Simulating Ultrasound Guided Biopsies in Ethiopia: Tips, Tools, and Pitfalls

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Global Health and Radiology: Emory-Black Lion Collaboration

Emory University has a long-standing collaboration with Black Lion Hospital (BLH), Ethiopia’s 800-bed teaching hospital and major referral center for the country of 85 million people.

With the help of faculty at Emory University, the Department of Radiology at Black Lion hospital was the first to pioneer image-guided procedures in the country. Despite this great accomplishment, image-guided procedures are only performed by trained faculty and residents rarely have the opportunity to practice. Therefore, in order to enhance resident training, the Department of Radiology and Imaging Sciences at Emory University developed a tissue simulation model to train the Black Lion Radiology residents to perform routine targeted ultrasound guided liver biopsies and cyst aspirations.

Spectrum of Disease

Ethiopia has diseases common to developing nations, such as malnutrition and infectious diseases (including tuberculosis, HIV, malaria), as well as an increasing prevalence of pathology traditionally more common in the first world, such as cardiovascular disease, cancer, and motor vehicle accident injuries.

Accurate diagnosis and staging of cancer is essential in improving survival rates; however, the radiographic appearance of various infectious and malignant hepatic pathologies can be nonspecific and histological diagnosis is frequently required to determine patient treatment and prognosis.

Ultrasound-guided FNA

Ultrasound is widely available in Ethiopia, even in the more rural areas where most graduating radiology residents will practice for at least two to three years. US guided FNA is a safe and effective procedure for tissue diagnosis. Avoiding complications, ultrasound readily performs US guided procedures, but there is no formal training program

Pitfalls

• Multiple incisions made into the beef livers with travel knife (3-inch blade)
• Kalamata olives were used to create the lesions
• Any organic matter to consider using are pimento filled olives
• Artifact: air induced while placing fluid filled object into the incision

Simulation Experience

A total of 12 residents volunteered to participate in the hands-on and didactic training. Each participant completed the educational module and performed the biopsy/aspiration successfully. Feedback from the residents and faculty were positive.

Following the training, information on how to set up the tissue model was requested from the chief residents from Black Lion Hospital and plans are being made for future training sessions for other residents.

Creating the Tissue Model

Solid Lesions:
• Multiple incisions made into the beef livers with travel knife (3-inch blade)
• Non-sterile gloves filled with water
• Finger compartments tied off and removed
• Artifact: air induced while placing fluid filled object into the incision

Cystic Lesions:
• Multiple incisions made into the beef livers with travel knife (3-inch blade)
• Non-sterile gloves filled with water
• Finger compartments tied off and removed
• Artifact: air induced while placing fluid filled object into the incision

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Conclusions

It is feasible to successfully train residents using tissue models for US-guided FNA. US-guided FNA biopsies and cyst aspirations are a cost-effective diagnostic method for interventional hepatic lesions. This skill has the potential to obviate the need for unnecessary invasive surgical procedures and expedite diagnosis in a safe and economical manner.

Our goal is to maintain this partnership with BLH and continue a meaningful bidirectional educational experience with residents from Black Lion Hospital and students from the Radiology Department that will provide the residents with the skills to perform the diagnostic ultrasound and US guided biopsy on a patient with faculty supervision.