart and IVC

Objective #3.Heart and IVC

- Generate both a subxiphoid and a parasternal long view of the heart

- Identify the RV, LV, RA, LA mitral and tricuspid valves (RA not seen on PSL)

- Discuss estimating gross LV function

- Discuss the RV/LV ratio and its significance

- Identifying IVC in transverse and sagittal plane. Measure IVC size and respiratory variability

Pathology

- Discuss integrating an assessment of global LV function, RV:LV ratio, IVC size and variability, lung profiles, and pleura in patients with chest pain and dyspnea

Module 7: Swollen leg

Clinical scenario: Male, 50, with lung cancer and a swollen leg

Objective #1. Probe choice

- Choose an appropriate probe for imaging the veins of the lower limb

Objective #2. Patient position and scanning technique

- Assure appropriate patient and sonographer position for imaging the veins of the lower limb.

Objective #3. Imaging the common femoral vein (CFV) in transverse plane moving caudally

- Compress the CFV every centimeter between the junction of the greater saphenous vein and the CFV, and the confluence of the deep femoral and femoral veins as they form the CFV

Objective #4. Imaging the popliteal vein in transverse plane

- Identify the popliteal vein in the transverse plane as high up the popliteal fossa as possible
- Compress the popliteal vein every centimeter between the most cephalad point in the popliteal fossa until the vein enters the calf

Pathology

- Learn the ultrasonographic appearance of a deep venous thrombosis