ECCU2
Advanced Apps

Fall ECCU Festival
PoCUS Conference and Advanced Applications Course

Point-of-care ultrasound in full Technicolor

- Day 1
  - International PoCUS experts
  - Clinical PoCUS hot topics
    - Shock, Gastrointestinal, MSK, Lung, Critical Care and New Technology
  - Top PoCUS research
  - IP2 Resuscitation stream lectures

- Day 2
  - The ECCU 2 Advanced Apps course
  - Small groups, Hands-on training
    - Resuscitation PoCUS
    - Cardiac, Lung, Shock
    - Diagnostic PoCUS
    - Biliary, Renal, DVT, Ocular
    - MSK / Needle Guidance
    - Fractures, Nerve Blocks
    - CEUS IP2 approved

Day 1 only - $200 CAD
Day 1 and 2 - $1750 CAD (includes all meals and accommodation)

September 25-26th 2015
The Algonquin Resort, St. Andrews by-the-Sea, NB, Canada

For more information Contact:
canada@emergencyultrasound.net
Apply online: http://eccufest.com

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ECCU2

- Course and Conference Delegates
- Resuscitation Stream Lectures
- 15:30 - Coffee - 15:45
Advanced PoCUS?

- Point of Care Ultrasound
  - FAST (1993)

- Emergency Medicine - AAA, Obs, Cardiac, etc

- Other Specialties

- Evolving Curricula - Basic -> Advanced
EM PoCUS Curricula

- Basic / Core / Introductory / Primary / Resident

- CEUS
- RCEM
- ACEP
- CAEP
- IFEM
PoCUS Curricula

• Basic / Core / Introductory / Primary / Resident

• CEUS

• RCEM

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Percentage of programs that provide instruction in selected ultrasound modalities.

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FAST  AAA  Resident
Basic Cardiac  Obstetric  eFAST
Echo in Life Support  Vascular Access
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IFEM Point-of-Care Ultrasound (PoCUS)

Curricula should include details of the following

PoCUS Applications to be included

Methodology of training for each application

Demonstration of how to generate and optimize an image

Introduction to application (introductory course, on-line learning etc.)

CORE selection of applications (mandatory)

Gaining experience for each application (scanning real patients, simulation, fellowship programs etc.)

ENHANCED selection of applications (optional)

Achieving competency & credentialing for each application (flexible to local circumstances)

Demonstration of good practice in CPU (mandatory application)

Keeping up skills & knowledge (continuous quality improvement)

Diagnostic applications

- Single area to be evaluated
  - e.g. is there an abdominal aortic aneurysm
  - Multiple areas to be evaluated
  - e.g. what is the cause of shock

Procedural applications

- e.g. vascular access, nerve blocks, thoracocentesis

- Applications should be chosen to compliment local EM practice
- Every national/region body will decide what CORE & ENHANCED applications should be included based on factors such as disease prevalence, impact of disease, patient benefit, practical considerations etc.
- Each application should include:
  - What it is and potential benefits
  - Equipment requirements
  - Knowledge of anatomy/pathology
  - Technique/skills requirement

© 2013 IFEM
PoCUS Curricula

- Advanced / Extended / Enhanced
  - CEUS
  - CAEP
  - ACEP
  - RCEM
  - IFEM
PoCUS Curricula

- Advanced / Extended / Enhanced
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Competency ?

• Image Acquisition
• Image Interpretation
• Clinical integration of findings into patient management decision-making

IFEM 2014
Becoming Competent

• Training
  • Introductory Courses
  • Residency (structured) vs Practice Based (unstructured)
  • Supervised experience

• Self-Directed Learning

• How many scans are required to become competent?
Learning Curve

- We don’t know how many are required for PoCUS…
- Evidence from Endoscopy…supportive
- But individual variation exists
PoCUS Numbers?

