

## PERIOPERATIVE ULTRASOUND

### THE ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF CANADA *Objectives of Training and Specialty Training Requirements in Anesthesia*

#### Specific Objectives in CanMEDS Format

#### OVERALL GOALS

Residents completing a one block elective will gain an understanding of the role of point-of-care ultrasound examination in perioperative patients. This will encompass the role of ultrasound as a diagnostic modality in patients with cardiorespiratory failure, as well as its use as an extension to perioperative physical examination. Residents are expected to develop the basic image acquisition and interpretation skills to perform an ultrasound assessment independently.

By the end of the rotation, residents are expected to have completed the following number of overviewed examinations:

- 1) 40 focused cardiac ultrasound examinations
- 2) 15 lung & pleural ultrasound examinations
- 3) 5 gastric volume & content ultrasound assessments
- 4) 5 focused assessments with sonography for trauma (FAST scans)

#### Medical Expert

##### A. *Ultrasound Physics, Cardiorespiratory Anatomy & Physiology*

The resident is expected to:

- Understand basic ultrasound physics and artefacts.
- Describe the relevant sono-anatomy of the heart, lung, pleura, and abdominal structures.
- Discuss the important aspects of cardiac and respiratory physiology that relate to normal ultrasound findings.

##### B. *Perioperative Diagnostic Ultrasound*

The resident will be able to:

- Describe the indications and limitations of point-of-care ultrasound as a perioperative diagnostic modality.
- Select the correct settings and appropriate probe for ultrasound examination.
- Obtain focused cardiac ultrasound views, perform a basic 4-point lung and pleural ultrasound examination, use ultrasound to assess gastric contents, and determine the presence of free fluid in the abdomen

- Understand the basic concepts, limitations, and potential applications of M-mode, pulse-wave, continuous-wave, and color flow Doppler, in answering specific clinical questions in the perioperative setting.
- Appreciate the impact of ultrasound findings in altering perioperative patient management.
- Identify specific sonographic features of conditions that might contribute to cardiorespiratory failure (hypovolemia, distributive shock, left ventricular/right ventricular failure, significant valvulopathies, pericardial/pleural effusions, pulmonary edema, lung consolidation, and pneumothorax).
- Confirmation of endotracheal intubation, identification of the cricothyroid membrane, and performing deep venous thrombosis ultrasound assessments are optional, and not considered core elements of this rotation.

### **Communicator**

Effective communication skills will be discussed, encouraged, and expected at several levels.

- A. Between the resident and the attending perioperative point-of-care ultrasound consultant:
  - For each case, the resident will discuss the ultrasound findings, clinical context, and possible implications for perioperative patient management with their attending consultant.
- B. Between the resident and the patient:
  - The resident will discuss the indications for ultrasound examination and obtain informed consent. The resident will also obtain patient consent for scans being done solely for educational purposes. If unexpected abnormalities are encountered, the resident will inform the patient after reviewing with the findings with the consultant.
- C. Between the resident and the surgical and anesthesia teams:
  - When appropriate, the resident will provide a brief report to the surgical and anesthesia teams involved in perioperative patient care. After consulting with the attending, the resident will then come to an agreement with the primary care team on the best course of action.



## Collaborator

Residents are expected to collaborate with health care teams and allied health staff throughout this rotation. This will be emphasized through multiple areas.

- Recognize their limitations when scans are challenging or inconclusive, and seek consultation from medical experts in this field and other disciplines where appropriate.
- Learn how to advise other physicians in an oral format on ultrasound findings in which the resident has developed expertise.
- Foster healthy team relationships with allied health staff in situations where patient management is altered or follow-up testing is needed.

## Professional

Residents must:

- Always demonstrate respectful and compassionate behavior toward patients, their families, and other health care providers.
- Prioritize clinically indicated ultrasound examinations, where intervention may be required, over educational scans.
- Remain calm and organized in stressful or emergency situations.
- When appropriate, participate through attendance, interaction, and presentation at educational sessions including departmental and resident rounds.

## READING LIST

1. Online modules: <http://www.caeiccu.com/courses>  
Modules are to be completed by residents during the block. A username and password will be provided at the start of the rotation.
2. Textbook: POINT OF CARE ULTRASOUND by Nilam J Soni, Robert Arntfield, Pierre Kory. August 26, 2014.  
A copy of this book will be provided, by our department's librarian, to be returned at the end of the rotation. An additional copy is available in the anesthesia library (University Hospital) for in-hospital reading.
3. FOCUS and standard transthoracic echo views:  
<https://pie.med.utoronto.ca>  
Gastric volume and/or content ultrasound assessments:  
<http://gastricultrasound.org/>