COMPARISON OF ULTRASOUND-GUIDED FINE NEEDLE ASPIRATION (USFNA) SKILLS ACQUISITION USING VARIOUS ENTRY APPROACHES

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ABSTRACT

In the current era of cost-effective medical care and patient satisfaction-based reimbursement, there is an increasingly recognized and expanding role for ultrasound-guided fine-needle aspiration (USFNA) in obtaining tissue diagnosis of head and neck masses. It is well-established that USFNA improves cytologic diagnostic accuracy, sensitivity, and positive predictive value and reduces the false-negative rate of FNA, facilitating correct diagnosis and conferring a cost-savings of $289 per additional correct diagnosis.1

Two techniques for guiding the needle into targeted structures predominate: the Longitudinal Approach directs the needle into a line that is along the long axis of the transducer (Figure 1.); the Transverse Approach directs the needle perpendicular to the long axis of the transducer (Figure 2.)2. The physics of US indicate that the beam width is relatively narrow, and the beam is transmitted along the long axis of the transducer. Therefore, theoretically, it may be more difficult to guide and visualize the needle and needle tip on the monitor using the Longitudinal approach.

The specific aims of this study were to determine which USFNA approach was (1) more comfortable for the USFNA user, (2) results in the shortest “time to-target” as visually confirmed by an observing US expert, and (3) results in the highest number of target “hits” and highest diagnostic yield as confirmed cytology review. An additional aim was to examined the utility of instruction on needle bevel identification as a subgroup of participants from each of the two needle approaches. The hypothesis was that the Transverse Approach and additional instruction on needle bevel identification would prove most efficacious.

INTRODUCTION

In the current era of cost-effective medical care and patient satisfaction-based reimbursement, there is an increasingly recognized and expanding role for ultrasound-guided fine-needle aspiration (USFNA) in obtaining tissue diagnosis of head and neck masses. It is well-established that USFNA improves cytologic diagnostic accuracy, sensitivity, and positive predictive value and reduces the false-negative rate of FNA, facilitating correct diagnosis and conferring a cost-savings of $289 per additional correct diagnosis.1

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METHODS & MATERIALS

A novel USFNA model was developed using pork shoulder and lima beans (Figure 3a.3b), which allowed for quantification of diagnostic yield (Figure 4.). Study flow proceeded as below:

1. Recruitment, Randomization
2. Complete Questionnaire & Survey
3. Watch 5th Technique Instructional Video
4. 3 attempts (capped at 30-sec) of Technique 5
5. Complete Comfort Survey for Technique 1
6. Watch 2nd Technique Instructional video, repeat 2x (i.e. Longitudinal, No Bevel or Transverse, No Bevel)
7. Compare,-complete Scorecard & Survey, Repeat
8. Complete Questionnaire & Survey

RESULTS

Participants

27 participants were recruited and completed test measures. The majority were medical students with no prior experience with USFNA.

Outcome Measures

1.Comfort Level Questionnaire (Subjective): Significant difference in mean “comfort level rating” favoring Longitudinal Approach over Transverse Approach (p = .019)
2.UltraSound Expert Visual Confirmation (Subjective): Significant differences in mean time-to-target with Bevel Identification (Mean = 13.93 sec) faster than No Bevel Identification (Mean = 17.33 sec) (p = .031)
3.Blinded Cytologic Confirmation (Objective): Mean rater counts and individual rater counts (i.e.”Hit” versus “No Hit”) showed no significant (p = .655) Diagnostic yield: not significantly higher using one technique versus another (p = .998)

CONCLUSIONS

It may be useful to be facile with several USFNA approach techniques: depending on the clinical application, each of the approaches studied here may have an advantage or provide an alternative orientation.

REFERENCES