- After statistical analysis
- “Performing up to 50 scans had little effect on accuracy”

### Table: Learning Curve of Resident Physicians Using Emergency Ultrasonography for Cholelithiasis and Cholecystitis

<table>
<thead>
<tr>
<th>Finding</th>
<th>Sensitivity, % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cholelithiasis (n = 864)</strong></td>
<td></td>
</tr>
<tr>
<td>All EUS examinations (1,837)</td>
<td>84 (81–86)</td>
</tr>
<tr>
<td>Examinations 1–10 (904)</td>
<td>83 (80–86)</td>
</tr>
<tr>
<td>Examinations 11–20 (458)</td>
<td>79 (74–84)</td>
</tr>
<tr>
<td>Examinations 21–30 (273)</td>
<td>85 (78–90)</td>
</tr>
<tr>
<td>Examinations 31–40 (120)</td>
<td>95 (85–99)</td>
</tr>
<tr>
<td>Examinations 40–75 (82)</td>
<td>91 (78–97)</td>
</tr>
<tr>
<td><strong>CBD dilation (n = 156)</strong></td>
<td></td>
</tr>
<tr>
<td>All EUS examinations (1,837)</td>
<td>40 (33–49)</td>
</tr>
<tr>
<td>Examinations 1–10 (904)</td>
<td>42 (31–55)</td>
</tr>
<tr>
<td>Examinations 11–20 (458)</td>
<td>39 (25–55)</td>
</tr>
<tr>
<td>Examinations 21–30 (273)</td>
<td>32 (17–52)</td>
</tr>
<tr>
<td>Examinations 31–40 (120)</td>
<td>40 (14–73)</td>
</tr>
<tr>
<td>Examinations 40–75 (82)</td>
<td>67 (24–99)</td>
</tr>
</tbody>
</table>
PoCUS Numbers?

- Parasternal views were the easiest to obtain
- IVC were the most difficult
- Trend towards improvement at > 46 scans

<table>
<thead>
<tr>
<th>No. of US completed</th>
<th>IVC</th>
<th>PSL</th>
<th>PSS</th>
<th>Apical</th>
<th>Subcostal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11-25</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>26-45</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>40+</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Total (all)</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>2</td>
<td>12</td>
</tr>
</tbody>
</table>

IVC = inferior vena cava; PSL = parasternal long axis; PSS = parasternal short axis; US = ultrasounds.

Numbers

- CEUS
- RCEM
- ACEP
- CAEP
- IFEM

50 AA
25 Core
No minimum
150 Total
20 Renal
40 Gallbladder

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Competency Assessment

- Review of Training
- Review of Logbook
- Written Test
- Video Exam
- Bedside Assessment
Competency A - Focussed Assessment of the Aorta (AAA)

Guidance

Please follow this guidance as closely as possible to ensure consistency between assessors. Ability to enter details, save image/clip and optimize environment only needs to be done once if multiple competencies are being assessed.

1. “What are the core indications?”
   - e.g. any pt. suspected of having AAA, Elderly pt. with back pain or suspected renal colic, unexplained hypotension. Any questionable indications should be challenged.

2. Demonstrates familiarity with the machine controls and transducer handling.

3. Demonstrates an ability to enter patient details as per EDPoCUS policy.

4. “This 70yr old patient presents with hypotension and back pain”

5. “Please show me the views you would use to assess the abdominal aorta”

6. Starts with or increases to enough depth to visualize the vertebral body.

7. “Please point out the structures you can identify”
   - Must be able to correctly identify vertebral body, aorta, aorta bifurcation, IVC.
   - May point out other structures e.g. SMA, splenic vein, etc.

8. If they fail to mention any of the above structures then ask them to identify it.

9. “How could you improve your image?”
   - e.g. firm transducer pressure to displace bowel gas, side view, longitudinal view

10. “Please measure the diameter of the aorta”

11. “What is the maximum diameter of a normal aorta?”
    - 3cm

12. “What are the pitfalls of measuring the aorta?”

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Competency Assessment

Name: __________________________
Assessor: _______________________
Date: __________________________

Logged Experience: number of scans (circle) 10 25 50+ Number: ______
Experience certified as evidenced by: ________________________________ (signed by Assessor)

