Integrating Ultrasound Curriculum into the Clinical Years

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Challenges with Ultrasound integration into the clinical rotations

- Real Patients/Real Problems
- Liability/Supervision
- Real standards of care - CMS
- Impressions- “Formal Scan” vs. ”Informal Scan?”
- Educational Scans- Informing patients, scripts of the intent of scan-education. Need for confirmatory testing during probationary period
- EHR –Charting- How to document? What to document? Should you document?
- Confirmatory Studies
Ideal Clinical Exposure

• Each Specialty has Scope of Practice with ultrasound
• Residents perform scans on rotations
• Attending physicians reinforce best practice and competency in ultrasound
• Each rotation has access to equipment/protocols/personnel to teach
2020 Vision for Sonology

- Standard Education with Ultrasound
- Standards for years of training (e.g. Med 1-4, PGY 1-3, fellows, attendings in multiple specialties)
- Early Integration into educational framework
- Link Researchers, Basic Scientists, with Clinicians/Sonographers/Sonologists

- Standards for Ultrasound at UME/GME/MOC levels
- **UME**- Undergraduate Medical Education LCME
- **GME**- Graduate Medical Education ACGME
- **MOC**- Maintenance of Certification- ABMS
Bedside Ultrasound- Ultrasonology

• Preclinical
• Clinical
• Advanced Competency

• Basic Skills

• I AIM$^1$  Indications/Acquisition/Interpretation/Medical Decision Making

• Clinician Performed Focused Bedside Scans


I-AIM: a novel model for teaching and performing focused sonography.

Bahner DP$^1$, Hughes D, Royall NA.
Ultrasound Anatomy and Physiology in Clinical Scenario’s

• Is that a vessel? Is it a vein? Is it an artery?

• Is the heart beating? What is the size of the chambers?

• Is the IVC full? Is it collapsible?

• Is there fluid in that potential space?
Anatomy and Physiology in Primary Care

• Is the aorta dilated?

• Is there a baby and does it have a heart beat?

• Is this a soft tissue injury, fluid collection?

• Can I monitor this patient’s condition?
Flexnerian Medical Education + Ultrasound

- Years 1 and 2
- Years 3 and 4
- Preclinical
- Clinical
- Knowledge
- Practice
- Indication Acquisition
- Interpretation/Medical Decision Making
The Story at OSU

- Differentiation of Care (DOC) –Clinical years/rotations
- The Undifferentiated Patient (EM) – SHOCK
- Integration of Ultrasound into SHOCK assessment
- TRINITY- A hypotensive ultrasound protocol
- Evidence Based Learning- Teaching 1\textsuperscript{st} years to focus on academics – Clinical experiences - Education grand rounds Research projects - Administration of programs
- Ultrasound taught to first years TRINITY \textsuperscript{1}
- BQUIET\textsuperscript{2} used as a quality tool for obtaining images

DOC 1 Workshop Ultrasound in Shock

- Cardiac windows and normal/abnormals
- Abdominal Aorta views
- FAST hands on practice/clinical scenarios
- Volume Assessment of IVC collapsibility
- Practical Hands On Stations/Checklists
- Exposure to ultrasound best practice
Pericardial Effusion
Patient Safety- Vascular Access
Clinical Rotations- 3rd Year

- Enhanced Ultrasound Experience
- MULTI- responsible students: peer to peer ultrasound instruction in skills lab during rotations

- CSIE- Skills Immersion- Intro to Ultrasound Basics
- Core Rotations- Medicine, Surgery, OB, Peds, Neuro, Psych.
- Electives – ENT, Urology, Emergency, Radiology
US ICU Rounds

• Students/Residents/Fellows/Attendings
• Interesting Cases in the Unit
• FATE Exam/Fluid Detection/Volume Status
• Real time scanning focusing on positioning/preparing/troubleshooting
• Examine Findings/Review Case/Compare and Contrast with normal signatures

• Debrief turns into email summary to participants
Integrate ultrasound into a 4\textsuperscript{th} year longitudinal elective

- Longitudinal Elective- Advanced Competency
  - Meet monthly to administrate curriculum
  - Curriculum – Asynchronous/Synchronous/Hands On

- Project- Geared toward Specialty Interest
  - Education projects- LSI part 1 Anatomy Blocks
  - Clinical Projects- ICU Rounds
  - Surveys
  - Technology - @ EDUltrasound, @ Edultrasound Q/A POCUS App

\textbf{Acad Med.} 2013 Feb;88(2):206-13. \textit{Advanced ultrasound training for fourth-year medical students: a novel training program at The Ohio State University College of Medicine.} Bahner DP, Royall NA.
One month/3, 2, 1 Week Rotation

• Curriculum of online material/quizzes/surveys
• QA review with residents and fellow
• Clinical Time with Ultrasound Team
  – Emergency Department
  – Simulation Lab
  – ICU-MICU/SICU/Cardiothoracic
• Cadaver Lab
  – Procedural Competency
How to get ultrasound training, reinforcement, opportunities to scan into the Clinical Rotations

