Early Clinical Experiences Using a Novel Hands-Free Robotic Percutaneous Biopsy Device: A Single Center Study

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PURPOSE

Biopsy success is driven by target visualization and device placement, the latter of which can be influenced by challenging anatomic locations, target mobility secondary to respirations, and non-rigid deformity as a function of mechanical compression during device placement. The purpose of this study is to assess the early clinical experience of a single center, large academic institution with multiple operators performing hands-free percutaneous biopsies using the XACT ACE Robotic System (XACT Robotics, Ltd., Caesarea, Israel), an FDA-cleared novel device that combines imaging-based procedural planning with robotic navigation and non-linear steering capabilities.

METHODS

17 percutaneous biopsies were performed at Emory using XACT ACE Robotic System between 8/29/22 and 9/21/22

We report:
(1) Patient target organ
(2) Overall technical success as defined by achieving pre-procedurally planned target placement
(3) Accuracy of biopsy need tip-to-target distance as a function of target distance

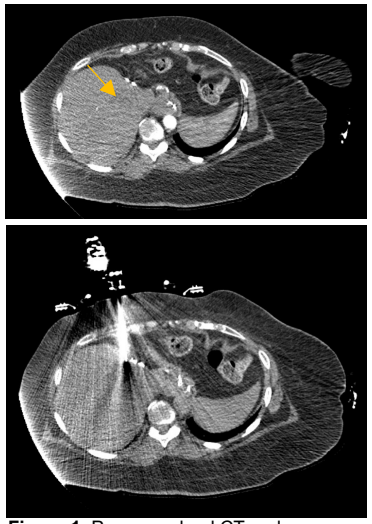


Figure 1. Pre-procedural CT and intraprocedural CT of robotic liver biopsy.

RESULTS

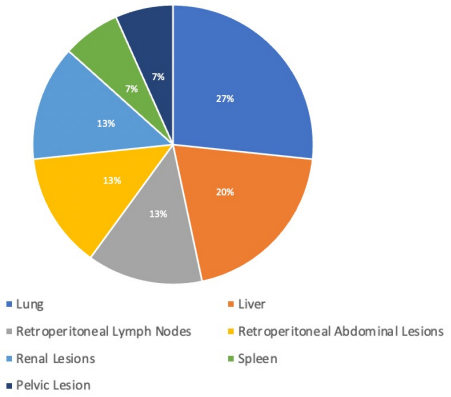


Figure 2. Distribution of anatomic sites attempted..

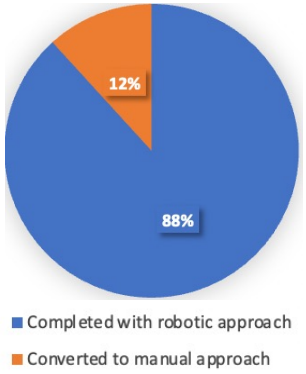
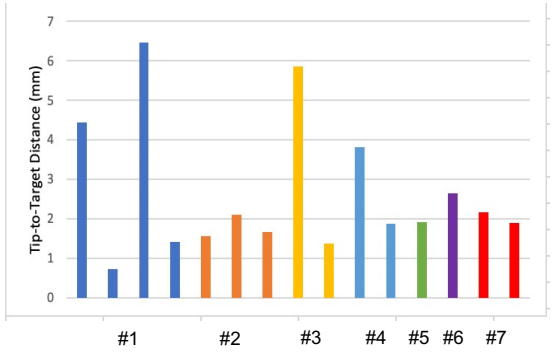


Figure 3. Technical success of robotic percutaneous attempt.



Legend	
#1	Lung
#2	Liver
#3	Retroperitoneal Lymph Node
#4	Retroperitoneal Abdominal Mass
#5	Spleen
#6	Pelvic Mass
#7	Renal

Figure 4. Tip-to-Target Distance by Target Organ

DISCUSSION

- Integration of a robotic percutaneous device into the clinical workflow of a large academic Interventional Radiology practice with success initial technical outcomes.
- Proper training and care should be taken in order to learn the proper setup of such devices to minimize set-up time and complications.
- Robotic percutaneous devices can be used to increase technical success in anatomically challenging biopsy procedures.

FUTURE DIRECTIONS

- **Expansion of robotic percutaneous devices to improve technical success in other procedures such as ablations.**
- **Examining inter-operator variability of integration of novel devices into the clinical workflow of busy practices.**

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