<table>
<thead>
<tr>
<th>Competency component</th>
<th>Trainer’s comments recorded during the assessment</th>
<th>Competent?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Preparation for the scan</td>
<td>Greet the patient appropriately and identify the patient. Demonstrate appropriate attitude and professional manner</td>
<td>Yes □ Prompted □ No □</td>
</tr>
<tr>
<td>Knowledge of core indications</td>
<td>Yes □ Prompted □ No □</td>
<td></td>
</tr>
<tr>
<td>Positions the patient correctly and ensures appropriately darkened environment</td>
<td>Yes □ Prompted □ No □</td>
<td></td>
</tr>
<tr>
<td>2. The scan</td>
<td>Sets up the equipment acceptably.</td>
<td>Yes □ Prompted □ No □</td>
</tr>
<tr>
<td>Probe selection, handling and scanning technique</td>
<td>Yes □ Prompted □ No □</td>
<td></td>
</tr>
<tr>
<td>Identifies Vertebral Body/Shadow</td>
<td>KEY STEP</td>
<td></td>
</tr>
<tr>
<td>Identifies Aorta in TS (LS optional)</td>
<td>KEY STEP</td>
<td></td>
</tr>
<tr>
<td>Identifies IVC</td>
<td>KEY STEP</td>
<td></td>
</tr>
<tr>
<td>Measures AP diameter of aorta accurately</td>
<td>Yes □ Prompted □ No □</td>
<td></td>
</tr>
<tr>
<td>Thoroughness (subxiphoid to bifurcation) Efficiency / Speed of scan</td>
<td>Yes □ Prompted □ No □</td>
<td></td>
</tr>
<tr>
<td>Saves/print/documents (As per local policy)</td>
<td>Yes □ Prompted □ No □</td>
<td></td>
</tr>
<tr>
<td>3. Post scan</td>
<td>Appropriate interpretation of the findings</td>
<td>Yes □ Prompted □ No □</td>
</tr>
<tr>
<td>Integrates information correctly into clinical scenario (Defines AAA)</td>
<td>Yes □ Prompted □ No □</td>
<td></td>
</tr>
</tbody>
</table>

Competency Level

<table>
<thead>
<tr>
<th>Guide</th>
<th>Level</th>
<th>Assessor (Print and Sign level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtually no prompting required</td>
<td>A. Competent to teach AAA</td>
<td></td>
</tr>
<tr>
<td>Some prompting required</td>
<td>B. Competent to scan and interpret findings independently</td>
<td></td>
</tr>
<tr>
<td>Significant prompting required</td>
<td>C. Needs Supervision. If scanning alone cannot rely on negative findings</td>
<td></td>
</tr>
</tbody>
</table>

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• Advanced Application Tracks
  • Resuscitation
  • Diagnostic
  • Musculoskeletal
• Each Track can be completed independently of each other
• IP1 to become “Core Track”
• CEUS ‘Track’ Provider
  • Core +/- any or all of the other tracks
  • Can supervise / sign-off on apprentice scans within their provider tracks

• CEUS Instructor
  • Full CEUS Provider -> Apprentice Instructor -> CEUS Instructor
  • Can proctor exams, organise courses
  • Practice-eligible Instructors e.g ICU, Cardiology, Sports Med, etc - Exam - Can supervise and sign-off on apprentice scans within their area of practice
CEUS IP2 - AdApps

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CEUS IP2 - AdApps

- Complete CEUS a recognised introductory course
- Register with CEUS for apprenticeship in chosen track or tracks
  - Minimum number of scans for each component of each track
  - Half supervised by IP2 instructor
  - Half as a training portfolio (recorded clips and case analysis)
- < 18months
CEUS IP2 - AdApps

- Competency Assessment
  - Online MCQ examination
  - Visual exam
  - Bedside practical
• Resuscitation Track
  • Cardiac
  • IVC
  • Lung / Pleura

<table>
<thead>
<tr>
<th>Advanced EDUS Applications</th>
<th>Number of examinations</th>
<th>Positives One of each of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP2 Resuscitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac PLAX, PSAX, A4C, SC</td>
<td>50 patients (25 directly supervised)</td>
<td>PCE, RV Dilation, LV Failure, Hyperdynamic LV</td>
</tr>
<tr>
<td>IVC- (spont, breathing or ventilated)</td>
<td>10 patients (5 directly supervised)</td>
<td>N/A</td>
</tr>
<tr>
<td>Lung/Pleura</td>
<td>20 patients (10 directly supervised)</td>
<td>Pneumothorax, Interstitial fluid, Pleural effusion</td>
</tr>
</tbody>
</table>
CEUS IP2 - AdApps