• Mentors for students
• Using ultrasound in the clinical setting
• Supervision/Expertise
• Barriers: Equipment/Liability
• Overcome Inconvenience of compliance system to perform, save, document point of care ultrasound images
Difficulty getting Attendings to learn Ultrasound

“Teaching an old dog new tricks”

• Motivation/Dedication to Sonology
• Ambiguity of competency _How many does it take to gain competency/proficiency in various fields?
• Attendings to get Credentialed- Compliance
• Compliance of Process- Privileges/Supervision
  – Indications for exam
  – performing and saving exams
  – documenting exam
  – quality assurance
Train the Trainers

- Basic Course (4, 8, 16 hour)
- Objectives/Timeline
- Online Material/Surveys, Content, Exams/quizzes, Tracking – Digital Portfolio
- Refresher Course – Periodic/Scheduled
- Recertification/Recredentialing
- Adult Learning Strategies – Online Pedagogy+
  Flexible synchronous opportunities- Skills lab
  Deliberate Practice
Local Experience- Columbus Ohio

- Community of Practice
- Faculty/Residents/Students/Sonographers/Others
- Focused on Content Area/Expertise/Mentorship
- Academic Goals- Clinical Care/Education of Operators-learners/Research of new knowledge/ Administration of Innovation/Quality/Safety
- Framework for groups to start the crucial conversations to implement ultrasound
Communities of Practice

- MSK
- Critical Care
- Procedural
- OB/GYN
- Anesthesiology
- Others – Education, Research
Emergency Medicine

• Embedded in their practice and clinical experience on the rotation- Students observe ultrasound used for 11 indications and performed in all traumas and most critically ill patient’s care
• QA process to participate in review, education
• Simulation lab with phantoms and TSUP models
• Online materials in lectures, test banks, images, tweets, apps, websites, and learning management systems
Current Challenges - Locally

• US Simulation Experience- Top Notch
• Clinical Experience- Sporadic exposure to equipment/supervision/instruction with bedside ultrasound
• More Consistent residency experience with central venous access in the use of US but still with variability in standard technique of procedure
• Increasing places with new operators/clinicians using ultrasound but needs coordination
Clinical Rotations

• Use Community of Practice concept to invoke engagement from faculty
• Use resident and student governance of “faculty development” to research academic advancement with ultrasound
• Clinical Rotations are opportunities to implement —clinical service US with real patients
• Logistics of implementing students into patient care where supervision has not kept pace?
Lead Serve Inspire Curriculum at OSU 2012

- LSI 1
- LSI 2
- LSI 3
- Advanced Competency
- Gradation of Core Enriched Competency
What You Need To Know

Clinical Applications

• Ground School

• Rings organized for integration of clinical experiences

• Small group activities facilitate application of clinical and foundational science concepts

• Longitudinal Projects
Part Three
Advanced Clinical Management

- Advanced Management in Hospital Based Care
- Advanced Management in Ambulatory & Relationship Centered Care
- Advanced Competencies Track
- Advanced Clinical Track
- Elective
- Flex
- Intersession

- Four week thematic rotations in association with advanced competencies & advanced clinical experiences
- Elective time for international & away experiences
Ground School

- Introduction to Clinical Scanning
- Patient/Probe/Picture/Protocol
- Knobology
- Probe Motion
- Image Interpretation

- Basic Skills-Knobology/Scanning
- Vascular Access
  - NALTA
    - North Star
    - Angle
    - Leap Frog
    - Tenting
    - Aspiration
Enriched Competency

• CardioVascular
• Fluid Collections
• FAST
• FATE
• AAA screening
• SOFT TISSUE
• Specialty Specific

• Knobology
• Scanning
• Peer to Peer
• Proctor to Student
• Separation by skills
• Opportunities for Advanced Study
Distribution- clinical years

- Ground School- Basic Skills
  - Small Groups
- Lecture/Hands On
- Proctor/Model/Equipment
- Protocol/Articulate Online modules

- Handouts
- Guides
- Links/Social Media
- Checklists
- Quizzes
- Tracking
Flipped Classroom

• Come prepared
• Preassigned Requirements
• Online preparation
• Performance of skills
• Competency based on attitude/knowledge/skill
Advice

• Collaborate with other local experts
• If possible, align basic scientists with clinicians- Cadaver labs- procedures
• Let the clinical challenges and barriers be the stimulus for new ideas to provide better care and opportunities for students
• Coordinate the preclinical and clinical UME US goals
Clinical Scans not used for Medical Decision Making

- Patient consent for an EDUCATIONAL scan
- Site specific number not linked to patient/personalized health information (PHI)
- Saved on server remote from patient records
- Able to be reviewed for education but not part of legal record.
Conclusions

Integration into Clinical Curriculum

• Find Way to prepare students to be ready
• Train the Trainers so able to supervise
• Maintenance of Certification in Ultrasound
• Student Learning best with Hands On
• Keep pushing the learning curve
• Ultrasound Competence is based on Deliberate Practice
• Administrate processes to ensure patient safety