- Diagnostic Track
  - Gallbladder
  - Renal
  - DVT
  - Ocular

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<tr>
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<th>Number of examinations</th>
<th>Positives One of each of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP2 Diagnostic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gallbladder (Hepatobiliary)</td>
<td>40 patients (20 directly supervised)</td>
<td>Cholelothiasis, Cholecystitis,</td>
</tr>
<tr>
<td>Renal</td>
<td>20 patients (10 directly supervised)</td>
<td>Mild, moderate and severe hydronephrosis</td>
</tr>
<tr>
<td>Bladder</td>
<td>5 patients (3 directly supervised)</td>
<td>N/A</td>
</tr>
<tr>
<td>DVT</td>
<td>20 patients (10 directly supervised)</td>
<td>Thrombus in: Femoral vein, Greater Saph. Vein, popliteal vein,</td>
</tr>
<tr>
<td>Ocular</td>
<td>20 patients (10 directly observed)</td>
<td>Vitreous hemorrhage, retinal detachment, globe rupture</td>
</tr>
</tbody>
</table>
CEUS IP2 - AdApps

- MSK Track
- Fractures
- Joints
- DVT
- Soft Tissue

<table>
<thead>
<tr>
<th>Advanced EDUS Applications</th>
<th>Number of examinations</th>
<th>Positives One of each of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP2 MSK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fractures</td>
<td>30 scans (10 directly supervised)</td>
<td>Long bone fractures, Boxer’s fracture, Smiths/Colles, Sternum</td>
</tr>
<tr>
<td>Dislocations</td>
<td>6 (3 directly supervised)</td>
<td>Anterior and Posterior shoulder dislocation</td>
</tr>
<tr>
<td>Joints</td>
<td>20 scans (10 directly supervised)</td>
<td>Joint effusion of elbow, knee, ankle, hip</td>
</tr>
<tr>
<td>Skin/soft tissue</td>
<td>20 (10 directly supervised)</td>
<td>Cellulitis/edema/abscess/seroma or hematoma</td>
</tr>
<tr>
<td>Foreign Body</td>
<td>5 scans (2 directly supervised)</td>
<td>Foreign body (metallic or organic)</td>
</tr>
<tr>
<td>Lymph node</td>
<td>5 (3 directly supervised)</td>
<td>Lymph node with normal/inflamed architecture</td>
</tr>
</tbody>
</table>
ECCU2

- Resuscitation Track
  - Cardiac
  - IVC
  - Lung
  - Simulator

### ECCU 2 Advanced Apps Course

#### Overview ECCU2 Lectures

<table>
<thead>
<tr>
<th>Time</th>
<th>Lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:00 - 14:15</td>
<td>Introduction to ECCU Advanced Apps</td>
</tr>
<tr>
<td>14:15 - 14:45</td>
<td>Resuscitation Views</td>
</tr>
<tr>
<td>14:45 - 15:10</td>
<td>My Patient is Shocked</td>
</tr>
<tr>
<td>15:10 - 15:30</td>
<td>My Patient is Breathless</td>
</tr>
<tr>
<td>15:30</td>
<td>Coffee</td>
</tr>
</tbody>
</table>

#### Resuscitation Stream Workshops

<table>
<thead>
<tr>
<th>Station</th>
<th>Stream 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station 1</td>
<td>Cardiac Views (Each Stream in Station 1 has 2 machines)</td>
</tr>
<tr>
<td>Station 2</td>
<td>IVC, Lung Views</td>
</tr>
<tr>
<td>Station 3</td>
<td>Patient / Sim – Stream 1 starts with patient then moves to Sim after 20 mins, Stream 2 is vice versa.</td>
</tr>
</tbody>
</table>
ECCU2

- Diagnostic Track
  - Gallbladder
  - Renal
  - DVT
  - Ocular
  - Simulator

Overview ECCU Lectures

<table>
<thead>
<tr>
<th>Time</th>
<th>Lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30-09:05</td>
<td><em>My Patient has Abdo Pain (GB/Renal)</em></td>
</tr>
<tr>
<td>09:05-09:20</td>
<td><em>My Patient has a Swollen Leg</em></td>
</tr>
<tr>
<td>09:20-09:30</td>
<td><em>My Patient has Reduced Vision</em></td>
</tr>
</tbody>
</table>

Diagnostic Stream Workshops

<table>
<thead>
<tr>
<th>Station</th>
<th>Stream 1</th>
<th>Stream 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abdo Views (GB / Renal) (Each Stream in Station1 has 2 machines)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>DVT / Ocular</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Patient (Gallstone)/ Sim – Stream 1 starts with patient then moves to Sim after 20 mins, Stream 2 is vice versa.</td>
<td></td>
</tr>
</tbody>
</table>
- **MSK Track**
- **Fractures**
- **Joints**
- **Soft Tissues**
- **FB’s**
- **Nerve Blocks**
- **Needle Guidance**